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Tobacco Control in Brazil

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Human Development Department
Latin America and the Caribbean Region
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Health, Nutrition and Population (HNP) Discussion Paper

Tobacco Control in Brazil

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Abstract: The objective of this study was to assess the smoking situation in Brazil, and the role of the tobacco control program in curbing smoking in the country. Available evidence indicates that there was a significant decline in smoking and total cigarette consumption per adult since the early 1990s. However, smoking is more concentrated among the uneducated groups of the population, which may also be the poorer. Lung cancer rates during early adult life decreased among males between 1980 and 2004, but increased among females. From 1996 to 2005, there were over 1 million hospitalizations attributable to smoking, which cost about US$0.5 billion.

The government has already complied with many provisions of the WHO Framework Convention on Tobacco Control. The tobacco control program is considered very innovative, but it has mainly focused on non-price instruments. Brazil has laid a strong foundation for unprecedented public health gain. Modest additional action could yield substantial additional health gains by preventing premature death among the 21 million current smokers.

Price instruments may be used far more effectively, to build on the substantial program that has been implemented based on non-price instruments. A specific recommendation is twofold:

- In the short-term, return to the 1993 real price of cigarettes. This would involve an increase of 23 percent of the 2005 average price, or an increase of 118 percent on the 2005 average rate of IPI tax.

- In the longer-term, raise the percentage of retail price that comes from the IPI tax from about 20 percent to about 40 percent.

In conjunction with tax increases, the government should continue to counter illegal sales of cigarettes. More emphasis should be placed on the revitalization of the state and municipal tobacco control network, which requires additional financing. Finally, effective monitoring of the tobacco epidemic is needed.

Keywords: tobacco, smoking, public health, prices tax policy.

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ACRONYMS AND ABBREVIATIONS

ABIFUMO	Tobacco Industry Association
AIDS	Acquired Immune Deficiency Syndrome
AIH	Hospital Admittance Authorization
AMI	Acute Myocardial Infarction
ANVISA	National Public Heath Surveillance Agency
CDC	Centers for Disease Control and Prevention
CENEPI	National Coordination of Epidemiological Surveillance
CID	International Disease Classification
CNPq	Scientific and Technological Development Agency
CONICQ	National Commission for the Implementation of the Framework Convention for Tobacco Control and its Protocols
COPD	Chronic Obstructive Pulmonary Disease
CPS II	American Cancer Prevention Study
DALY	Disability-Adjusted Life Years
DNDCD	National Division for Chronic-Degenerative Diseases
EU	European Union
FCTC	Framework Convention on Tobacco Control
HIV	Human Immunodeficiency Virus
IBGE	National Institute of Statistics
ICD	International Classification of Diseases
IDCRM	Household Survey of Risk Behavior and Referred Morbidity
IHD	Ischemic Heart Disease
INCA	National Cancer Institute
IPI	Industrial Production Tax
MoH	Minister of Health
NCD	Non Communicable Diseases
OECD	Organization for Economic Co-operation and Development
POF	Household Budget Surveys
PPS	Prospective Payment System
PRONAF	Public Program to Support Family Agriculture
RR	Relative Risk
SAF	Smoking Attributable Fraction
SES	State Health Secretariats
SIDA	Swedish International Development Cooperation Agency
SIH	Hospital Information System
SRF	Secretariat of Federal Revenue
SUS	Unified Health System
WHO	World Health Organization

EXECUTIVE SUMMARY

Available evidence indicates that there was a significant decline in smoking in Brazil between 1989 and 2006. About two decades ago, the government launched a tobacco control program, with a marked acceleration of efforts since 1990, focusing on non-price interventions such as bans on advertising, restrictions on smoking in public places and other activities. Although the Brazil tobacco control program is considered one of the most comprehensive in the developing world, no formal evaluation has been carried out.

The objective of this study was to assess the smoking situation in Brazil, and the role of the tobacco control program, and compare it to experience in other countries. The study assessed key trends in smoking rates and lung cancer in Brazil, and reviewed price and non-price interventions. A discussion of fiscal instruments and smuggling is also included in this report.

Evidence gathered by the study indicates that in Brazil:

- **Smoking prevalence decreased significantly between 1989 and 2006**. In 2006, about 20 percent of males and 13 percent of females smoked in the main cities. Smoking prevalence among adults in state capitals ranged from a low of 9.5 percent in Bahia to 21.2 percent in Porto Alegre and Rio Branco.
- **Smoking is more concentrated among the uneducated groups of the population**, which may also be the poorer. There is a 1.5-2 fold higher prevalence of smoking among those with little or no education as compared to those with more years of schooling.
- **Total cigarette consumption per adult also decreased significantly, but has stabilized in recent years**. Legal and illegal sales of cigarettes decreased from 1,700 cigarettes per year in 1990 to 1,175 cigarettes in 2003-2005.
- **In metropolitan areas, the percentage of households with smokers decreased** from 34 percent in 1995-96 to 27 percent in 2002-2003. The proportion of tobacco expenditures in total household expenditures also decreased from 3 percent in 1995-96 to 2 percent in 2002-03.
- **Lung cancer rates during early adult life decreased among males between 1980 and 2004, but increased among females**, which may be related to smoking cessation among men, and increased smoking among women.
- **From 1996 to 2005, there were over 1 million hospitalizations attributable to smoking**. **Tobacco-related hospitalizations cost about US$0.5 billion**, or 1.6 percent of the hospitalization budget between 1996 and 2005.

Even at its pick, in the 1980s, **cigarette consumption per capita was always much lower in Brazil than in OECD countries** such as the US, Canada, France, Germany, and Italy. Brazil smoking prevalence rates and cigarette consumption among adults have also been lower than those in several neighboring countries, which may be the result of

domestic tobacco control policies implemented in the 1990s. However, consumption has remained stable in Brazil in recent years, while it is lower and continues to decline in Chile.

The Brazil tobacco control program has been very innovative, and is considered best practice on advertising bans and warning labels – for example, Brazil was the first country to ban misleading descriptors such as light and mild from cigarette packages – **but it has mainly focused on non-price instruments**. These have included bans on tobacco advertising and smoking in public transportation; regulation of tobacco products, such as limiting the levels of tar, nicotine and carbon monoxide in cigarettes, and including severe warnings and images on cigarette packages and tobacco products; and launching awareness and education campaigns. In addition, the program developed surveillance and monitoring initiatives; built institutional capacity; and decentralized tobacco control initiatives to states and municipalities.

The government has already complied with many provisions of the WHO Framework Convention on Tobacco Control (FCTC), which was signed in 2003 and ratified in 2005. However, to be in full compliance with the treaty's provisions, the government needs to take additional steps, including raising tobacco taxes.

Price instruments have been used only indirectly, with higher taxes being implemented for fiscal reasons. **Even in the context of illegal sales, higher tobacco taxes reduced consumption and increased government revenue in the 1990s**. Between 1990 and 1993, the price of cigarettes experienced a real increase of almost 78 percent, despite high inflation rates. The increase in price contributed significantly to the observed decline in overall consumption. Tobacco specific tax collection grew 23 percent at constant 2005 values, between 1992 and 1996, despite a reduction of legal consumption per adult of 15 percent in this period.

Due to lower taxes, the real price of cigarettes in 2005 was lower than the average real price in the period 1992-98. The percentage of retail price due to the specific tobacco tax (IPI) decreased from nearly 40 percent to 20 percent between 1993 and 2004. However, the price decline in the period 1998-2001 did not lead to a commensurate increase in smoking, which may have been due to the impact of non-price instruments over demand.

Brazil has established a network of state and municipal focal points and programs in major cities of the country. This network started to bring and adapt tobacco control actions and regulations to the local level, creating the necessary instruments to advance tobacco control at community level. However, this network has been weakened in recent years, as the mechanism formerly used by the National Cancer Institute (INCA) to transfer funds to states and municipalities from the federal level is no longer available, and no other mechanism has replaced it.

Recommendations

Brazil has laid a strong foundation for unprecedented public health gain. Tobacco control in the country has been effective. **Modest additional action could yield substantial additional health gains by preventing premature death among the 21 million current smokers.** However, to achieve sustainable reductions in premature death and disease due to tobacco, **Brazil should continue to invest on its comprehensive control program and focus both on avoidance of initiation and on cessation efforts**, which are central to preventing millions of deaths.

More emphasis should be placed on the revitalization of the state and municipal tobacco control network, which has received less attention and funds from the federal government. **Further reductions in smoking prevalence and increases in smoking cessation require financing and strengthening of the state and municipal tobacco control programs**. State health secretaries should resume annual meetings to plan activities and review strategies and policies, as well as training activities. State and municipal coordinators require more support from the Ministry of Health for the implementation of decentralized programs. There is also demand for scaling up the smoking cessation program, which requires staff training and provision of cessation aids, as well as coordination of the national tobacco control program with the Unified Health System.

Price instruments may be used far more effectively, to build on the substantial program that has been implemented based on non-price instruments. Tobacco taxes are the most cost-effective instrument to reduce cigarette consumption while increasing public revenue due to the low price elasticity of cigarette demand. It is at least paradoxical that a country such as Brazil, with a high public debt to GDP ratio, spends public money on tobacco control measures without effectively using price and tax instruments to curb smoking. Returning to the prices and taxes practiced in the mid 1990s would boost public revenue and public health gains.

The study found that a 10 percent increase in smoking restrictions (legal and other restrictions), would reduce consumption by 2.3 percent in the long-term; a 10 percent price increase would reduce consumption by about 4.8 percent in the long-term. The study shows that an increase of 72 percent in the cigarette specific tax (IPI) would increase prices by about 14 percent, decrease consumption per adult 7 percent, and increase fiscal income from tobacco by 60 percent. A specific recommendation is twofold:

- In the short-term, return to the 1993 real price of cigarettes. This would involve an increase of 23 percent of the 2005 average price, or an increase of 118 percent on the 2005 average rate of IPI tax. In 2005 prices, this would result on an average street price of R$2.72 (about US$1.36). Such increase would reduce consumption by about 11 percent or about 100 legal cigarettes per capita per year.
- In the longer-term, raise the percentage of retail price that comes from the IPI tax from about 20 percent to about 40 percent.

In conjunction with tax increases, the government should continue to counter illegal sales of cigarettes. As part of the 2000 Health Act, Brazil established a national register of importers, exporters and producers of tobacco products for fiscal purposes, and strengthened controls on the marketing of cigarettes through the use of control stamps and production of counting equipment in production. Policies to fight the illegal market should reduce the demand for illegal cigarettes through counter-propaganda; increase the probability of smugglers being caught and the severity of their punishment through greater control and enforcement of the law; and adopt excise and value-added taxes that are paired with anti-smuggling technologies, including product tracing and use of prominent tax stamps with warning labels in local language, and enhanced punishment of illegal street sales.

Finally, effective monitoring of the tobacco epidemic is needed. Reliable surveys of smoking prevalence and cessation, and studies of the impact of smoking on mortality are necessary. Studies on consequences of smoking would complement the findings from smoking prevalence and consumption surveys. Reliable monitoring of smoking mortality should document the often unexpected hazards of various types of tobacco use, to maintain public support for regulating tobacco and evaluate control programs. Innovations such as including information on smoking habits in death certificates could also be considered. Econometric studies, such as those included in this report, may contribute to appraise policy impact on public health. Analyzes of costs of smoking to households, health system, labor market and the economy, as well as the impact of price and tax increases on smoking habits and burden of disease, would provide useful contributions for further development of public policy in this area.

INTRODUCTION

Smoking is one of the most important risk factors for non communicable diseases (NCD), the main cause of death and disease in Brazil. The proportion of deaths by NCD increased more than three times in the country between the 1930s and 1990s. In 2004, non communicable diseases (NCD) were responsible for about 63 percent of mortality by known causes.[11]

Brazil has developed tobacco control interventions since 1985. A recent study of non-communicable diseases (NCD) in Brazil found that the "cornerstone of Brazil's program is sweeping legislation which started in 1996 by restricting tobacco use in public places. It includes, for example, bans on smoking in theaters, schools, government offices, and on public transportation, warnings on cigarette packs, and extensive mass media campaigns. Brasilia recently became the first smoke free city in Brazil. Brazil is one of a few countries with a regulatory authority that regulates tobacco products including comprehensive regulation of tobacco product marketing, content and distribution. Taxes make up about 74 percent of cigarette prices, and are made up of value-added and other taxes. However, cigarette prices are still relatively low in Brazil, despite fairly high taxes".[12]

This study aimed at further evaluating the smoking situation in Brazil, the role of the tobacco control program in the country, and compares it to global best practice and experience in other countries.

The study report is structured into three main parts:

- in the first chapter, trends in smoking prevalence, consumption, and cigarette expenditures in Brazil are reviewed, including the illegal market;
- in the second chapter, trends in lung cancer mortality and health care costs of smoking-related diseases in the country are analyzed;
- in the third chapter, non-price and price interventions are reviewed, including those taken by the Brazil tobacco control program, as well as the impact increases in cigarette prices and taxes would have on smoking prevalence and tax revenue.

The report concludes with recommendations for further action to protect the Brazilian population from premature death and disease caused by smoking, and to reverse the negative impact of smoking on public expenditures.

[11] MoH VIGITEL 2006.
[12] Danel et al 2005. Brazil - Addressing the Challenge of Non Communicable Diseases. Washington DC: The World Bank.

Trends in smoking prevalence, tobacco consumption and expenditures. The study reviewed historical data for smoking prevalence in selected years, annual and quarterly tobacco consumption per capita, and tobacco expenditures by different income groups in selected years. To analyze trends in cigarette consumption per adult, the study differentiated between cigarettes made by companies that meet their legal obligations, or so-called official or legal consumption, and those associated with contraband, counterfeiting, or tax evasion, or the so-called illegal or informal market. Total consumption includes legal consumption and illegal consumption. Consumption per adult was calculated dividing total consumption by the population of 15 years and over. Annual legal consumption was calculated by subtracting exports from legal production plus imports. These are official figures from the Secretariat of Federal Revenue and the External Trade Secretary.

There are important caveats to the data used here. Prevalence rates are not the best instruments to assess smoking trends in Brazil. There are no nationally representative surveys that have been repeated over time with the same methodology to measure smoking prevalence, cessation and initiation. Therefore, interpreting existing survey results requires caution. Survey data presented are not standardized over time, which did not allow for direct comparison of results from different years. In addition, survey data on smoking might be subject to various errors, including under-reporting of illegal consumption. Moreover, survey data suffer from self-reported biases, especially considering that social attention against smoking increased. Trends in tobacco consumption in Brazil rely upon various data sources, not all of which show congruent results. Sales and consumption data are based on aggregate sales, which may misclassify the levels of actual use, and misreport legal versus illegal sales. Similarly, sales data might be biased by over-reporting of smuggled cigarettes, as such data are provided by the tobacco industry.

Trends in lung cancer mortality. The study compared lung cancer trends at young ages (35-44) from 1980-2004. Lung cancer at these ages is sensitive to relatively recent changes in cigarette consumption for several reasons. First, almost all lung cancer due at these ages is due to smoking (with only a very low and generally stable background rate of lung cancer not attributed to smoking). Second, lung cancer at these ages is reasonably easy to diagnose and not easily misclassified with other causes of deaths. Third, there is little treatment for lung cancer so that mortality is a reasonable indicator of new lung cancers.

Trends in health care costs of smoking-related diseases. The costs of inpatient care for tobacco-related diseases were analyzed. The following diseases were considered: malignant neoplasm, ischemic heart disease, pneumonia and influenza. The study used records of hospitalizations paid by the Unified Health System (SUS) to health providers, represented by standardized forms (AIH) for the period 1996-2005 obtained from the Ministry of Health. Costs were adjusted to 2005 prices using a general price index. The frequency and expenses of tobacco related hospitalizations were weighted according to a simplified “smoking attributable fraction (SAF) model”. Since there are no data available on SAFs for Brazil, the age and sex-specific SAFs for each disease were calculated using relative risk estimates from the American Cancer Prevention Study II (CPS-II) and prevalence data was taken from a Brazilian population-based survey (World Health Survey

- Brazil 2003). Applying the SAF to all Hospital Admittance Forms of a tobacco-related disease from 1996 to 2005, the number of attributable hospitalizations and expenses by age and gender of that disease were estimated.

Brazil Tobacco Control Program. Information about the national tobacco control program was collected from the National Cancer Institute (INCA) and state and municipal reports and from interviews with health authorities and tobacco control program coordinators. Data on training and non-price interventions at local level were collected from the INCA records.

Trends in cigarette prices and taxes. Data on quarterly cigarette consumption per adult, cigarette real prices and disposable income were used to estimate an econometric model of consumption per capita between 1991 and 2005. A dummy variable called smoking restrictions was used in the model to simulate changes on smoking control in the country. This econometric model was used with two purposes. First, to appraise the impact of price and non-price control measures on per capita consumption. In this sense, the econometric model was a tool to assess the impact of tobacco control policies on smoking. Second, to assess price and tax-collection impacts of a price increase. As price elasticity is lower than one, a certain tax increase reduces consumption per capita and increases revenue collection.

Smoking and Tobacco Control in the World

Tobacco smoking is a leading cause of death worldwide. Until recently, the epidemic of chronic disease and premature death due to tobacco mainly affected rich countries, but it is rapidly shifting to the developing world. Smoking was estimated to kill nearly 5 million people annually by 2000[13], accounting for 1 in 10 adult deaths globally[14]. About half of those deaths were in low-income countries. In 2000, tobacco accounted for 1 in every 5 male deaths, and 1 in 20 female deaths, over age 30. Males accounted for 3.7 million deaths, or 72 percent of all tobacco deaths. About 60 percent of male deaths and 40 percent of female deaths due to tobacco were of middle-aged people (35-69 years).

The 20th century saw 100 million tobacco deaths, most of them in developed countries and the former socialist economies. On current smoking patterns, annual tobacco deaths will rise to 10 million by 2030. The 21st century is likely to see 1 billion tobacco deaths, most of them in low-income countries.

Indirect estimates suggest that some 300,000 people died from smoking in the Latin American and Caribbean region in 2000, making it a more important cause of death than HIV/AIDS and TB combined. The specific numbers of deaths from tobacco and of total disability-adjusted life years (DALYs) by gender and region show that smoking accounted for about 12-14 percent of all adult deaths in the region (Table 1).

[13] Ezzati and Lopez 2003.
[14] WHO 1999.

Table 1. Tobacco Mortality and Total Disability-Adjusted Life Years by Gender and Region 2000

	Tobacco Deaths (thousands)		Total DALYs (thousands)	
Region/Gender	**Males**	**Females**	**Males**	**Females**
East Asia and Pacific	829	274	13,116	4,128
Europe and Central Asia	754	161	12,407	2,686
Latin America and the Caribbean	177	97	2,789	1,613
Middle East and North Africa	97	28	1,676	554
South Asia	768	187	12,397	3,285
Sub-Saharan Africa	105	66	1,659	1,091
Low-and middle-income	2,730	813	44,044	13,357
High-income	929	548	12,304	6,866
World	3,659	1,361	56,347	20,222

Source: Ezzati and Lopez 2003; DCPP website. DALY = disability-adjusted life year.

Current trends suggest that the tobacco epidemic will affect mostly poorer developing countries, which are already struggling to improve the living conditions of their populations. About 1.1 billion people currently smoke worldwide. More than 1 billion of them are men and 231 million are women. Approximately 900 million smokers (84 percent of all smokers) live in developing and transitional economy countries, while only about 16 per cent live in developed countries, where cigarette consumption decreased significantly in recent decades. However, in developing countries, smoking increased since 1970, particularly among the poor and less educated.[15]

In 1995, the average prevalence rate in the adult population of low and middle-income countries was 29 percent. Two thirds of the poor nations for which data are available have male smoking rates above 35 percent, which is the average prevalence rate in the developed world. Although smoking rates have been low in much of Africa, between 1995 and 2000 cigarette consumption jumped by nearly two-thirds. There are many low and middle-income countries with large pockets of poverty and high smoking rates.

Over the next 25 years, total cigarette consumption is projected to rise by 60 percent in countries with medium levels of human development and 100 percent in countries with low levels of human development. By then, this latter group of nations will consume more tobacco than either medium or high human development countries.[16]

Smoking rates for females in the developing world are much lower than for males, but this is set to change. Data from the Global Youth Tobacco Survey show that many girls in their early teens are taking up smoking in the developing world.[17] Data from many countries show that the poor are most likely to smoke. Regardless of country income,

[15] Jha and Chaloupka 1999.
[16] Esson and Leeder 2004.
[17] Esson and Leeder 2004.

poorer individuals are those more likely to use tobacco, accounting for much of the mortality gap between rich and poor.

The smoker rapidly becomes addicted to nicotine and quitting is difficult. Individual attempts to quit have low success rates in high-income countries and quitting is rare in low- and middle-income countries.[18] Evidence from developed countries, and an increasing number of studies from developing countries, suggest that about half of all smokers will die from their addiction; of these, half will die prematurely by two or three decades. Worldwide, about 80 percent of deaths among 2.7 billion adults over age 30 are related to vascular and respiratory diseases, and cancer. Smoking is associated with an increase in the frequency of many of these diseases, although there are important differences between and across populations.

The impact of tobacco use is not limited to tobacco users. There is clear evidence of an increased risk of lung cancer for non-smokers exposed to second-hand smoke, estimated at 20 percent in women and 30 percent in men who live with a smoker. It has also been shown that non-smokers who live with smokers have a 30 per cent greater risk of heart attack or death from heart disease[19].

Tobacco use also raises concerns as a development issue. Available evidence shows that poorer individuals tend to smoke the most. For the poor, the money spent on tobacco represents a high opportunity cost; money spent on tobacco is money not spent on vital goods, such as food for the family, education and health care. Tobacco also contributes to the poverty of individuals and their families because tobacco users are more likely to suffer from disease and loss of productivity and income, higher medical costs and death in the worst cases. Tobacco and poverty form a vicious circle from which it is difficult to escape, unless tobacco users are encouraged and given the support necessary to quit.

Tobacco Control Policies

There is no one key intervention to control smoking. The present consensus about tobacco control programs suggests that measures to reduce demand are the most effective. These include: higher cigarette taxes, non-price measures of demand control (consumer information, cigarette advertising and promotion bans, warning labels and restrictions on public smoking) and increased access to smoking cessation programs. Apart from smuggling control, there is not much evidence of effectiveness of restrictions imposed on the supply-side of the process, such as on youth access, tobacco trade or crop substitution.[20] The instruments of a tobacco control policy and the degree of effectiveness of each instrument in attaining the main objectives of tobacco control are presented in Table 2.

[18] Jha and Chaloupka 1999.
[19] WHO and United Nations 2006.
[20] Idem.

Table 2. Instruments and Effectiveness of Tobacco Control Policies

Policy Instruments	Actions	Impact on Health	Correct Market Failures		
			Protect Children	Protect non-smokers	Inform adults
Demand Side					
Taxation	Raise Taxes	HR	HR	SR	SR
Information	Research on disease causes, health consequences and social costs of smoking	R	SR	R	HR
	Dissemination of results and warning labels	R	R	R	R
Regulation	Ban advertising and promotion	R	HR	SR	R
	Restrict public and workplace smoking	R	SR	HR	SR
	De-regulate nicotine and replacement products	SR	NR	SR	R
Supply Side					
	Control smuggling	SR	R	NR	NR

Source: Jha et al 2000. HR= highly relevant, R= relevant, SR=somewhat relevant, NR=not relevant.

The chief aim of tobacco control policies is to improve health. Government intervention in the tobacco market is justified on several grounds. First, many smokers, particularly younger and poorer ones, are not fully aware of the high risks of disease and premature death due to tobacco consumption. Actual and potential consumers are not fully aware of the addictive nature and the likely health consequences of smoking. Second, smoking imposes costs on nonsmokers such as health damage, as well as nuisance and irritation from exposure to tobacco smoke. Finally, smokers may impose financial costs on other people, such as higher health care costs. On average, smokers' health care costs exceed non-smokers'. If healthcare is paid by general taxes, nonsmokers will support part of the smokers' health care costs. [21]

OECD countries have adopted comprehensive control programs to reduce tobacco consumption, based on several instruments that interact, reinforcing their individual effect. Countries with successful control policies implement several approaches to reduce demand and control illegal tobacco trade or smuggling. Tobacco control programs generally focus on prevention of initiation, promoting cessation and reducing exposure of non smokers to tobacco smoke. The instruments or mechanisms to reduce demand are: tax and price increases, dissemination of information about health consequences, non-price restrictions on smoking and regulation of tobacco products.

Taxes. The main instrument for demand control is higher taxes. In high-income countries, taxes amount to two-third or more of the retail price of a pack of cigarettes. There are basically two types of taxes: specific – a fixed amount is added to cigarette prices – and ad valorem – a percentage of the base price is added to the consumer price. [22]

[21] Jha and Chaloupka 1999.
[22] Jha and Chaloupka 1999.

Higher taxes and higher cigarette prices lead to decreases in consumption, and higher quit rates and deter young people from taking up smoking. In some cases, policy makers are wary of increasing cigarette taxes because they fear tax revenue losses. Although the question of what the right level of cigarette taxes should be is a complex one, as long as cigarette price elasticity is lower than one, tax collection will increase. Revenue lost because of a fall in sales is more than compensated for by the extra revenue from each pack sold. Sound and strong tobacco control measures will effectively reduce consumption, which will in turn improve the health of populations and contribute to better economic development, in particular in developing countries.

Raising taxes and, consequently, increasing cigarette prices is important to discourage young smokers and to prevent initiation. According to Townsend, youth "…is the age of recruitment to smoking and there has been an apparent lack of success of health education in reducing teenage smoking".[23] Jha et al confirm that "the strongest rationale for increasing tobacco taxes is to deter children from smoking".[24]

Higher prices also reduce adult consumption, and are particularly effective in reducing cigarette consumption among low-income adults. Evidence shows that tobacco tax increases are likely to have different impact according to income level. Low income groups tend to smoke more, but reduce smoking more in response to tax and price increases. Townsend reported a significant difference in price response of white and blue-collar workers in England.

A review of over 50 price elasticity studies found that price elasticity of demand is lower in high-income countries (around -0.4), than in middle and low-income countries, where the estimates range from -0.2 to -0.9.[25] Studies of price elasticity in developing countries show a wide variation, some of which is due to study design, but generally support the key finding that consumption of tobacco products is sensitive to price (Table 3). According to these estimates, a price increase of 10 percent would decrease consumption 2-9 percent in low and middle–income countries. Higher price elasticity in developing country means that taxes are relatively more effective to reduce consumption. The net impact on government revenue may be less in developing countries, but as long as price elasticity is lower than one, increasing taxes will generate more government revenues.

Information. In OECD countries, research on the causes, consequences and cost of tobacco use has made people aware of the health risks of smoking and contributed to creating a favorable environment for implementation of tobacco control policies. For these reasons, this kind of research and dissemination of its results are fundamental components of a smoking control package. According to Jha et al, independent scientific reviews, such as reports by the United States Surgeon General and the United Kingdom Royal College of Physicians, were milestones in declines in consumption in high income-countries.

[23] Townsend 1996.
[24] Jha et al 2000.
[25] Jha and Chaloupka 1999.

However, information has a greater impact when general knowledge of smoking risks is low.[26]

Table 3. Expected Decrease in Cigarette Consumption per 10 Percent Increase in Real Price of Cigarettes in 2000 (%)

Eastern Europe and Asia		Middle East and Latin America	
Bulgaria	8.00	**Egypt**	4.00
Estonia	3.40	**Morocco**	5.10
Turkey	1.90	**Argentina**	2.70
Bangladesh	2.70	**Bolivia**	8.50
China	5.40	**Brazil**	2.50
Indonesia	3.40	**Chile**	2.20
Nepal	8.80	**Uruguay**	4.90
Sri Lanka	5.30		
Thailand	3.90		

Sources: The World Bank 2007.[27]

Sustained anti-smoking mass information has played an important role in reducing smoking in the UK and US[28]. Dissemination of the consequences of smoking has also contributed to the implementation of other tobacco control instruments. For example, greater public awareness of the consequences of tobacco smoke has helped to make clean-air laws "self enforcing" in many jurisdictions in the US and UK, and knowledge and recognition of the benefits of cessation contributed to higher demand for cessation therapies and aids.[29]

Information has a different impact according to age and level of education of the population. In general, the higher the education level, the quicker the change of behavior as a result of new information about smoking health hazards.[30] However, evidence from developed countries shows that younger people appear to be less responsive than adults to information about the health consequences of smoking. Apparently, health promotion is countered by advertising. School antismoking educational programs appear to be less effective than many other types of information, although they become more effective as interventions continue using modern marketing techniques and messages tailored to the interests and motivations of young people, rather than focusing on long-term health effects.

Bans on Advertising and Promotion. Advertising is an important factor in promoting and reinforcing smoking among young people.[31] There is a consensus that partial restrictions on advertising do not work because the tobacco industry tends to exploit

[26] Jha et al 2000; Jha and Chaloupka 1999.
[27] Hu and Mao 2002; Onder 2002; Ali, Rahman et al. 2003; Aloui 2003; Arunatilake and Opatha 2003; Karki, Pant et al. 2003; Nassar 2003; Taal, Kiivet et al. 2004; Adietomo and Djutaharta and Hendrsatno 2005; Alcaraz 2005; Debrott Sanchez 2005; Gonzales-Rozada 2005; Iglesias and Nicolau 2005; Ramos and Curti 2005; Sanginsoy, Yurekli et al. 2005; cited in The World Bank 2007. Public Policy and the Challenge on Chronic Noncommunicable Diseases.
[28] Townsend 1993.
[29] Jha et al 2000.
[30] Jha and Chaloupka 1999.
[31] Townsend 1993; Wiehe et al. 2005.

other media and alternative promotional tactics. For this reason, a total ban on tobacco advertising and promotion has been recommended as a better policy in OECD countries, although it faces free trade arguments and law suits by the industry based on free speech and constitutional claims.

Since 1972, most high-income countries have introduced stronger restrictions across more media and various forms of sponsorship.[32] In the 1990s, the European Union (EU) implemented a partial ban on advertising of tobacco products, and in 1998, approved a complete ban on advertising and promotion of tobacco, with full and final enforcement in 2006. However, the EU directive legislates on cross-border aspects of advertising, leaving many aspects open to the Member States discretion. The Directive does not ban local advertising such as street billboards, posters, parasols, ashtrays and other articles used in hotels, restaurant and cafés; the ban focus on media advertising and promotion; certain forms of indirect advertising, such as diversification products (sharing brand names for tobacco and non-tobacco products), are not covered; as for sponsorship, only cross-border events are covered. Furthermore, the criteria for cross-border impact are not listed in the Directive. Member States retain the competence to regulate these matters as they deem necessary to protect public health, as many of them have done. Finally, the Tobacco Advertising Directive does not create tobacco-specific cross-border enforcement mechanisms between Member States.

Warning Labels. Cigarette packages failed to give consumers adequate information about the product they were buying, and the risks associated with its consumption. For this reason, since the 1960s, an increasing number of governments have required cigarette producers to include health warnings on their products. Evidence shows that warnings are effective in reducing consumption and inducing quitting when labels are large, prominent, and contain hard words and specific effects.[33] This instrument may not reach poor people in low and middle-income countries, where cigarettes are bought one at a time rather than in packs, or illegally-manufactured cigarettes are sold without any kind of warning labels. However, counterfeited cigarettes are increasingly displaying updated health warnings, and are sold in regular retailers in packs.

Bans on Smoking in Public Places and Workplaces. There is evidence that non smokers who experience life-time exposure to environmental smoke have an increased risk of lung cancer. Studies have identified many deleterious effects of passive smoking on respiratory function, heart disease and childhood development.[34] Findings of the negative effects of passive smoking have added a new dimension to the arguments for legal policies directed to restricting smoking in collective private and public places and workplaces. Smoking restrictions in public places and workplaces protect non smokers, reduce smokers' consumption of cigarettes and induce quitting smoking.

OECD countries have been establishing non smoking environments in enclosed public places, including public transportation, schools and hospitals, and workplaces such

[32] Jha and Chaloupka 1993.
[33] Jha and Chaloupka 1999.
[34] Townsend 1993.

as restaurants and bars. However, some of these countries have approved weak smoke-free place regulations, and in federal countries such as the US, the legislative pattern is not regular across the country. In some states and cities, such as California and New York, total bans have been successfully enforced, but in Nevada and Las Vegas, smoke free places legislation is inexistent, making it difficult to compare the situation in the US with other countries such as Norway and Ireland, where smoking in public places was banned countrywide.

Cessation Interventions. Cessation interventions, including bupropion and nicotine replacement products, improve success rates of quit smoking attempts**.** Nicotine Replacement Therapy (NRT) products deliver low doses of nicotine without other harmful constituents of tobacco smoke. They are safe and effective. Compared to cigarettes, the sale of NRT products is highly regulated in developed countries. Deregulation of those sales and lower prices for the product could be effective in enabling more people to quit.[35]

The WHO Framework Convention on Tobacco Control

The Framework Convention on Tobacco Control (FCTC) was developed by WHO in response to the expansion of the tobacco epidemic.[36] The spread of the tobacco epidemic has been exacerbated by a variety of complex factors with cross-border impact, including trade liberalization, direct foreign investment, global marketing, transnational tobacco advertising, promotion and sponsorship, and the international contraband and counterfeiting of cigarettes.

The core demand reduction provisions in the FCTC are the following:

- Price and tax measures; and
- Non-price measures including:
    - Protection from exposure to tobacco smoke;
    - Regulation of the contents of tobacco products;
    - Regulation of tobacco product disclosures;
    - Packaging and labeling of tobacco products;
    - Education, communication, training and public awareness;
    - Tobacco advertising, promotion and sponsorship; and,
    - Tobacco cessation.

The core supply reduction provisions are the following:

- Reduce illicit trade in tobacco products;
- Reduce sales to and by minors; and
- Provision of support for economically viable alternative activities.

[35] Townsend 1993.
[36] WHO FCTC – WHO webpage.

This is the first global health treaty negotiated under the auspices of the WHO. This convention represents a paradigm shift in developing a regulatory strategy to address addictive substances; in contrast to previous drug control treaties, the FCTC asserts the importance of demand reduction strategies, as well as supply reduction issues. It also represents a legally binding instrument to countries that adhere to it.

Countries are using the treaty as a large umbrella under which to strengthen tobacco control. The UK is reassessing its policies on exposure to second hand smoke in public places; the Democratic People's Republic of Korea has announced that it will double the price of cigarettes to reduce consumption; Tanzania has banned smoking in public places; and Thailand is focusing on cross-border issues and tobacco smuggling[37].

The FCTC redefines the role of international law in preventing disease and promoting health. The core demand reduction provisions in the Convention are contained in Articles 6-14, which detail the price, tax, and non-price measures necessary to reduce the demand for tobacco. The core supply reduction provisions are contained in Articles 15-17. A novel feature of the Convention is the inclusion of a provision to address liability issues. Mechanisms for scientific and technical cooperation and exchange of information are set out as well.

Countries are expected to develop national tobacco control strategies taking into consideration national profile, socio-political environment and global evidence. Countries should also establish a multi-sector committee to coordinate tobacco control policy and program development. The FCTC requires countries, in accordance with their respective constitution and constitutional principles, to undertake a comprehensive ban on all tobacco advertising, promotion and sponsorship within five years of the FCTC approval in each country. Where total prohibition would be unconstitutional, the FCTC requires countries to apply all constitutional restrictions on tobacco advertising, promotion and sponsorship.

Among other measures, the treaty requires countries to establish new packaging and labeling of tobacco products; establish clean indoor air controls; and strengthen legislation to clamp down on tobacco smuggling. As advertising restrictions are implemented, tobacco packaging plays an increasingly important role in discouraging tobacco consumption. The treaty obliges countries to adopt and implement large, clear, visible, legible, and rotating health warnings and messages on tobacco products and its outside packaging, occupying at least 30 percent of the principal display areas. This is an obligation that should be fulfilled within three years of entry into force of the Convention in a given country.

Second-hand smoke is a real and significant threat to public health, especially for children. The treaty obliges countries to adopt and implement, or promote effective measures providing for protection from exposure to tobacco smoke in indoor public places and workplaces.

Cigarettes are smuggled throughout the world. In addition to making international brands more affordable and accessible, illegal cigarettes evade restrictions and health

[37] WHO 2003.

regulations. The treaty obliges countries to adopt and implement effective measures to eliminate illicit trade, illicit manufacturing, and counterfeiting of tobacco products.

Impact of Tobacco Control

In the 1970s, OECD countries experienced large increases in consumption of tobacco products. Although many reduced consumption in the 1980s, their efforts had different intensities. The UK, Canada and USA were the leaders in the consumption reduction race. However, it was only in the second half of the 1990s that control efforts began to show results, and many OECD countries experienced sharp reductions in consumption levels per capita.

Changes in consumption have an impact on mortality. The UK had a decline of over 70 percent in the number of cigarettes smoked per year in the period 1970-2000. In France, the increase in smoking occurred some decades later than in the UK, and declines in smoking began only after 1990, and were more modest than in the UK. Age-standardized male lung cancer rates at ages 35 to 44 per 100,000 in the UK decreased from 18 in 1950 to 4 by 2000. In contrast, French male lung cancer rates show the reverse pattern.[38] Similarly, a large increase in female lung cancer at young ages was avoided in the UK, but female lung cancer continues to rise in France.

[38] Peto et al 2003.

CHAPTER 1

Smokers' Behavior in Brazil

In this chapter, trends in smoking prevalence, consumption, and expenditures are analyzed, including the illegal trade and consumption.

- Smoking prevalence decreased from 35 percent in 1989 to 16 percent in 2006. In 2006, about 20 percent of males and 13 percent of females smoked.
- Smoking is consistently more concentrated among the uneducated groups of the population, which may also be the poorer. There is a 1.5-2 fold higher prevalence of smoking among those with little or no education as compared to those with more years of schooling.
- Smoking prevalence among adults in state capitals ranged from a low of 9.5 percent in Bahia to 21.2 percent in Porto Alegre and Rio Branco in 2006.
- Total consumption per adult, including illegal sales of cigarettes, decreased from 1,700 cigarettes per year in 1990 to 1,175 cigarettes in 2003-2005.
- The percentage of households in metropolitan areas with smokers decreased from 34 percent in 1995-96 to 27 percent in 2002-2003.
- In households with smokers, the proportion of tobacco expenditures in total expenditures decreased from 3 percent in 1995-96 to 2 percent in 2002-03.
- Poorer groups spend a larger proportion of their income on tobacco compared with groups from higher income brackets.

Trends in Smoking Prevalence

Smoking prevalence decreased in Brazil from 35 percent to 18 percent in the period of 1989-2003, and further declined to 16 percent in 2006, according to the results of a new survey[39]. The 1989 National Survey on Health and Nutrition (PNSN) estimated that about 35 percent of the population smoked cigarettes and other tobacco products, while the 2003 World Health Survey estimated that about 18 percent of the Brazilian population smokes (Table 4). A recent review of both surveys indicates that, between 1989 and 2003, the age-adjusted smoking prevalence ratio decreased 35 percent.[40] However, the reduction in the mean number of cigarettes smoked per day (from 13.3 to 11.6) was modest. The review further indicates that reductions in prevalence and intensity of smoking were greater among males, younger age groups and higher socioeconomic strata. In 2006, the Ministry of Health carried out, for the first time, a telephone survey of adults in capital cities, which found an average smoking prevalence of 16 percent in the 27 cities studied.[41]

[39] VIGITEL 2006.
[40] Monteiro CA et al 2007.
[41] VIGITEL 2006.

Table 4. Smoking Prevalence by Gender and Age group in 1989 and 2003

	1989			2003		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
18-29	**38.37**	**27.11**	**32.56**	**18.8**	**10.3**	**14.3**
30-44	**49.5**	**31.53**	**40.03**	**22.5**	**19.8**	**21**
45-59	**45.45**	**25.46**	**35**	**29.4**	**15.8**	**21.7**
60+	**36.83**	**17.19**	**26.04**	**21.5**	**9.5**	**15.4**
Total	**43.09**	**26.87**	**34.57**	**22.6**	**14.6**	**18.3**

Sources: National Survey on Health and Nutrition 1989; World Health Survey 2003.

The three surveys had different sample designs and are not directly comparable, although questions about whether a person smokes were similar. The 1989 sample was from metropolitan areas in each state. The 2003 sample was from the whole country including metropolitan, urban and rural areas. The 2006 sample included adults over 18 years from the capital cities of the 26 Brazilian states and Federal District served by a phone line.

As expected, a higher proportion of men smoke at all ages, and the difference is greater for the age group over 45 years. In 2003, about 23 percent of men and 15 percent of women smoked. In 2006, about 20 percent of men and 13 percent of women smoked. Smoking other tobacco products in Brazil is a phenomenon of older people (over 45 years), less educated and inhabitants of smaller urban areas.

In the period 1989-2003, the decline of prevalence rates was greater among men. In São Paulo, the largest city in the country, smoking prevalence among men was curtailed by 40 percent. Porto Alegre experienced the lowest decrease and maintained higher than average prevalence rates in 2003 (Table 5).

Table 5. Smoking Prevalence in Capital Cities by Gender in 1989, 2003 and 2006

Capital Cities	**Smoking Prevalence %**					
	1989		**2003**		**2006**	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
Belém	43.5	21.2	23.3	12.1	19.5	10.1
Campo Grande	33.6	16.9	18.7	10.7	20.5	9.9
Distrito Federal	33.4	20.8	20.7	14.9	19.9	14.9
Manaus	30.6	18.1	26.8	13	20.7	8.9
Natal	35.4	21.9	19.6	12.8	17.5	10.3
Porto Alegre	31.1	25.7	28.4	23.5	26.3	17.0
Recife	33.6	23	22.3	14.4	19.3	11.0
Rio de Janeiro	38.1	23.3	18.8	15	16.1	13.2
São Paulo	37.6	23.5	22.6	17.7	23.6	14.6

Source: INCA estimates based on National Survey on Health and Nutrition 1989; Household Survey of Risk Behavior and Morbidity 2002-03; VIGITEL 2006.

The 2006 survey still found smoking prevalence above the 2003 average among men in Macapá (29 percent), Porto Alegre (26 percent), Porto Velho, Rio Branco (25 percent each), São Paulo, Cuiabá and Teresina (24 percent each); and among women in Rio Branco (18 percent), Porto Alegre (17 percent), Curitiba and Florianópolis (16 percent).

In Brazil, smoking is consistently more concentrated among the uneducated groups of the population, which may also be the poorer. There is about 1.5 to 2 fold higher prevalence of smoking among those with little or no education as compared to those with more years of schooling. Unexpectedly, however, a higher proportion of smokers is found among people with university and post-graduate education than among people with secondary education. Among smokers with less schooling, consumption of other tobacco products tends to prevail. The difference between smoking prevalence of tobacco products and cigarettes is higher among people with no education or incomplete elementary school (Table 6).

Table 6. Smoking Prevalence by Education Level in 2003 (%)

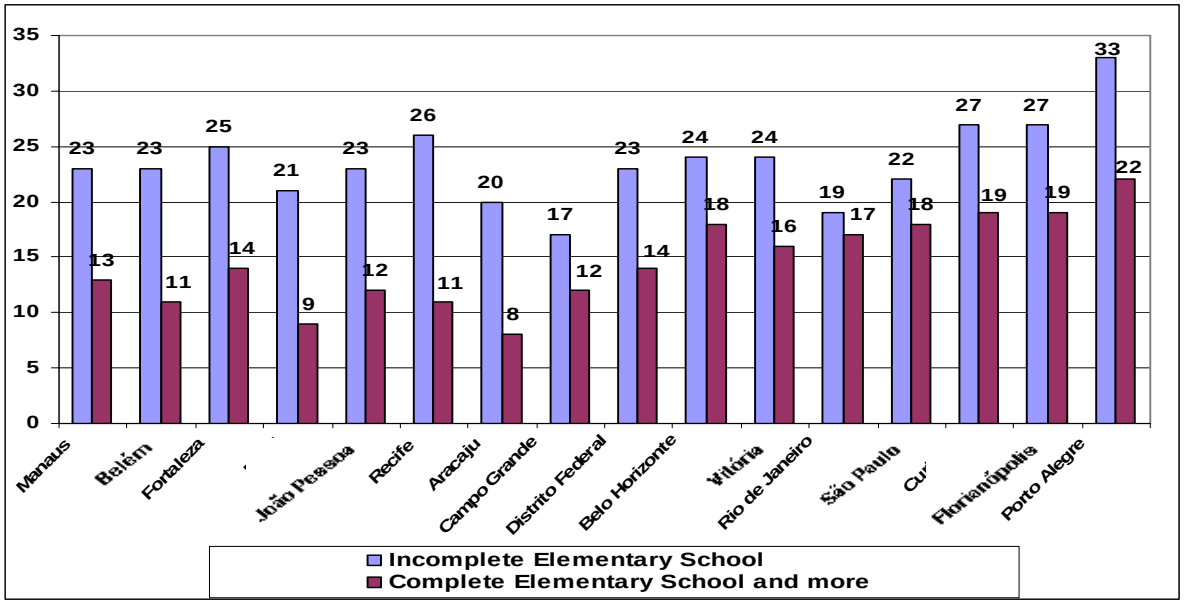
Education	Tobacco Products	Cigarettes
None	27.1	13.6
Incomplete elementary	21.8	16.2
Complete elementary	20.7	18.1
Primary	15.9	14.9
Secondary	11.4	11.1
University	12.2	11.4
Post-Graduation	14.3	14.3

Source: 2003 World Health Survey – Brazil

The largest differences in smoking prevalence between less educated and more educated people were found in northern and northeastern cities, such as Belém, Natal, Recife and Aracaju. Southern and southeastern cities, such as Curitiba, Florianopolis, Porto Alegre and São Paulo, display the highest prevalence rates among better-educated people (Graph 1).

Graph 1. Smoking Prevalence Rates in Main Brazilian Cities by Level of Education

Percentage of population over 15 years of age



Source: Household Survey of Risk Behavior and Morbidity (IDCRM) 2002/03.

The decline in smoking prevalence in state capitals between 1989 and 2002-03 was significant, except in the case of Porto Alegre, a city with a high-smoking prevalence (Table 7). To compare smoking prevalence in main metropolitan areas or capitals between 1989 and 2003, this study used the 2002-03 Household Survey of Risk Behavior and Morbidity (IDCRM), as the World Health Survey did not provide data by state. The survey was carried out by INCA and the National Coordination of Epidemiological Surveillance (CENEPI-SVS) in 15 capitals and the Federal District (DF). In 2006, smoking prevalence among adults in state capitals ranged from a low of 9.5 percent in Bahia to 21.2 percent in Porto Alegre and Rio Branco.

Table 7. Smoking Prevalence in State Capitals and DF in 1989 and 2003

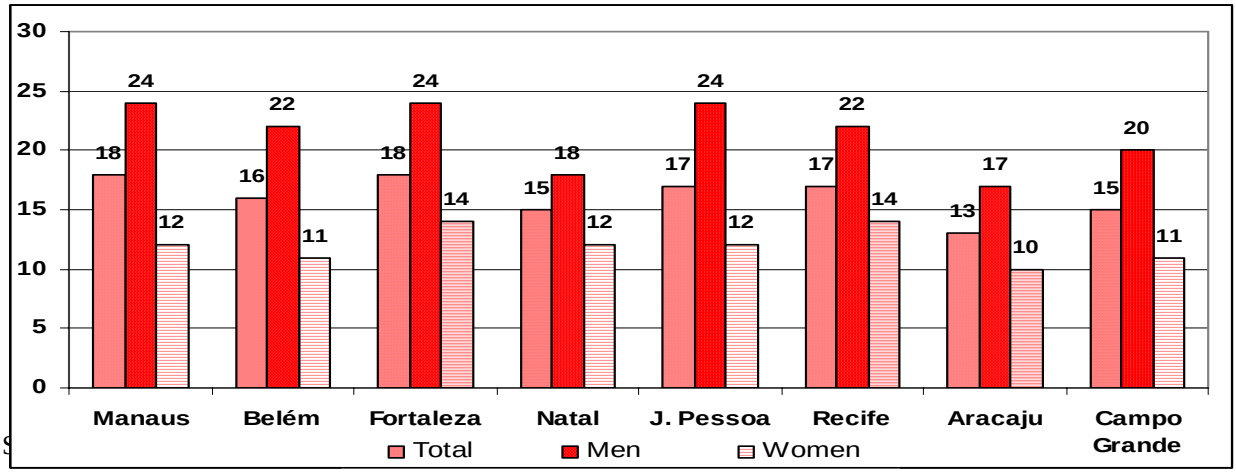
Capital Cities	Smoking Prevalence (%)		
	1989	2003	Relative difference
Belem	31	17	-45.2
Campo Grande	24	14	-41.7
Distrito Federal	26	17	-34.6
Manaus	27.6	19	-31.2
Natal	26	16.6	-36.2
Porto Alegre	29	26	-10.3
Rio de Janeiro	30	17	-43.3
São Paulo	30	20	-33.3

Source: INCA estimates based on National Survey on Health and Nutrition 1989; and Household Survey of Risk Behavior and Morbidity 2002-03.

Northern and northeastern cities have in general lower than average prevalence rates, as a result of low rates of female smoking prevalence (Graph 2). Large cities, located in the South and the Southeast of the country, such as Belo Horizonte, Curitiba, Florianópolis, Porto Alegre and São Paulo have higher prevalence rates (Graph 3). Curitiba, Florianópolis and Porto Alegre have the highest female smoking prevalence rates in the country.

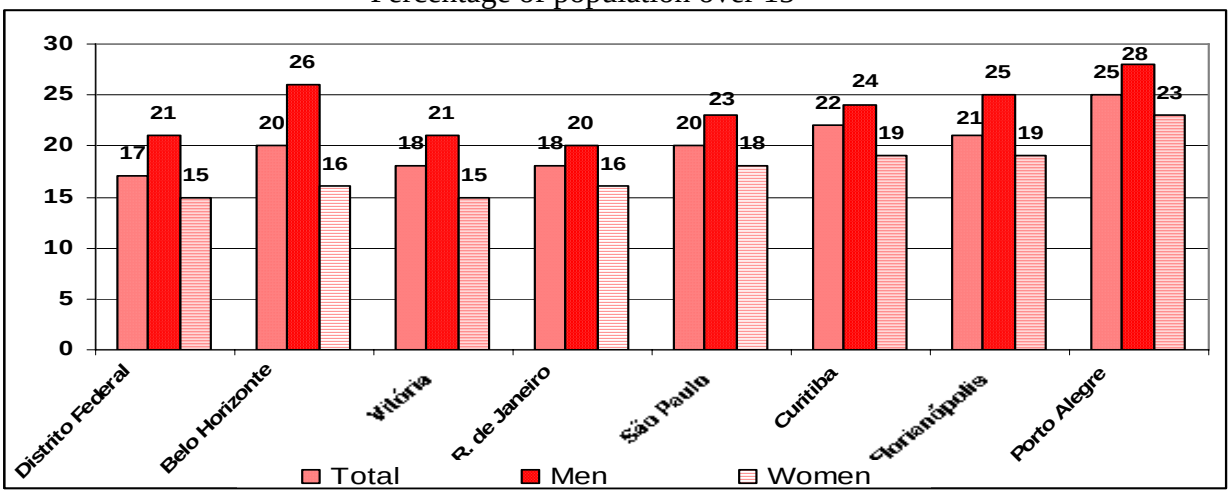
Graph 2. Smoking Prevalence Rates in North and Northeast Cities by Gender 2002-2003

Percentage of population over 15



Graph 3. Smoking Prevalence Rates in South and Southeast Cities by Gender 2002-2003

Percentage of population over 15

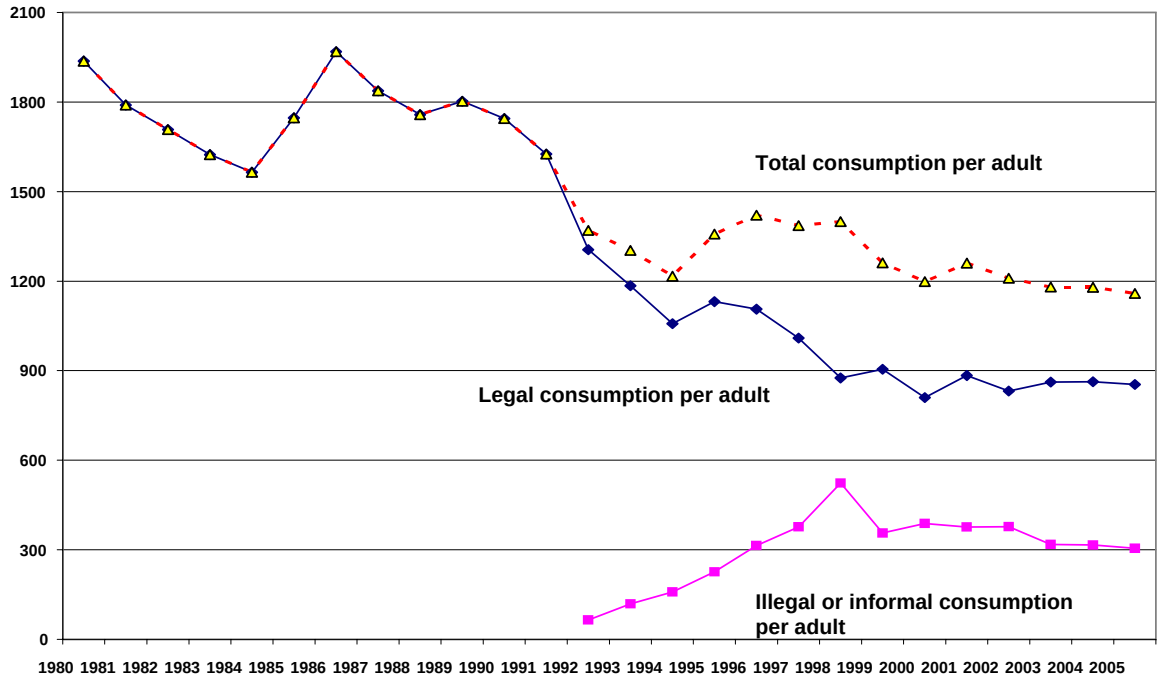


Source: Household Survey of Risk Behavior and Morbidity (IDCRM) 2002/03.

Trends in Tobacco Consumption

Overall tobacco consumption declined in Brazil in the 1990s, as the decrease in legal consumption was not fully offset by the rise in consumption of illegal cigarettes. Total consumption per adult, including illegal sales of cigarettes, decreased from 1,700 cigarettes per year in 1990 to 1,175 cigarettes in 2003-2005 (Graph 4). In this decade, legal consumption has remained stable at around 850 cigarettes per adult per year. Trends in adult consumption of legal cigarettes in the 1990s and in the present decade are not totally explained by traditional determinants, such as cigarette real prices and income changes (Graph 5). The illegal market is a serious cause for concern as it may undermine the effectiveness of tobacco control policies. There was an increasing and worrying upward trend in illegal cigarette consumption in the 1990s, but signs of stability or even a slight downward trend have been observed recently.

Graph 4. Cigarette Consumption per adult per year in Brazil 1980-2005



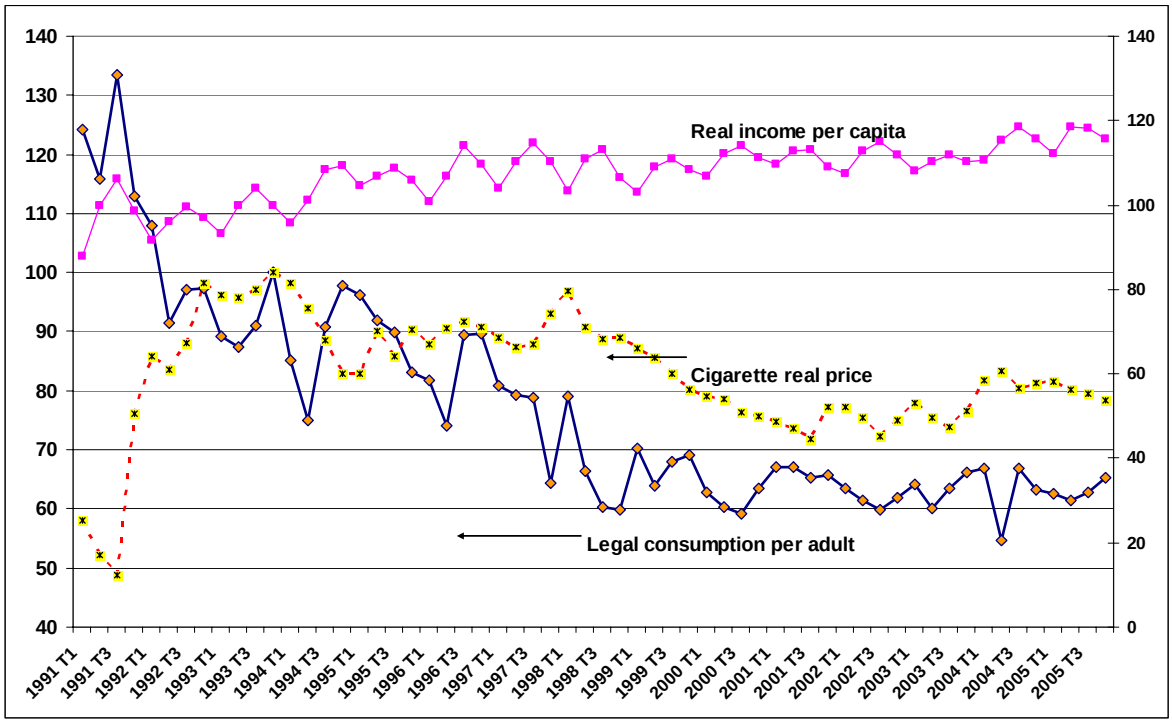
Source: Secretary of Federal Revenue, IBGE and External Trade Secretary.

Brazilian adults consumed on average around 1,800 cigarettes per year during the 1980s, reaching almost 2,000 units during a phase of economic expansion in 1986. From 1986 to 1994, adult consumption per capita declined, mainly as a result of decreasing legal consumption. Between 1995 and 1999, consumption per adult was around 1,400 cigarettes per year, with a declining share of legal cigarettes as a part of total consumption. The average legal consumption per adult went down from 1,100 cigarettes in 1995 to 900 in 1999. Between 1999 and 2002, total per adult consumption averaged 1,230 cigarettes, with constant ratios of legal (70 percent) and illegal cigarettes (30 percent). In recent years, the average adult consumption went down to 1,170 cigarettes, with legal consumption being responsible for a higher proportion because of a slight decrease in illegal consumption.

The real price of cigarettes increased significantly between 1990 and 1993, representing a real increase of 78 percent despite high inflation rates.[42] This rise was not due to tobacco control policies. In 1991, the public sector stopped determining the price of cigarettes. Still, the real price remained high until 1998, although lower than in 1993. After that, the price declined and then leveled off, with real values higher than at the beginning of the 1990s.

Graph 5. Legal Consumption per Adult, Real Disposable Income per Capita, and Cigarette Real Price in Brazil 1991 - 2005

Indexes (1993.4=100)



Sources: Secretary of Federal Revenue, IBGE and External Trade Secretary.

Between the first quarter of 1991 and the fourth quarter of 1993, real prices increased 78.6 percent and consumption decreased 20.5 percent. The reduction in consumption was smaller than price and income effects. In the second period, from the first quarter of 1994 to the first quarter of 1998, there was a small decrease in real price, and increase in real income, but legal consumption continued to decline due to increasing smoking restrictions in the country.

As a result of the huge real price increase of 1991-93 and smoking restrictions, there was a significant reduction of legal consumption until 1998, but the illegal market flourished and partially compensated for the reduction of legal consumption. In 1998, total consumption per capita was higher than in 1994 due to illegal consumption. Nevertheless,

[42] Cigarette real prices are the result of dividing their nominal price by the consumer price index. Data on cigarette nominal prices and the consumer price index are from the Brazilian Institute of Geography and Statistics (IBGE).

the smoking behavior of the country had changed: total consumption per capita in 1998 was lower than in 1990. The real price increase changed the market, and the final result was lower consumption.

In the period between the first quarter of 1994 and first quarter of 1998, smoking restrictions continued to increase and affect legal consumption. However, this cannot be considered a successful period in terms of smoking control, as total consumption increased due to illegal consumption. The next period, between the second quarter of 1998 and third quarter of 2000, was important for tobacco control. Real price decreased and legal consumption dropped 6 percent. At the same time, the illegal market was negatively affected by the 1999 real devaluation and illegal consumption decreased. In this period, smoking restrictions seem to have been effective and lead to lower level of legal tobacco consumption in the country.

Finally, between the fourth quarter of 2000 and fourth quarter of 2005, real price increased, but the consumption response was smaller than expected. In recent quarters, legal consumption stabilized or has even slightly increased. As the decrease in legal consumption has been smaller than real price effect, other restricting forces on legal consumption may not have had the expected impact in this period. As a result of real devaluation of domestic currency, illegal consumption declined in this period.

In 1992 and 1993, the legal cigarette market behaved as expected. The reduction in consumption was the result of real price increases and real income reduction. Legal cigarette consumption in 1993 was approximately 75 percent of its 1991 level, while real prices per pack were 65 percent higher than in 1991. However, after 1993, legal consumption changes were not totally explained by real price and income changes. In 1994 and 1995, legal consumption did not rise in relation to 1993, despite real price reduction and an improvement in disposable income. The recovery of real income after 1994 did not have a significant impact on the legal market. In those years, illegal per adult consumption almost doubled, rising from 123 to 234 cigarettes per year. In the following three years (1996-98), legal cigarette consumption behavior was also atypical. Real price and real income remained almost constant, but legal consumption dropped 27 percent. Illegal consumption grew, reaching 524 cigarettes per adult per year. Finally, after 1999, real price decreased and income remained almost constant, but legal consumption did not increase, fluctuating around 850 cigarettes per year.

To understand what happened to legal consumption in the 1990s, it is necessary to incorporate information about the illegal trade. Illegal consumption increased until 1998, reflecting a change in the smoking habits of many consumers. As illegal cigarettes were cheaper than legal ones, and were sold almost without restriction in the streets of metropolitan areas, they became a substitute for legal cigarettes, particularly among lower income people. Some consumers left relatively expensive legal cigarettes and began to smoke cheaper illegal cigarettes. After 1994, when per capita disposable income improved, particularly among the lower brackets, people increased consumption of illegal cigarettes. After the devaluation of the Brazilian currency in 1999, illegal consumption declined and then leveled off, remaining stable despite a relative increase in the price of contraband cigarettes due to the exchange rate depreciation.

Comparison to Other Countries

Brazil smoking prevalence rates are lower than those in neighboring countries (Table 8), which may be the result of domestic tobacco control policies implemented in the 1990s.

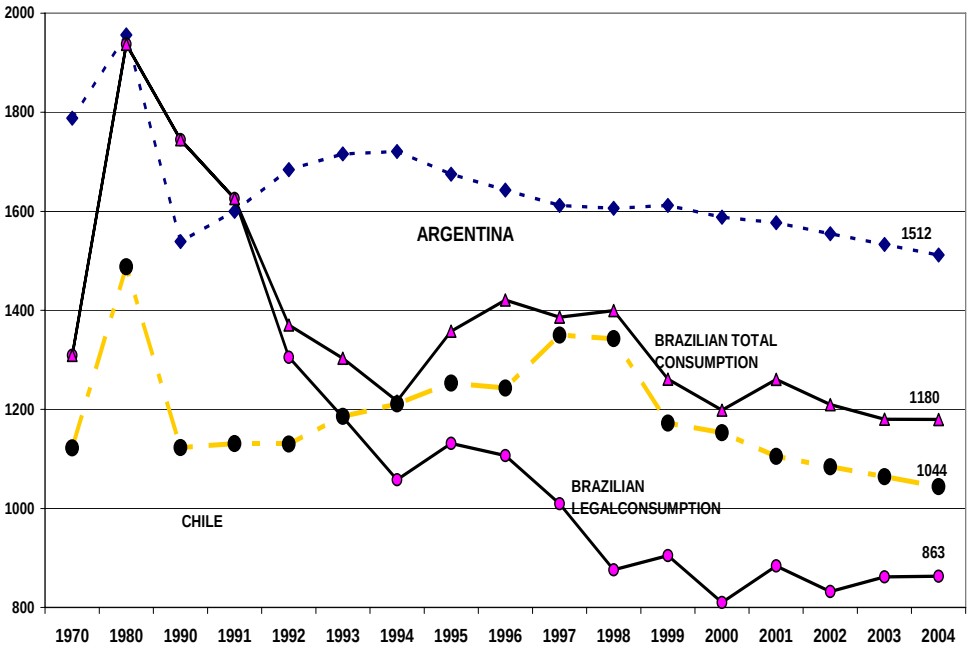
Table 8. Smoking Prevalence Rates in Neighboring Countries
Percentage of population over 15 years of age

	2000	2001	2002	2003
Argentina				38.4
Bolivia	28.6			
Chile			40.9	
Uruguay		32.3		

Source: PAHO 2004. The Economics of Tobacco Control – Country Cases.

Given the weakness and lack of regular data on smoking prevalence rates, data on cigarette consumption per adult in Argentina, Brazil and Chile, between 1970 and 2004, were compared (Graph 6). Due to availability of legal and illegal consumption data in Brazil, these were plotted as well.

Graph 6. Adult Cigarette Consumption in Argentina, Brazil and Chile 1970-04

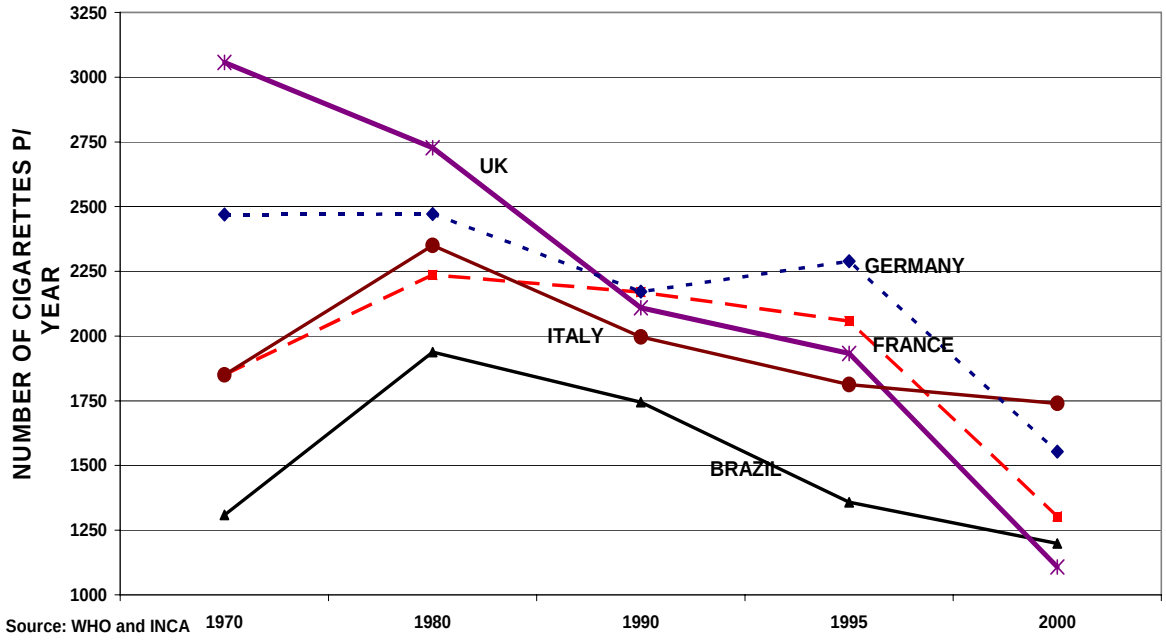


At the beginning of the 1990s, Brazil had a lower per capita income than Argentina and Chile. However, tobacco consumption per adult was higher in Brazil than in the other two countries. In the 1990s, Brazil displayed a clear negative consumption trend, even considering illegal consumption. On the contrary, during the same period, Argentina and Chile presented stable or increasing consumption trends, respectively. Argentina stabilized

around 1,600 cigarettes per adult per year, without any clear trend, while Chile displayed an increasing trend until 1998, when consumption per adult per year reached around 1,350 cigarettes. In recent years, Brazilian consumption among adults remained stable around 1,200 cigarettes per year and around 860 legal cigarettes, while Argentina and Chile showed clear declining trends.

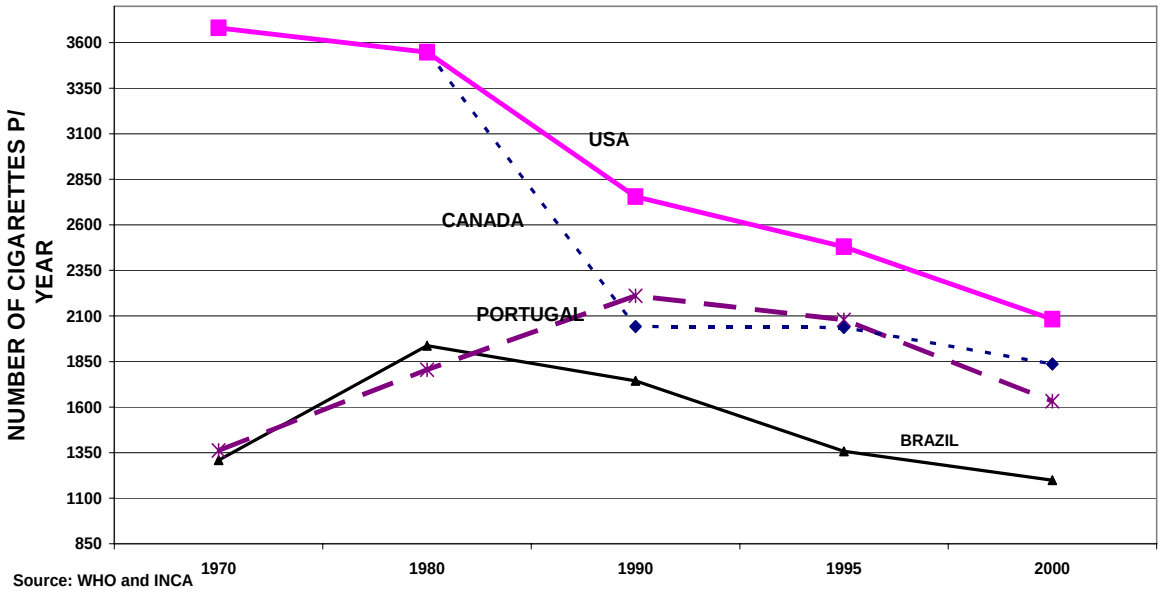
Brazil experienced a large increase in consumption of cigarettes one decade later than OECD countries such as the UK and US. However, the level of consumption per capita was always much lower in Brazil than in the US, Canada and EU countries such as France, Germany, Italy, even at its pick in the 1980s – while Brazil consumed less than 2,000 cigarettes per adult per year in 1980, other countries consumed between 2,250 (France) and 3,500 (US). Nowadays, after the impact of tobacco control interventions was felt throughout all these countries, Brazil continues to consume less cigarettes per capita than all other countries, with the exception of the UK (Graphs 7 and 8).

Graph 7. Cigarette Consumption per Capita in EU Countries & Brazil 1970-2000
Including Illegal Consumption



Graph 8. Cigarette Consumption per Capita in Portugal, Canada, US and Brazil 1970-2000

Including Illegal Consumption



Trends in Smoking Expenditures

In households with smokers, the proportion of tobacco expenditures in total expenditures decreased from 3 percent in 1995-96 to 2 percent in 2002-03. Evidence from developing countries indicates that the proportion of expenditure that goes on tobacco is larger among lower income groups. In Brazil:

i) cigarettes are the main component of tobacco expenditure;
ii) tobacco and cigarette expenditure as a proportion of total spending decreased between 1996 and 2003; and
iii) poorer groups spend a larger proportion of their income on tobacco compared with groups from higher income brackets.

To assess the situation in Brazil, this study analyzed the last two available Household Budget Surveys (POFs), from 1995-1996 and 2002-2003. These surveys are national and representative of metropolitan areas, and the second survey also includes non-metropolitan urban areas.

Table 9 shows expenditure on tobacco as a percentage of total spending[43] by income strata[44], confirming the higher level of smoking expenditure among lower-income groups.

[43] Total disbursement is equal to income+ asset changes – liability variation.
[44] Household Budget Surveys use the conventional Brazilian income brackets (minimum wages) for analysis of expenditures. Income and expenditures were valued at Reais (R$) of January 1996 and January 2003. The minimum wages were, in PPP valuation, approximately US$95 in 1996 and US$112 in 2003.

Table 9. Proportion of Tobacco and Cigarette Expenditures by Income Level

	1996		2003		
	Tobacco	**Cigarettes**	**Tobacco**	**Cigarettes**	**Variation for Tobacco**
Sample average	**1.00**	**0.99**	**0.57**	**0.53**	-42.90
Monthly household income # Minimum Wages					
Up to 2	2.14	2.11	1.07	0.92	-49.90
+ 2-3	2.28	2.26	0.96	0.88	-57.94
+3-5	1.77	1.77	0.98	0.94	-44.54
+5-6	1.81	1.81	0.72	0.69	-60.51
+6-8	1.63	1.63	0.73	0.72	-55.20
+8-10	1.17	1.17	0.55	0.54	-53.24
+10-15	1.12	1.12	0.45	0.45	-59.51
+15-20	0.71	0.71	0.43	0.43	-39.69
+20-30	0.59	0.59	0.30	0.30	-48.95
+30	0.35	0.35	0.22	0.21	-36.37

Source: IBGE Household Budget Surveys 1995-96 and 2002-03.

Table 10. Proportion of Non-Smoking Households by Income Level

	Metropolitan areas			Non Metropolitan areas
	1996	**2003**	**Variation 1996-2003**	**2003**
Total sample	65.7	73.1	11.2	72.4
Monthly household income # Minimum Wages				
Up to 2	70.8	74.0	4.6	72.0
+ 2-3	64.8	74.0	14.1	71.8
+3-5	65.5	71.4	9.1	71.8
+5-6	63.7	74.2	16.5	73.0
+6-8	61.6	72.4	17.4	73.3
+8-10	63.9	73.4	14.9	73.1
+10-15	62.1	72.6	16.8	72.1
+15-20	67.8	72.1	6.3	74.4
+20-30	67.6	75.4	11.5	77.7
+30	68.3	73.8	8.1	74.9

Source: IBGE Household Budget Surveys 1995-96 and 2002-03.

In 2003, families with a monthly income of less than two minimum wages spent over 1 percent of their total expenditures on tobacco, whereas households with incomes of up to 6 minimum wages spent 0.73 percent. At the other end of the scale, households that earned more than 20 minimum wages per month spent 0.3 percent or less of their income on cigarettes. The observed reduction of the proportion of tobacco expenditure in the total

sample and at different levels of income was the result of two forces: (i) an increase in the proportion of non-smoking households; and (ii) lower levels of tobacco expenditure in households with this kind of expenditure.

In 2002-03, more than 73 percent of Brazilian households did not spend money on tobacco products, and this proportion was 11 percent higher than in 1995-96. In 2003, there was an increase in non-smoking households and a convergence of non smoking behavior across different income levels. Households that earned between 10 and 15 minimum wages, experienced the greatest increase in the proportion of non-smoking households, which could be interpreted as a result of the tobacco control policies implemented in the country.

Lower national levels of tobacco expenditure resulted from lower tobacco expenditure on smoking households (Table 11). The proportion of tobacco expenditures in total expenditures in smoking households decreased from 3 percent to almost 2 percent. This result could have been influenced by the relative variation of cigarette prices and monthly average incomes in the Brazilian economy.

Table 11. Proportion of Tobacco and Other Expenditures in Smoking Households in Metropolitan Areas

Expenditures	1995-96	2002-03
Current	84.84	93.06
Consumption	74.55	82.47
Tobacco	2.87	2.02
Cigarettes	2.86	1.94
Other Tobacco Products	0.01	0.01
Total	100	100

Source: IBGE Household Budget Surveys 1995-96 and 2002-03.

To be able to compare both moments, the study estimated the number of cigarette packs purchased by the average monthly income in January 1996 and January 2003. The purchasing power of wages in terms of cigarette packs decreased slightly between both periods. The average monthly income would buy 476 cigarette packs in January 1996, and 463 packs in January 2003. Consequently, the reduction of the proportion of tobacco expenditures in a smoking household may be due to a lower number of packs bought. An alternative explanation would be purchasing of illegal and cheaper cigarettes. However, the survey indicated that the proportion of cigarettes purchased at informal selling points was minimal.

In summary, the study identified two important changes in smoking habits. First, between 1995-6 and 2002-3, there was an increase of non–smoking households in Brazil from 66 percent to 73 percent. Second, with slightly higher cigarette prices relative to average income, tobacco expenditures decreased as a proportion of total expenditures from 2.9 percent to 1.9 percent. This is an indicator of behavior change suggesting that smokers consume on average less tobacco products. Due to the decrease of real cigarette prices between 1996 and 2003, the growth on non-smoking households could be due to other

factors, such as smoking restrictions on public places and/or more information about tobacco risks.

Table 12. Proportion of Non-Smoking Households by Gender, Age and Educational Level of Household Head

	Metropolitan areas			Non Metropolitan areas
	1996	2003	Variation	2003
Gender				
Male	64.5	72.3	12.1	71.2
Female	69.4	75.3	8.5	76.7
Age				
0 a 17	92.4	84.9	-8.1	80.8
18 a 24	74.1	79.0	6.5	78.2
25 a 34	68.8	75.9	10.4	75.0
35 a 44	59.0	72.3	22.5	71.8
45 a 59	62.2	67.5	8.5	67.3
more than 60	73.9	77.3	4.6	75.5
Education				
None	65.6	69.1	5.4	67.7
Up to 7 years	62.9	71.7	14.1	71.3
8 years	64.4	72.5	12.6	72.6
Up to 10 years	67.1	75.7	12.9	77.1
11 years	70.0	78.3	11.8	80.3
More than 12 years	71.7	76.7	7.1	79.3

Source: IBGE Household Budget Surveys 1995-96 and 2002-03.

However, the reaction was different according to age, gender or education characteristic. Illiterate and highly educated people, youngsters and women are those in need of more attention from tobacco control interventions. Men are apparently more responsive to information on tobacco hazards. Households headed by women have a greater proportion of non smoking units, but households headed by men had the greatest increase in non-smoking units in the period of analysis. The opposite happened in the group of households lead by younger people (less than 17 years), where the proportion of non-smoking households decreased, and a greater proportion of families had tobacco expenditures in 2003. Older people (35 and 44 years) were apparently more receptive to information about tobacco risks, as there was a significant increase in the proportion of non smoking households in this age-group. However, despite recent improvements, households led by people 35-59 years had the lowest percentage of non-smoking units. This age group started smoking before the tobacco control program started in Brazil.

The level of education conditions smoking habits. Normally, less educated people tend to smoke more than well-educated people. Also, after the national campaigns implemented by INCA and State Health Secretariats, one could expect a lower proportion of tobacco expenditures among well informed people or people with higher level of education which can better understand the new public information about tobacco risks. Available evidence indicates that uneducated and highly educated people seemed to be less aware of tobacco risks, and/or less responsive to the information about those risks. In 2003, 69 percent of households headed by an uneducated person did not smoke as compared to the national average of 73 percent, and 78 percent of households headed by someone with 11 years of education. Between 1996 and 2003, households headed by illiterate people experienced the lowest rate of increase in the percentage of non-smoking households (5.4 percent). In 1996, households led by a person with more than 12 years of schooling had the highest proportion of non-smoking households, but the participation of non-smoking households in this group grew only 7 percent between 1996 and 2003.

The analysis of the proportion of non-smoking households by level of education and income shows that in most of them the head had more than 8 years of education. The two highest proportions of non smoking households in each income bracket are marked in Table 13. Despite the association between education and non-smoking, it is interesting to note that the highest proportion of non-smoking households was not found among those where the head earns more than 15 minimum wages, and has more than 12 years of education. This suggests lack of smoking cessation programs among highly educated people in the period 1996-2003.

Table 13. Proportion of Non-Smoking Households by Education and Income Level of Household Head

Monthly Household income # Minimum wages	**Education**					
	None	**Up to 7 years**	**8 years**	**Up to 10 years**	**11 years**	**More than 12 years**
Up to 2	**79.2**	**77.0**	**69.9**	**71.1**	**84.1**	**64.0**
+ 2-3	**71.3**	**76.6**	**88.5**	**81.3**	**79.5**	**94.1**
+3-5	**69.9**	**68.3**	**76.3**	**77.5**	**75.9**	**77.7**
+5-6	**76.0**	**75.1**	**66.3**	**72.1**	**82.6**	**86.8**
+6-8	**73.9**	**68.0**	**66.2**	**72.7**	**72.3**	**82.7**
+8-10	**65.2**	**74.1**	**72.0**	**83.7**	**73.9**	**73.2**
+10-15	**58.8**	**69.2**	**61.8**	**58.7**	**77.3**	**87.0**
+15-20	**21.9**	**67.8**	**77.0**	**81.2**	**78.7**	**66.0**
+20-30	**82.3**	**77.5**	**59.7**	**73.6**	**79.6**	**71.7**
+30	**.**	**76.4**	**100.0**	**65.3**	**62.1**	**75.4**

Source: IBGE Household Budget Surveys 2002-03.

A reduction in the proportion of non-smoking households was observed in households headed by people with 8 or more years of schooling, and households that earn between 15 and 30 minimum wages. On the contrary, the proportion of non-smoking households increased among those led by people with up to 7 years of school, no matter the income level. On Table 14, marked cells identify cases of reduction in the proportion of non-smoking households.

Table 14. Change in the Proportion of Non-Smoking Households by Education and Income Level 1996-2003 (%)

Monthly Household income # Minimum wages	**Education**					
	None	**Up to 7 years**	**8 years**	**Up to 10 years**	**11 years**	**More than 12 years**
Up to 2	**12.5**	**9.9**	**-5.7**	**17.4**	**10.0**	**-25.2**
+ 2-3	**16.5**	**17.8**	**27.6**	**32.8**	**23.5**	**19.1**
+3-5	**-0.7**	**11.1**	**20.4**	**3.8**	**4.5**	**-8.5**
+5-6	**9.3**	**35.4**	**-5.0**	**-20.3**	**23.9**	**4.4**
+6-8	**76.6**	**20.0**	**-4.5**	**17.0**	**2.1**	**14.2**
+8-10	**-11.5**	**14.1**	**40.0**	**30.9**	**10.6**	**6.4**
+10-15	**38.8**	**15.9**	**1.2**	**-4.0**	**9.2**	**36.6**
+15-20	**-63.0**	**8.5**	**47.1**	**8.5**	**15.4**	**-13.7**
+20-30	**-2.5**	**37.8**	**-6.9**	**81.9**	**15.2**	**-4.8**
+30		**23.1**	**101.4**	**-16.6**	**-12.3**	**9.5**

Source: IBGE Household Budget Surveys 1995-2006 and 2002-03.

Although more educated households tend to have a lower proportion of smoking units, cigarette expenditure of smoking households tends to increase with the level of education in each income bracket (Table 15). Cigarette expenditure increases systematically from those households headed by illiterate people to those headed by people with 8 years of education, for almost all income brackets. After that, the behavior is more mixed, although the most common behavior is for expenditures to increase with education level.

The World Health Survey identified a higher prevalence of smoking among those with high school and more, than among those with secondary school. The IDCRM survey found high prevalence rates among those with complete elementary school or more, in highly educated and populated cities, such as Belo Horizonte, Curitiba, Florianopolis, Porto Alegre, Rio de Janeiro and São Paulo. The Household Budget surveys shows that: i) highly educated smokers tend to spend more on tobacco products than their counterparts with less education and the same income level; ii) the proportion of non-smoking household among those with more than 12 years of education increased less than among those led by less educated people; and iii) there was a decrease of non-smoking households for well educated people at different levels of income between 1996 and 2003.

Table 15. Proportion of Cigarette Expenditure by Education and Income Level 2003 Smoking Households

	Level of education of the head					
Monthly Household income # Minimum wages	**None**	**Up to 7 years**	**8 years**	**Up to 10 years**	**11 years**	**More than 12 years**
Up to 2	6.77	7.34	8.77	7.76	10.70	8.51
+ 2-3	6.17	7.33	9.67	10.67	9.21	7.01
+3-5	6.19	8.56	9.55	13.12	10.33	9.62
+5-6	4.20	9.33	9.20	8.09	12.59	14.32
+6-8	5.34	8.66	9.97	9.72	12.84	16.69
+8-10	5.39	8.40	13.69	8.27	13.06	12.36
+10-15	7.03	7.46	9.45	9.02	10.65	15.24
+15-20	7.35	9.59	10.19	11.13	14.89	16.67
+20-30	6.39	8.92	19.31	13.33	14.16	15.04
+30	0.88	12.58	12.27	22.43	14.29	16.01

Source: IBGE Household Budget Surveys 2002-03.

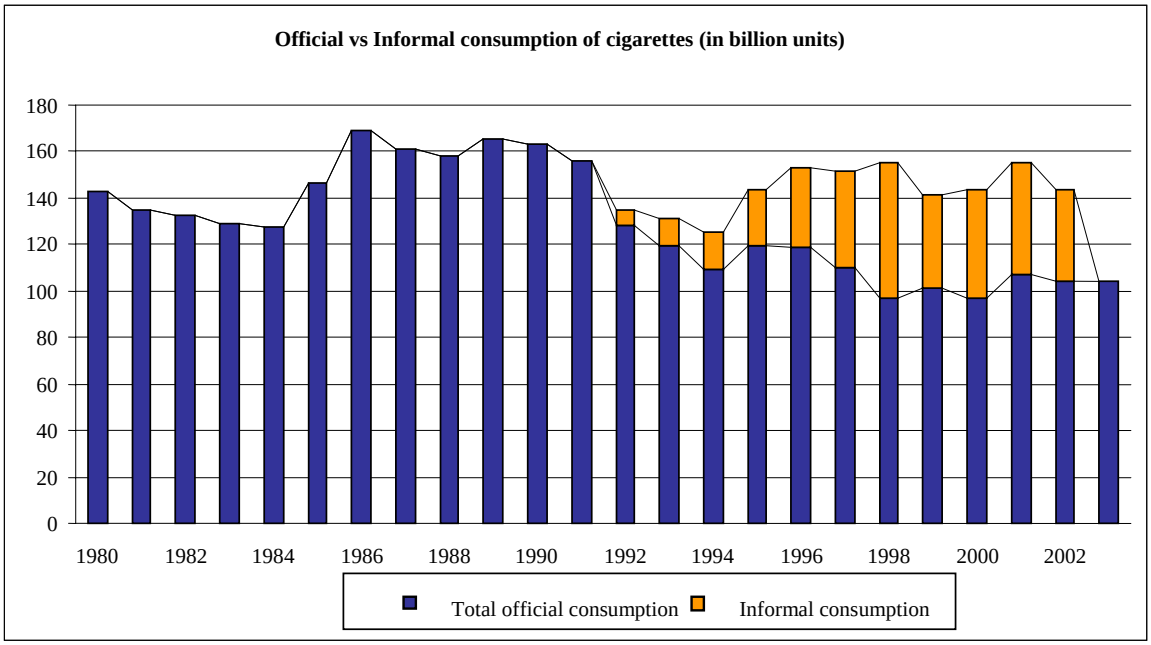
This evidence highlights the difficulty of reaching highly educated people with information and other tobacco control interventions. Simple messages or frightening photographs may not be the best way to motivate highly educated people. More research is needed on how to reach this group. The analysis shows that people with a higher education level are less likely to smoke. Consequently, it is possible to find a higher proportion of non-smoking households at higher levels of education for each income bracket. However, there were reductions in the percentage of non-smoking households among households with 8 or more years of education, at different income levels, between 1996 and 2003. As a result, in 2003, households earning 15 to 30 minimum wages, and with 12 and more years of education, had a relative lower proportion of non-smoking households. Finally, smokers with higher levels of education tend to spend a higher proportion of their income on tobacco products, whatever their income level, which suggests that they buy more expensive cigarettes and other tobacco products.

Illegal Trade[45]

The illegal trade of cigarettes accounts for about 30 percent of total cigarette consumption in Brazil, and its participation in total consumption is growing (Graph 9). While legal cigarette consumption decreased since 1986, illegal consumption increased between 1992 and 1998, reaching 500 cigarettes per adult, and then gradually decreased, reaching an annual average of 310 cigarettes per adult in recent years. This suggests that tobacco control policies have been effective in reducing legal consumption, but they have been less effective in reaching the illegal market.

[45] This section is based on Iglesias and Nicolau 2006.

Graph 9. Total Legal and Illegal Consumption



Source: Iglesias e Nicolau 2006.

The illegal tobacco market is outside the scope of existing public policies aimed at controlling consumption. It works without the benefit of public health controls applied to the legal product; it operates free of taxes, which could be used to finance the high social costs associated with smoking and could help regulate the price; and it operates without providing any information to the consumer about the risks of cigarette consumption. Lack of information about tobacco products sold on the illegal market aggravates the asymmetry of information that the consumer has.

The illegal cigarette trade in Brazil basically involves three different activities:

(i) **Smuggling**: cigarettes brought from abroad without paying import duties or other domestic taxes. An important part of smuggling between 1992 and 1998 was of Brazilian cigarettes exported to Paraguay, and illegally reintroduced in the country, without paying import duties and other domestic taxes. As exported products, those cigarettes were not required to pay domestic and specific taxes.

(ii) **Tax Evasion**: cigarettes produced domestically without paying taxes and without any control from authorities. These cigarettes are produced by firms that do not pay taxes and are not registered as cigarette producers in the Secretariat of Federal Revenue (SRF). Recently, the Secretariat also started considering as part of the informal market cigarettes produced by registered firms that do not pay taxes and are involved in legal disputes with the Secretariat.

(iii) **Counterfeiting:** cigarettes that imitate a local brand, are also marketed tax-free and are usually produced abroad.

Data currently available on illegal trade comes from surveys conducted by Nielsen.[46] Survey data are disseminated by Souza Cruz, which is the largest cigarette manufacturer in the country, and the Tobacco Industry Association (ABIFUMO). The Nielsen surveys are the main source of data on the illegal market. Since 2003, the Secretariat of Federal Revenue, which oversees payment of taxes on cigarette production and on imports admitted into the country, has provided estimates of illegal trade without disclosing the methodology. There are no other independent sources of data on the illegal market.

Illegal Cigarette Consumption

The illegal consumption grew rapidly between 1992 and 1998, from 5 percent to 37 percent of total consumption, declined after the currency devaluation in 1999, and recovered slightly between 2000 and 2001. The legal market reached its highest level – over 160 billion cigarettes per year – in the second half of the 1980s. After that, as a result of falling income and rises in the real price of legal cigarettes, total formal consumption began to decline in the first half of the 1990s, ultimately stabilizing at about 100 billion units a year.

Between 1994 and 1998, the real appreciation of the Brazilian currency brought down the relative cost of smuggled products.[47] Also, rising consumer income after the 1994 stabilization program led to an upswing in the consumption of illegal cigarettes, with weak impacts on legal consumption.[48] As a result of these two factors pushing illegal consumption, total combined cigarette consumption (formal and informal) nearly returned to the peak levels of the 1980s. After 1999, illegal cigarettes became less attractive because devaluation increased the relative price of smuggled cigarettes. The share of illegal cigarettes in total consumption fell and remained around 30 percent from 1999 onward, with a decreasing participation in recent years.

The drop in real income that accompanied depreciation seems to have mainly affected the illegal market. This market shrank considerably, falling from 524 cigarettes per adult per year in 1998, to 357 cigarettes in 1999. Between the mid-2000 and mid-2001, another real exchange appreciation reduced the cost of smuggled products. This coupled with improvements in worker wages gave a new impetus to the illegal market, increasing the average consumption per adult per year to 400 cigarettes. In recent years, illegal consumption decreased to an annual average of 310 cigarettes per adult.

Shares of the different segments or activities of the illegal market vary from year to year, but the Nielsen surveys indicate that about 60 percent of the illegal market corresponds to smuggled products, 30 percent to non-taxed products, and about 10 percent to counterfeit products. In 2002, for example, contraband accounted for 58 percent of the

[46] Nielsen is an international survey company recognized for its high technical quality.
[47] A real appreciation of the domestic currency reduces the relative price of imported products vis-à-vis their domestic substitutes. In that situation, it is relatively cheaper to buy imported or foreign products.
[48] The econometric analysis shows that income variables do not explain legal consumption.

illegal market, counterfeit products for 13 percent, and tax evasion for the remaining 29 percent.[49]

The first reason for the illegal cigarettes to account for 30 percent of total market may be the difficulty of enforcing payment of import taxes and other duties in a country with extensive borders. The differential between Brazil tax rates and those of some of its neighbors creates an incentive to produce cigarettes in countries where taxes are lower and sell them in Brazil, where prices are higher, without paying taxes. However, although extensive borders and tax-related differentials existed before, this trend took off in the 1990s, which may be related to the country opening up to international trade, and increased globalization of crime.

The 1990s saw two major new trends that increased the supply of contraband or illegal products in Brazil. The first was the exportation of Brazilian cigarettes (which would thus be exempt from internal taxes such as IPI and ICMS) to bordering countries where the tax burden was lower. Cigarette factories in bordering countries and illegal factories in Brazil were a second source of supply to the illegal market. Specialists indicate that, after the Brazilian cigarettes entered the Paraguayan and Uruguayan markets, they returned to Brazil through illegal channels. This suspicion was based on the relative size of Brazilian cigarette exports, which was much higher than the size of consumption in bordering countries, and inconsistencies on data on Brazilian exports to these two countries and their import-export data.

Table 16. Cigarette Consumption in Paraguay and Uruguay and Brazil Exports to those Markets 1991-1998

Billions of cigarettes

	Paraguay Consumption	**Uruguay Consumption**
2000	2.5-3.0	4.0
	Brazil Exports to Paraguay	**Brazil Exports to Uruguay**
1991	2.1	0.14
1992	5.2	0.23
1993	10.2	0.23
1994	13.6	0.52
1995	19.4	0.57
1996	11.7	4.9
1997	18.1	2.5
1998	22.7	5.5

Source: Estimates for 1991-95[50]. SECEX/MDIC for 1996-98.

49 Souza Cruz 2003.

[50] Annual export value to Uruguay and Paraguay divided by export unit value of total cigarette exports from Brazil. Export unit values calculated as the ratio of total cigarette export value divided by cigarette-export quantities.

In relation to the size of bordering markets, it was estimated that Paraguay consumes almost 3 billion cigarettes per year and Uruguay 4 billion.[51] In 1992, Brazil exported to Paraguay 5.2 billion cigarettes, much more than the total consumption of this market. This does not consider Paraguayan domestic production, so the surplus of import less domestic consumption was higher. As for Uruguay, by 1996 Brazilian exports were as much as 4.9 billion, also a higher quantity than total consumption in this country.

The paradox of this flow is that Paraguay almost did not officially export, nor re-export, any quantity of those imported cigarettes between 1991 and 1998. Table 17 shows official Paraguayan data on imports, exports and net imports (imports minus exports) between 1991 and 2001. As the data were presented in kilograms, the last column presents a rough estimation of net imports in terms of cigarettes.[52] Even with this imperfect estimate, between 1996 and 1998, Paraguay imported in net terms more than 30 billions of cigarettes, ten times its domestic consumption.

Table 17. Paraguayan Trade Data and Estimated Net Imports in Cigarettes

	Imports*	Exports*	Net Imports	Packages
	Kg	kg	Kg	billon
1991	3,994,524	0	3,994,524	3.82
1992	3,747,217	0	3,747,217	3.59
1993	3,668,110	94,406	3,573,704	3.42
1994	9,024,477	109	9,024,368	8.63
1995	22,811,338	0	22,811,338	21.83
1996	33,745,148	0	33,745,148	32.29
1997	36,922,992	39,028	36,883,964	35.29
1998	35,451,744	n.d	35,451,744	33.92
1999	16,658,810	2,874,983	13,783,827	13.19
2000	10,320,899	3,739,865	6,581,034	6.30
2001	6,222,349	3,840,861	2,381,488	2.28

Source: COMTRADE http://unstats.un.org/unsd/comtrade/default.aspx
Net imports = Imports – Exports

Brazilian official export data in kilograms to Paraguay and Uruguay, and imports from Brazil as registered by Paraguayan and Uruguayan authorities suggest that Brazilian cigarette exports to Uruguay and Paraguay fed the illegal market for six years (Table 18).

[51] Cabral 2001.
[52] This is a very rough estimate. Brazilian cigarette trade data to Paraguay was used to estimate an annual ratio, transforming kilograms into number of cigarettes. Then, this relationship was applied to kilograms imported by Paraguay from all sources.

Table 18. Cigarette Trade between Brazil, Paraguay and Uruguay

		Brazil Exports	Paraguay and Uruguay Imports	Difference
	Countries	**Net Weight** Kg	**Net Weight** Kg	**Net Weight** Kg
1991	Paraguay	2,585,812	0	2,585,812
	Uruguay	49,539	NA	49,539
1992	Paraguay	5,702,882	4,500	5,698,382
	Uruguay	152,769	NA	152,769
1993	Paraguay	11,117,566	2,375	11,115,191
	Uruguay	316,500	NA	316,500
1994	Paraguay	13,308,683	3262,625	10,046,058
	Uruguay	886,625	0	886,625
1995	Paraguay	17,838,344	16,041,281	1,797,063
	Uruguay	1,246,375	0	1,246,375
1996	Paraguay	12,920,156	24,726,584	-11,806,428
	Uruguay	4,885,785	0	4,885,785
1997	Paraguay	19,435,612	25,690,188	-6,254,576
	Uruguay	2,522,375	0	2,522,375
1998	Paraguay	23,354,496	22,092,612	1,261,884
	Uruguay	5,505,886	0	5,505,886
1999	Paraguay	616,437	4,171,167	-3,554,730
	Uruguay	484,937	0	484,937
2000	Paraguay	0	430,375	-430,375
	Uruguay	0	0	0
2001	Paraguay	0	26,230	-26,230
	Uruguay	0	0	0
2002	Paraguay	0	0	0
	Uruguay	0	0	0

Source: COMTRADE http://unstats.un.org/unsd/comtrade/default.aspx.

One the one hand, Uruguay did not have any register of cigarette imports between 1991 and 1993, and there were no imports from Brazil between 1994 and 1999. During those years, Brazilian declared exports to Uruguay amounting to 16 million of tons. On the other hand, Paraguay presented a systematic underestimation of the cigarette imports from Brazil between 1991 and 1995. This underestimation amounted to 29 million of tons. After that, a more mixed situation was observed with underestimation and overestimation in relation to Brazilian data. After this very special export market flourished for six years, in December 1998 the Brazilian government issued a decree that levied an export tax of 150 percent on cigarettes destined to countries in South and Central America and the Caribbean. This tax became effective in January 1999. As a result, cigarette exports to Paraguay and Uruguay plunged, and with this single stroke, one source of supply to the illegal market was cut off.

The rapidly multiplying cigarette factories in bordering countries and illegal factories in Brazil are the second source of supply to the Brazilian illegal market. Many of the illegal products come from factories in Paraguay and, to a lesser extent, factories in Uruguay. The number of factories in Paraguay, and their capacity increased significantly during the 1990s. The number of factories in the bordering countries supplying the illegal market grew from 5 to 17 between 1993 and 2000. During that same period, the number of illegal factories in Brazil grew from 6 to 10. Installed capacity for illegal cigarette production grew impressively, reaching about 100 billion units in 2000. [53]

The capacity for illegal cigarette production has continued to expand in recent years. It is estimated that Paraguay's production is more than 3 times greater than its domestic consumption and export volumes: the country manufactures 87 billion units per year for a domestic market of 2.5-3 billion, and official total cigarette exports of 25-30 billion cigarettes per year between 1999 and 2004. [54] A Paraguayan report mentioned a smaller figure of domestic consumption, around 1.5 billion in 1997, and a higher production capacity of 155 billion cigarettes in 2002, according to official figures.[55]

Cigarette factories in Paraguay and Uruguay have encouraged exports from Brazilian suppliers for the manufacture of cigarettes in those countries. Since the Brazilian government perceived that the increase in the Paraguayan and Uruguayan demand for cigarette supplies (tobacco and paper) resulted from the expansion of companies that were supplying the illegal market in Brazil, authorities decided to make these supplies more expensive for producers in the neighboring countries. A tax of 150 percent was levied on exports of leaf tobacco (manufactured and non-manufactured) destined for Paraguay and Uruguay. At the same time, another tax of 150 percent was levied on exports of cigarette paper and cigarette filter cylinders shipped to any country in South or Central America or the Caribbean. This latter tax was revoked in 2003 by decision of the new government.

Finally, in order to reduce tax evasion and curtail the activity of illegal factories in Brazil, the Secretariat of Federal Revenue introduced in 1999 a series of measures intended to tighten control. These measures consisted of a special registry for cigarette producers; a control stamp; a special declaration; distance monitoring; and ongoing surveillance. Increased government control will shore up the government's monitoring of the companies that is already watching, but it will not capture illegal companies that are operating far beyond the control of the Secretariat. Unless the government and Federal Revenue increase intelligence aimed at combating crime and expanding surveillance into the streets and businesses, illegal producers and vendors, which are protected in peripheral neighborhoods of the major metropolitan regions and cities of the interior, will not be eliminated. The SRF and Federal Police should systematically study seizures of illegal cigarettes to identify patterns such as origin, type, means of transportation, and other important variables, to better understand the pathways of organized crime.

[53] Cabral 2001.
[54] Cabral 2001.
[55] PAHO 2004. The Economics of Tobacco Control in Mercosur and associates, Paraguay Report.

The Economics of the Illegal Cigarette Market in Brazil

To further explain the growth of the illegal market, it is necessary to look at demand and supply factors. From the point of view of demand, the decision to change the number consumed of one or another type of cigarette depends basically on usual economic factors, such as relative price and taste, and institutional restrictions to the functioning of the illegal market. Brazilian illegal cigarettes are a substitute for legal cigarettes among low-income population. A study described the social characteristics of consumers of illegal cigarettes: most of the consumers are men (74 percent), over 35 years of age (62 percent), and 88 percent of them belong to lower income classes[56]. The main factors for choosing the illegal product are lower prices and availability.

In the 1990s, there was an important difference between domestic legal prices and nominal prices of illegal cigarettes (Tables 19 and 20).

Table 19. Cigarette Nominal Prices (US$ per pack)

	Domestic Legal Market	Import Unit Value Total Imports	Import Unit Value Mercosul	Export unit value to Paraguay	Export Unit Value to Uruguay	Illegal Market
1996	1.28	…	0.912	0.156	0.149	…
1997	1.27	0.216	0.247	0.174	0.198	…
1998	1.24	0.207	…	0.189	0.210	…
1999	0.76	0.137	…	0.137	0.173	…
2000	0.75	0.176	…	…	…	…
2001	0.60	0.038	…	…	…	0.319
2002	0.53	0.150	…	…	…	0.257
2003	0.58	0.140	…	…	…	0.244

Sources: Iglesias and Nicolau 2006.
Imported products (FOB): web Alice- SECEX These prices do not include domestic taxes, such as IPI, ICMS and other specific taxes. Exported products (FOB): web Alice –SECEX.

Table 20. Ratio of Domestic Legal Cigarette Prices to Legally & Illegally Imported Cigarettes

	Import Unit Value Total Imports	Import Unit Value Mercosul	Export unit value to Paraguay	Export Unit Value to Uruguay)	Illegal Market
1996		1.41	8.26	8.62	…
1997	5.85	5.13	7.29	6.39	…
1998	5.99	…	6.58	5.92	…
1999	5.59	…	5.58	4.43	…
2000	4.25	…	…	…	…
2001	15.71	…	…	…	1.88
2002	3.51	…	…	…	2.05
2003	4.15	…	…	…	2.38

Source: Iglesias and Nicolau 2006.

[56] Lagreca RH 2003.

Unit values of cigarette exports to Paraguay were lower than any import unit value from all origins. More important, these export unit values were approximately six times lower than the cost of legal cigarettes in the period 1996-98. From the point of view of supply, cigarettes illegally reintroduced in Brazil from Paraguay could be placed at informal sales points at prices substantially lower than legal ones with substantial profits, even considering transport costs and several intermediation margins. In other words, illegal supply could undercut cigarette prices and gain a substantial market share of the tobacco market, which happened in Brazilian cities in the 1990s.

From the point of view of demand, the existence of illegal cigarettes at substantial lower prices attracted to that market consumers with high elasticity to relative prices of the product. As higher relative price elasticities for non-food goods are more common among low-income people, it is our presumption that mainly lower income people were attracted to the illegal market. This is confirmed by the results of the Nielsen survey and specialist's opinions. After the 1999 devaluation, legal domestic prices decreased in dollar terms, from an average of US$1.27 per pack in 1996-98 to US$0.57 in 2001-2003. That change certainly contributed to reduce the ratio of legal to illegal prices. Between 2001 and 2003, illegal prices were on average approximately half of those in the legal market. Also the ratio of legal price to import unit value decreased substantially from 1996-98 to 2000-03 (the high value of 2001 is not representative because imports were insignificant).

The growth in real income in1994-1998 led to an increase in cigarette consumption but, as illegal cigarettes were cheaper and their consumption was not repressed, consumers, particularly lower-income consumers, bought illegal cigarettes and contributed to the expansion of the illegal market. During those years, the relative price differential between legal and illegal cigarettes was associated with appreciation of the real exchange rate, which increased the dollar price of domestic cigarettes, while making smuggled products relatively cheaper. After the 1999 devaluation, the illegal market did not disappear. Evidence indicates that the price differentials between legal and illegal cigarette decreased in relation to the 1990s. However, demand for illegal cigarettes does not exclusively depend on relative prices. The strength of the illegal market also depends on the preferences of consumers, who seem to be accustomed to the illegal products. The distribution network mounted during the years of real appreciation continues to exist and to reach out to consumers.

CHAPTER 2

Burden of Disease & Health Care Costs due to Smoking

In this chapter, trends in lung cancer mortality and health care costs of smoking-related diseases are reviewed.

- Male lung cancer rates due to smoking decreased in Brazil in the period 1980-2004. However, this is partly offset by increases in female lung cancer rates, which may be due to increased smoking among women.
- Tobacco-related hospitalizations amounted to about R$1.1 billion (about US$0.5 billion, or 1.6 percent of the hospitalization budget) between 1996 and 2005.
- While the number of tobacco-related hospitalizations increased, the average cost decreased, suggesting the use of less costly procedures or lack of cost adjustments.

Lung Cancer Mortality Trends

The impact of tobacco control can be measured by changes in tobacco consumption, as well as tobacco-related outcomes. The study examined trends in lung cancer mortality among men and women over the time period of 1980-2004. The trends would help establish the background trends of tobacco-related deaths, the relationship to tobacco consumption, and relate these findings to the price and non-price interventions implemented.

The study compared lung cancer trends at young ages (35-44) from 1980-2004. While changes in lung cancer trends for older ages (45+) may be related to smoking that took place 20-30 years before, changes in lung cancer at younger ages may be related to relatively more recent changes in consumption (5-10 years). Lung cancer at these ages is sensitive to changes in cigarette consumption for several reasons.[57],[58] First, almost all lung cancer at these ages is due to smoking (with only a very low and generally stable background rate of lung cancer not attributed to smoking). Second, lung cancer at these ages is reasonably easy to diagnose and not easily misclassified with other causes of deaths. Third, there is little treatment for lung cancer so that mortality is a reasonable indicator of new lung cancers.

There are other indirect methods, including application of lung-cancer based "attributable fraction" models[59]. However, such indirect methods were beyond the scope of work in the present study, and moreover, have not been yet validated for tobacco-related deaths in Latin America. Similarly, examination of all cancer trends might lead to misclassification, as cancers other than lung cancer can be more likely influenced by

[57] Doll R, Peto R 1981.
[58] Zatonski W, Jha P 2000.
[59] Peto R, Lopez AD, Boreham Thun JM, Heath Jr. C 1994.

changes in treatment, co-existing risk factors (such as alcohol for esophageal cancers), and uncertainty of diagnosis of the cancer.

Data on age-specific lung cancer mortality (5 year age groups), underlying population demographics, and education level on death certificates were provided by the Ministry of Health (MoH). Brazil's death certification has been reasonably complete. The study compared the total number of deaths in the dataset provided by the MoH to the WHO's official estimation of numbers of deaths by age group, as reported from the Brazilian Government (Table 21). There were fewer deaths at all ages in the dataset we analyzed, but with a generally consistent deficit (greater among females than males) across age groups.

Table 21. Comparison of Study Mortality Counts with WHO 2000 data

Gender		35-39	45-49	55-59	65-69	75-79	Total
Male	WHO	29,116	36,338	43,748	57,773	58,523	686,323
	Present study	23,652	29,921	36,190	47,509	48,275	552,127
	Relative Difference (%)	19	18	17	18	18	20
Female	WHO	12,632	20,253	27,800	43,890	55,664	487,451
	Present study	9,924	15,956	21,894	34,128	42,645	393,606
	Relative Difference (%)	21	21	21	22	23	19

Sources: Brazil Ministry of Health 2006; WHO 2000.[60]

Data for lung cancer are based on the International Classification of Diseases (ICD), 9th revision for the years 1980-1988 and on the ICD-10th revision for 1989-2004. Previous studies have shown that these changes in the coding do not affect analyses of lung cancer mortality trends.[61]

Analyses consisted of stratifying deaths into the following age groups for each gender: 30-44, 45-69 and 70-79. Deaths above age 80 might be quite misclassified due to other conditions (given that deaths at older ages can have co-morbid diseases), and only constituted 9.9 percent of all deaths over the time period. All analyses were standardized to the 2004 Brazilian population, based on the age-pattern of deaths provided by the Minister of Health. Standard 99 percent confidence intervals were calculated based on the formula

$$99\%CI = \pm 2.576 * \frac{1}{\sum w_i} * \sqrt{\sum \left[{w_i}^2 * \left(\frac{p_i * (1 - p_i)}{n_i} \right) \right]}$$

where p_i is crude mortality rate of age i in study population, n_i is the number of people of age i in study population, and w_i is the proportion of people of age i in standard population. Graphic methods involved presenting the size of the yearly point estimate based on the total variance of that year, meaning that a large number of deaths provide a larger square for the point estimate. Test of trend was done as variance-weighted linear regression.

[60] Lopez AD et al 2002.
[61] Peto et al 1994 ibid.

A total of 251,322 deaths were included from 1980-2004, with the distribution by age and gender shown in Table 22. The growth in absolute number of lung cancer deaths from 1980-2004 represents an increase in the total population, plus the increasing hazards of smoking[62]. The absolute increase in lung cancer deaths is not fully explicable by population growth for males and females. For males, despite a nearly doubling of population in the various age-groups, the absolute number of lung cancer deaths rose less than expected at young ages (30-44), suggesting that the age-specific lung cancer rates fell. In contrast, the absolute number of lung cancer deaths rose in proportion to population growth at ages 45-69, but were twice as high as population growth at ages 70-79. This in turn reflects the fact that the full effects of prolonged smoking on lung cancer risks increase with duration of exposure[63]. For women, absolute increases in lung cancer outstrip population growth at young (30-44), middle (45-69) and older (70-79) ages. This suggests that the age-specific lung cancer rates rose. Thus the remainder of the discussion will focus on the age-specific rates.

Table 22. Distribution of Lung Cancer Deaths

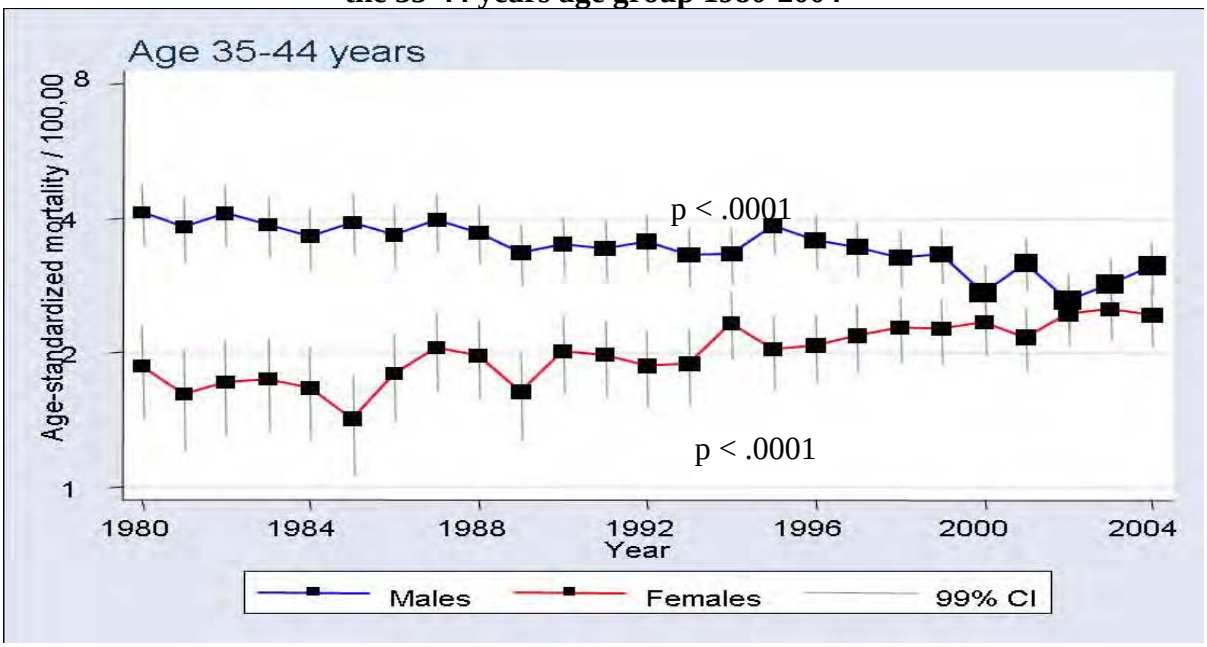
Gender	Age group	No. Lung Cancer Deaths 1980-2004	Relative Increase No. Lung Cancer Deaths 1980-2003 (%)	Relative increase in population 1980*-2003† (%)[64]
Male	30-44	8,512	31	95
	45-69	121,603	87	87
	70-79	53,512	205	109
	Total	183,627	111	93
Female	30-44	5,442	132	101
	45-69	42,817	229	105
	70-79	19,436	288	132
	Total	67,695	234	105

*Census data; †Factual estimate (latest year available).

The age-standardized trends in lung cancer mortality per 100,000 population by age group and gender are shown in Graphs 10 and 11. The figures use a doubling scale for each age-group (ranging from 1 to 8 for ages 35-44 and from 4 to 32 at ages 45-54). These show that lung cancer mortality at ages 35-44 among males has fallen by about ¼ over the time period, from about 4 to 3 per 100,000 (p for decline <0.0001). In contrast, lung cancer among females of the same ages has risen by about 30 percent from about 2 to 3 per 100,000 (p for increase <0.0001). Similarly, there are modest declines of 8 percent among males at ages 45-54, but much more marked increases of 65 percent among females. Data not shown indicates increases at older age groups (70 or higher) for both males and females.

[62] Peto R 1986.
[63] Peto R 1986; Peto et al 1994 ibid; Doll R., Peto R , Boreham J, Sutherland I 2004.
[64] United Nations Statistics Division 2006. Demographic Yearbook System.

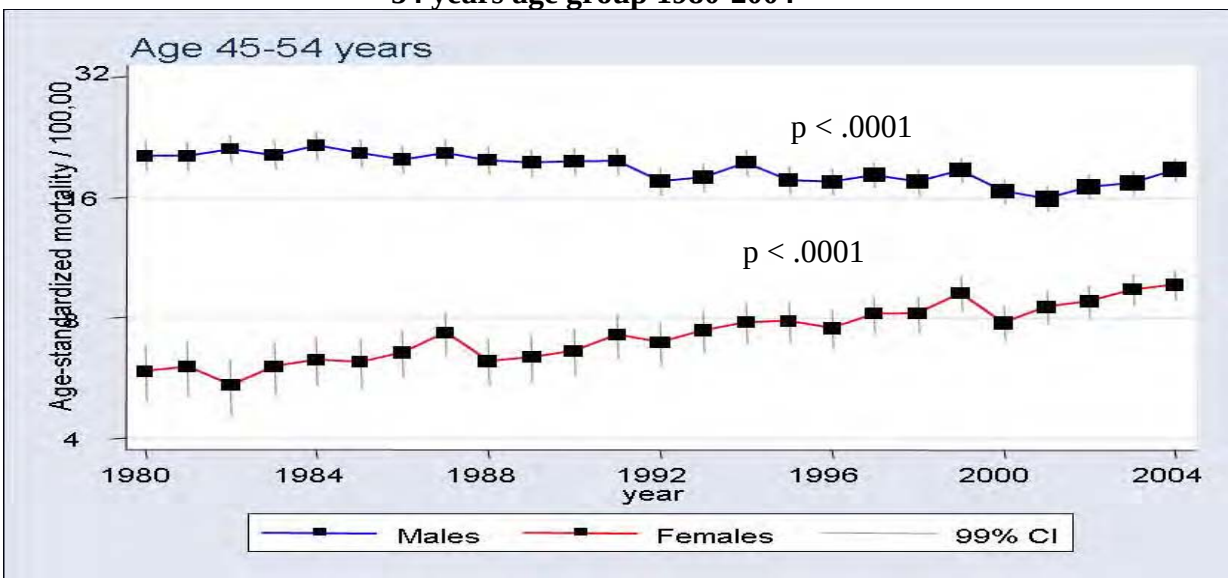
Graph 10. Age-Standardized Trends in Lung Cancer Mortality Rates by Gender in the 35-44 years age group 1980-2004



Males: Abs. Dif (2004 - 1980) = -1.00
Rel. Dif (2004 - 1980) = -24%

Females: Abs. Dif (2004 - 1980) = +0.56
Rel. Dif (2004 - 1980) = +30%

Graph 11. Age-Standardized Trends in Lung Cancer Mortality by Gender in the 45-54 years age group 1980-2004



Males: Abs. Dif (2004 - 1980) = -1.61
Rel. Dif (2004 - 1980) = -8%

Females: Abs. Dif (2004 - 1980) = +3.79
Rel. Dif (2004 - 1980) = +65%

Note: The area of black squares illustrates the relative amount of "information content" of the data coming from each year.

The major sources of bias in these trend analyses for lung cancer were described before. The number of deaths is reasonably large; and there were no major sources of change in diagnostic coding for lung cancer. However, the coverage of deaths in the Brazilian population in the preliminary analyses shows gaps that need to be clarified. The key observation is the decline in male lung cancer mortality at ages 35-44. In contrast, lung cancer deaths have risen for women aged 35-44.

What explains these findings, and specifically the divergence of male and female lung cancer mortality trends? An examination of the causes of these trends needs to be cautious, given data gaps identified. One key gap is the completeness of death registration, and it might be prudent to repeat the analyses for a state with higher completeness of death registration by cause to establish if these trends are not biased.

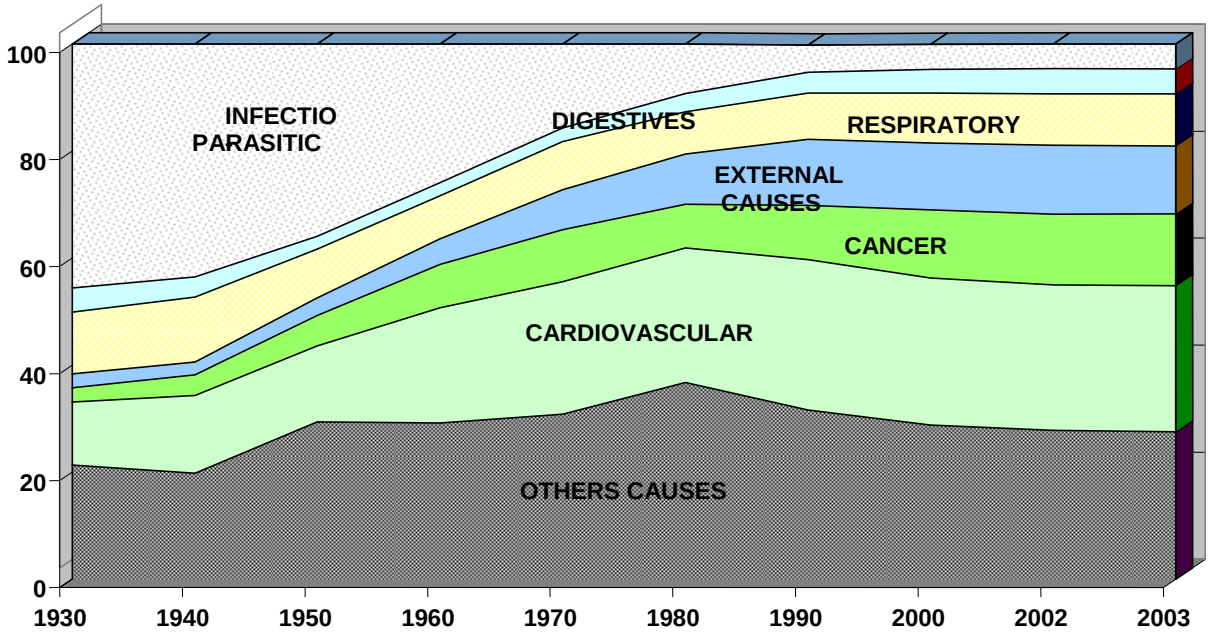
However a few points are worth noting. Cessation is highly effective at avoiding lung cancer rates, especially at younger ages. It appears that even modest increases in cessation by males might have reduced lung cancer rates in Brazil. However, only a few reliable surveys on smoking cessation have been done, such as the IDCRM surveys. An in-depth discussion of the reasons for cessation by males is beyond the scope of this study. However, as indicated before, a major price increase occurred in 1990-1992, but taxes have not increased since then to maintain the price increase. Other interventions that could have impacted only on male smoking, such as smoking restrictions in work places, have only been introduced recently. Thus, it might be too early to measure their impact on cessation. The tobacco industry may well have specific strategies to increase consumption among younger women. Finally, the divergence in male/female lung cancer has also been noted in other countries.

In conclusion, the above analyses of lung cancer trends suggest that Brazil has had some success in lowering male lung cancer rates due to smoking. However, this is partly offset by increases in female lung cancer rates. The chief conclusion is that the need to adopt more comprehensive programs, including those that raise the price of cigarettes and use non-price measures are needed to ensure reductions in death and disability from smoking. Price instruments are underused except for the one-time price increase in the early 1990s. Moreover, methods to decrease female smoking involve more aggressive control of advertising and promotion. Finally, the study points out the need for ongoing epidemiological monitoring, through specific epidemiological studies of lung and other cancers, placing of smoking questions on death certificates, and tracking ex-smoking rates in surveys.

Health-Care Costs of Tobacco-Related Diseases

In Brazil, where the epidemiological transition is not complete yet, old and new health problems coexist, with chronic and degenerative disorders predominating (Graph 12). Medical evidence on harm caused by smoking has been accumulating for many years. Smoking has proven to be a major cause of premature death and disease caused by cardiovascular and respiratory diseases, and cancer.

Graph 12. Distribution of Deaths by Cause in Brazil 1930-2003



Source: Brazil Ministry of Health Mortality Information System – SIM.

Evidence suggests that smokers consume more health care resources for each year that they live than non-smokers[65]. Precisely because smokers die earlier, their net lifetime healthcare costs are less likely to be very different from non-smokers. However, while net lifetime costs matter from an economic perspective, gross annual costs also matter from a budget perspective, considering the opportunity costs of budgets. Estimates of the health, social and economic costs of tobacco use are increasingly regarded as key for setting tobacco control strategies, such as raising taxes on cigarettes, developing cessation programs, and enforce smoke-free workplaces. Estimates of smoking costs are also valuable to policy makers when planning health service provision and other related public expenditures.

The study estimated health care costs of tobacco-related diseases in Brazil. The study analyzed records of hospitalizations paid by the SUS to health providers in the period 1996-2005. Hospital admittance authorizations (AIH) form a database that is the largest source of information produced by hospitals in the country. AIH information produced by the health care system can be accessed through the Hospital Information System of the Brazilian Unified Health System (SIH/SUS), and it is used by the Ministry of Health to control and pay for inpatient care.

The analysis shows that the impact of smoking on medical care utilization and its costs is serious. In Brazil, the number of hospitalizations for diseases analyzed increased significantly during the period. Total costs for inpatient care are significant - R$1.1 billion, corresponding to 8 percent of hospital costs for adults over 35 years. The study found that

[65] Lightwood et al 2000.

average costs for inpatient care for some tobacco-related diseases were either stable or decreased during the period, which suggests that less costly procedures are used, and/or costs have not been updated.

More studies about tobacco-related costs that effectively measure the total cost of treatment of these and other diseases caused by smoking are necessary. Such studies should include all inputs consumed during all phases of the treatment, taking into consideration SUS norms for human resources, technology and hospital infrastructure, and protocols of treatment. This information would help the formulation of public policies regarding allocation of resources for prevention and treatment.

The Brazilian Health Care System: Prospective Payment System (PPS). In 1984, Brazil adopted a prospective payment system (PPS) that groups diseases in 2,300 groups to reimburse hospitals and other health facilities. Since 1991, this system has been utilized by all services that depend on public financing, which provide the majority of health care in the country.[66] Payments for inpatient services are based on the AIH, representing 80 percent of the medical and hospital assistance of approximately 12 million hospitalizations per annum.[67] The form does not include important patient variables such as income and co-morbidities, which could have been the basis for the grouping system, together with costs and medical diagnosis. However, this database is the largest source of information on hospital activities in Brazil, and it also provides some epidemiological information. For outpatient services, health providers are also reimbursed by a PPS, but information about medical procedure and diagnosis is not collected according to the International Disease Classification-10th version (CID 10). [68]

The following diseases were considered: malignant neoplasm, ischemic heart disease, pneumonia and influenza. The study did not estimate hospitalization costs of vascular and chronic respiratory diseases; and it did not consider costs of chemotherapy and radiotherapy procedures.

Costs of some procedures do not reflect real prices of inpatient care. Information about costs of procedures may be underestimated, among other reasons due to lack of continuous price adjustment. Despite these issues, health costs have been estimated on the basis of information provided by SIH/SUS; this database can also be used to estimate costs of specific pathologies. A general price index was used to adjust annual current costs to 2005 prices. [69]

The frequency and expenses of tobacco related hospitalizations were weighted according to a simplified "smoking attributable fraction (SAF) model". Since there is no data available on SAFs for Brazil, the age and gender-specific SAFs were estimated using the following formula:

[66] Travassos Veras 1992.
[67] Laurenti et al 2000.
[68] Authorization System for Out-patient Procedures of High Complexity and/or Cost (APAC/SAI).
[69] Indice Geral de Preços from Getúlio Vargas Foundation.

SAF= (RR – 1)* prevalence/1+ (RR-1)* prevalence

The disease-specific SAF are derived from relative risk (RR) estimates from the American Cancer Prevention Study II (CPS-II). The prevalence by gender was taken from the 2003 Brazilian population-based survey[70]. Applying SAF to all AIH of tobacco-related diseases from 1996 to 2005, the attributable number of hospitalizations and expenses by age and gender were estimated (Table 23).

Table 23. Smoking-Attributable Risk (SAF) by Gender for Selected Diseases

Diseases	SAF	
	Male Smoker	**Female Smoker**
Cancer		
Cancer of lip, oral cavity and pharynx	0.20	0.12
Cancer of esophagus	0.19	0.13
Cancer of stomach	0.11	0.04
Cancer of pancreas	0.13	0.08
Cancer of larynx	0.21	0.13
Cancer of trachea, bronchus and lung	0.22	0.13
Cancer of bladder	0.16	0.08
Cancer of cervix uteri	-	0.05
Cardiovascular Diseases		
Ischemic Heart Disease		
Persons 35–64	0.14	0.10
Persons 65+	0.08	0.05
Influenza and pneumonia	0.10	0.08

Source: CDC 2006; World Health Survey - Brazil 2003.

From 1996 to 2005, there were over 1 million hospitalizations attributable to smoking. Hospitalizations from pneumonia, influenza and ischemic heart disease were responsible for 88 percent of those hospitalizations in the period. Hospitalizations from cancer, ischemic heart disease, influenza and pneumonia attributable to smoking cost a total of R$1.1 billion (2005 prices). Men spent R$740 million in inpatient care due to smoking, and women R$330 million. R$517 million (47 percent) were due to ischemic heart disease, and R$132.3 million (12 percent) to cancer. Ischemic heart disease hospitalization among men cost R$389 million, and among women R$127.5 million. Hospitalizations due to influenza and pneumonia cost R$339 million, R$198 million for men, and R$141 million for women. Approximately half of male costs were due to four cancers: leukemia (20 percent) cancer of the lip, oral cavity and pharynx (18 percent), cancer of esophagus (16 percent) and cancer of trachea, bronchus and lung (15 percent). Among women, cancers of lip, oral cavity and pharynx (22 percent), trachea, bronchus and lung (21 percent) and esophagus (17 percent) were the most common.

[70] World Health Survey – Brazil 2003

Lung Cancer

Hospitalization for lung cancer attributable to smoking among males has increased over the years, at a steeper rate since 2001 (Graph 13). In 2005, the number of AIHs for men was about 13 percent higher than in 1996 and 84 percent higher for women. This may be due to increased smoking prevalence among males in previous decades, and significant increases in smoking among females more recently. However, it also reflects improvements in the quality of cancer recording and billing systems.

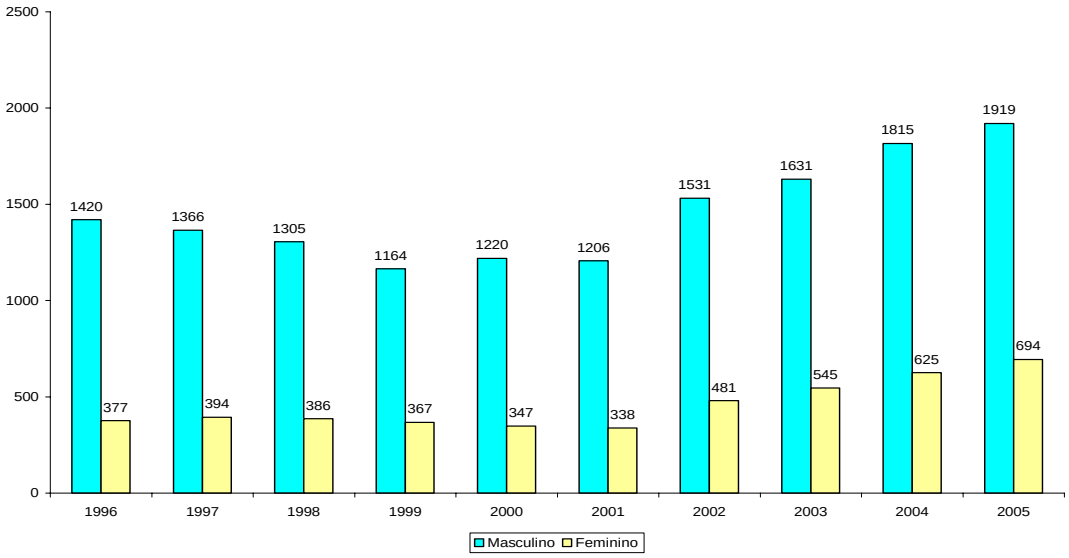
Total cost of hospitalization in the SUS due to lung cancer was about R$24.1 million in the period 1996-2005, of which R$18.5 million was for males and R$5.6 million for females. Hospital treatment accounted for R$2.41 million annually. These costs include hospital payments, but do not take into account costs of chemotherapy and radiotherapy, which are included in the out-patient payment system.

The total cost increased since 2003, accompanying the growth in the number of AIHs (Graph 14). From 1996 to 2005, 19,130 AIH were registered, with an average cost of R$1,259.43 per hospitalization. The average cost per hospitalization decreased significantly in real terms. Consequently, the increase in the number of AIHs was accompanied by a reduction in the real amount paid for lung cancer inpatient care. Lower average payments could mean that hospitals were using less costly procedures. However, lower real values may also be due to lack of periodic readjustments or lower-than general inflation adjustments.

Cancer of the Larynx

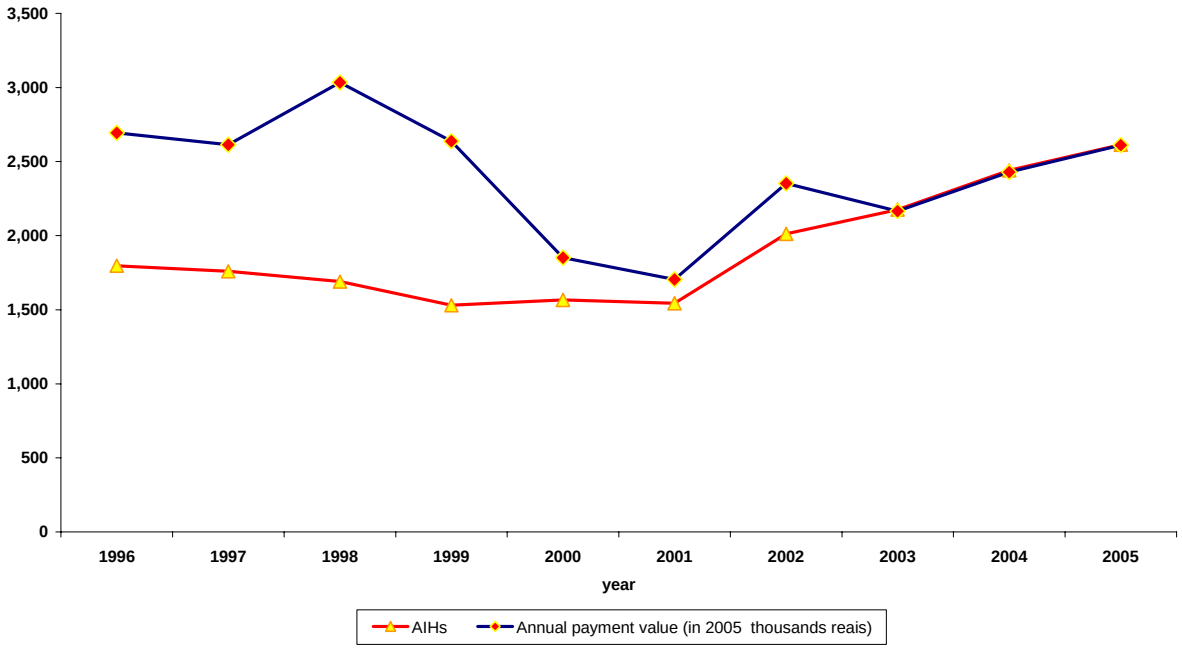
Hospitalization costs for cancer of the larynx during the period reached about R$15.3 million, of which R$13.9 million were for males and R$1.4 million for females. Hospital treatment cost R$1.53 million per year. Between 1996 and 2005, hospitalizations by cancer of the larynx among men increased 57 percent, and among women 56 percent, which could be due to increased smoking, and to improvements in recording. The average payment of hospital procedures for cancer of the larynx decreased over the years for both sexes (Graph 16). Again, this suggests an absence of price readjustments that maintain real values for these procedures.

Graph 13. Lung Cancer Hospitalizations by Gender 1996-2005



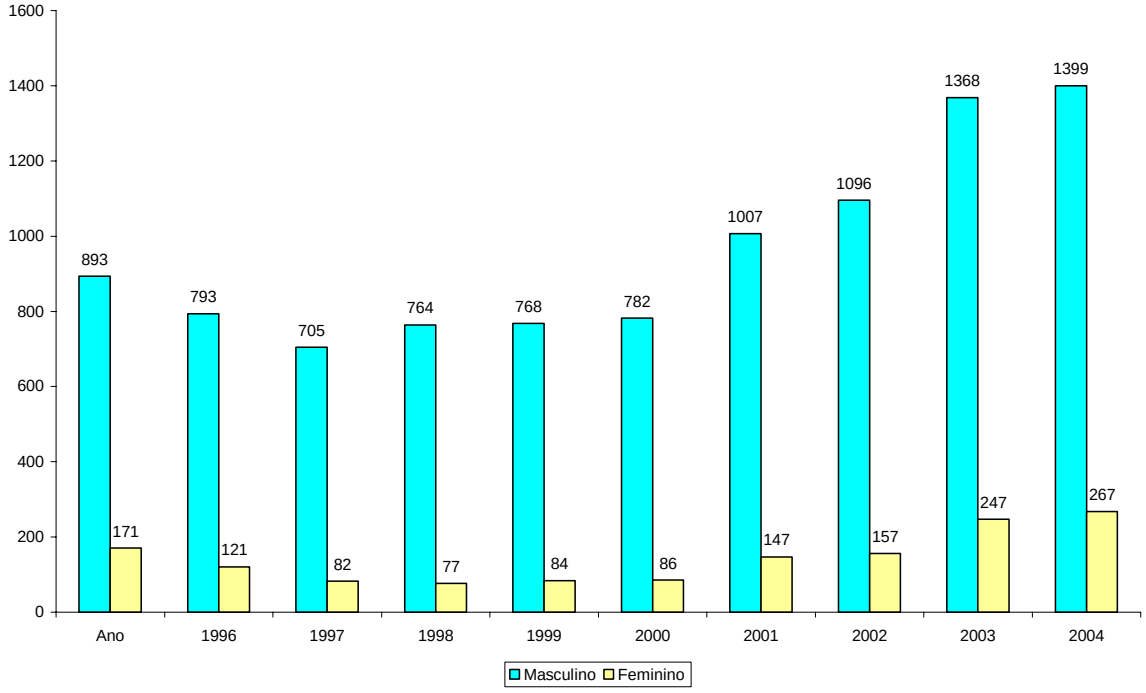
Source: SIH-SUS

Graph 14. Lung Cancer Hospitalizations and Costs 1996-2005
In thousands – 2005 prices



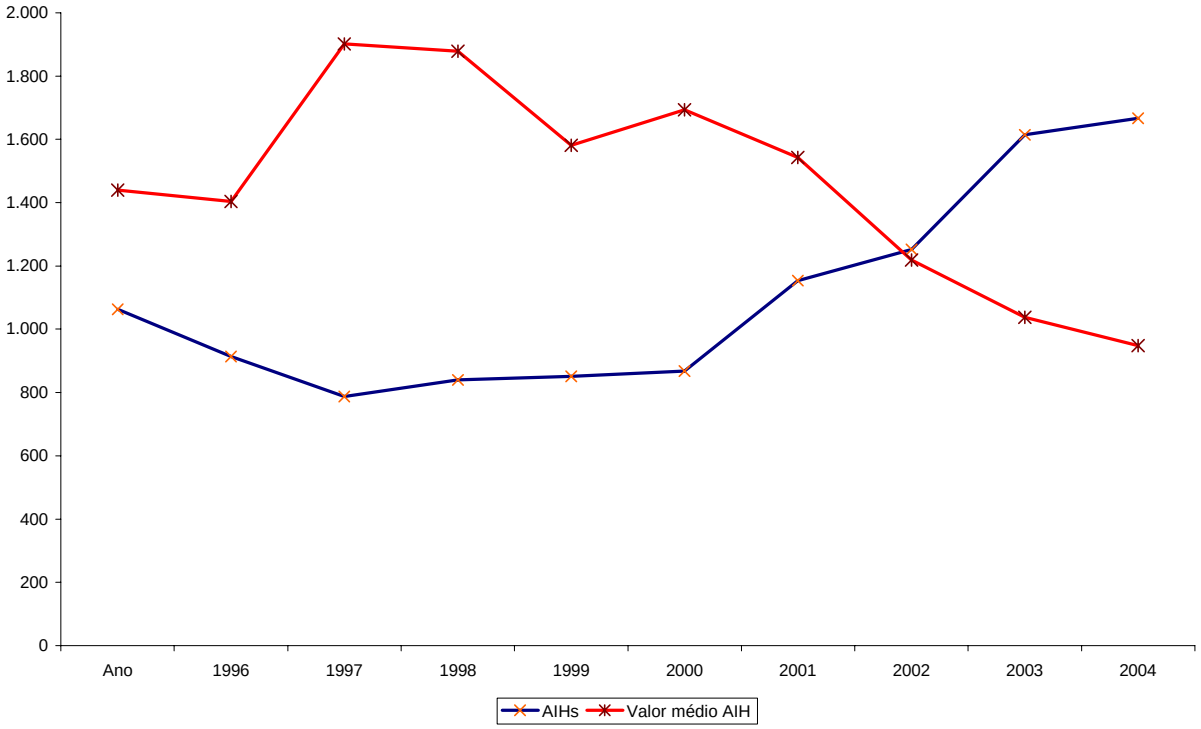
Source: SIH–SUS.

Graph 15. Cancer of Larynx Hospitalizations by Gender 1996-2005



Source: SIH-SUS

Graph 16. Cancer of Larynx Hospitalizations and Average Costs 1996-2005
2005 prices



Source: SIH-SUS.

Cancer of the Lip, Oral Cavity and Pharynx

Costs of hospitalization for this cancer group reached R$28.7 million between 1996 and 2005, of which R$22.9 million were for men and R$5.8 million for women. The average annual cost was R$2.87 million. The behavior of hospitalization for this cancer group is similar to that seen for lung and larynx cancers (Graph 17). However, the increase in hospitalizations was substantially higher. Between 1996 and 2005, there was an increase of 135 percent in the number of hospitalizations for males, and 129 percent for females. As these three cancers are grouped in the database, it was not possible to identify which contributed the most to hospitalizations and costs. Graph 18 shows that while the number of hospitalizations increased in the period 1998-2005, average cost of hospitalization for these types of cancer declined, similarly to what happened with hospitalizations due to cancers of the lung and larynx.

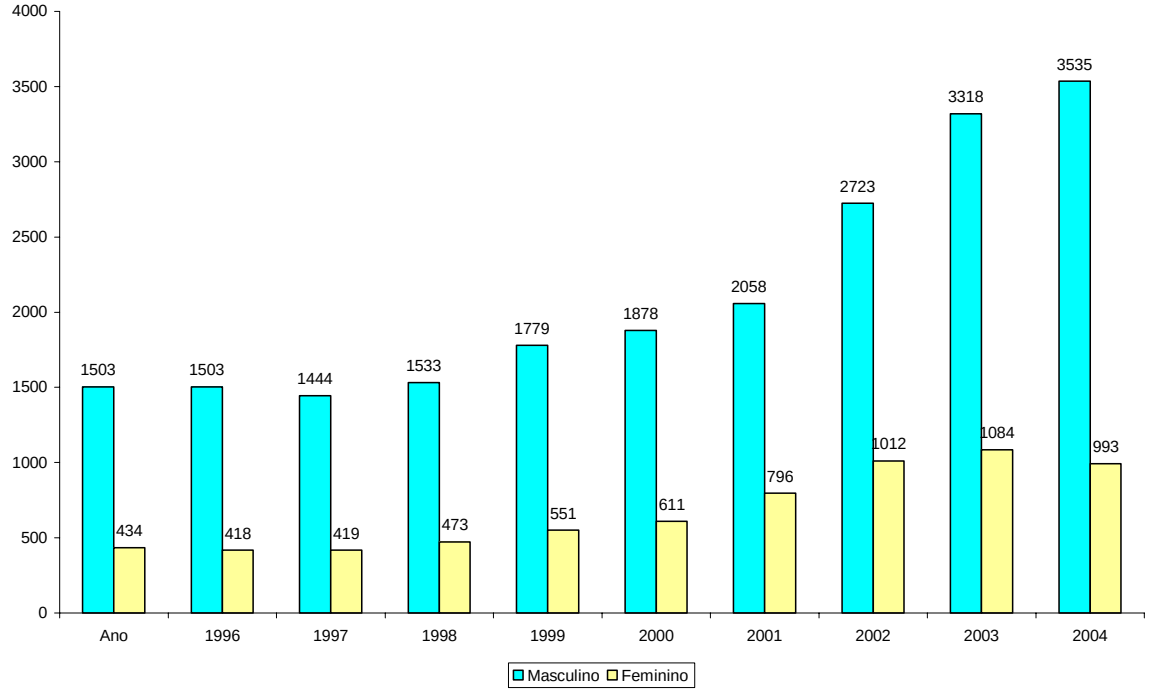
Cancer of the Esophagus

Cancer of the esophagus accounted for a total cost of R$24.39 million during the period under analysis, of which the greater part – R$20.07 million – corresponded once again to hospitalization for males, and the remainder R$4.32 million for females. Annually, the costs for hospitalizations were on average R$2.43 million. These costs are higher than those of cancer of the lip, mouth, pharynx and larynx, showing values close to those for lung cancer. Graph 19 shows that the number of AIHs increased over the last few years, especially since 1999. For females, the number of AIHs almost doubled (97 percent increase) between 1996 and 2005, while for males the increase was smaller, but it was still very significant (67 percent). The analysis of the average number and cost of AIH for cancer of the esophagus attributable to smoking is shown in Graph 20. As seen for other diagnosis, there is an increase in the number of AIH together with a reduction in the average real value paid for hospitalizations. For an increase of about 70 percent in the number of AIH, the average cost decline was of about 73 percent over the period 1996-2005.

Stomach Cancer

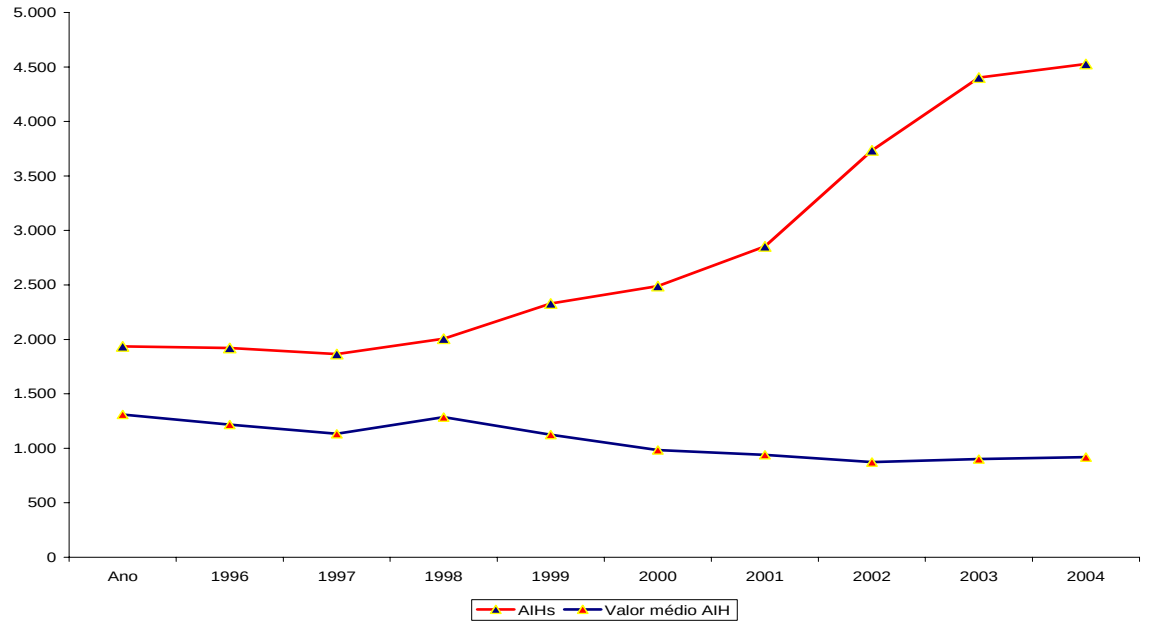
Total costs of hospitalization for stomach cancer attributable to smoking during the period reached R$17.66 million and, once again, hospitalization for males were responsible for the majority of these costs, about R$14.89 million. Since 2002, there was an increase in hospitalizations for both sexes, with the number of AIH for males increasing 41 percent in one year (2001-02); the increase in male hospitalizations in the whole period reached 123 percent; hospitalizations among women during this period increased 151 percent (Graph 21). A lower number of hospitalizations suggest that stomach cancer treatment in Brazil is concentrated in outpatient care, which offers chemotherapy and radiotherapy not requiring hospitalization.

Graph 17. Cancer of Lip, Oral Cavity and Pharynx Hospitalizations by Gender 1996-2005



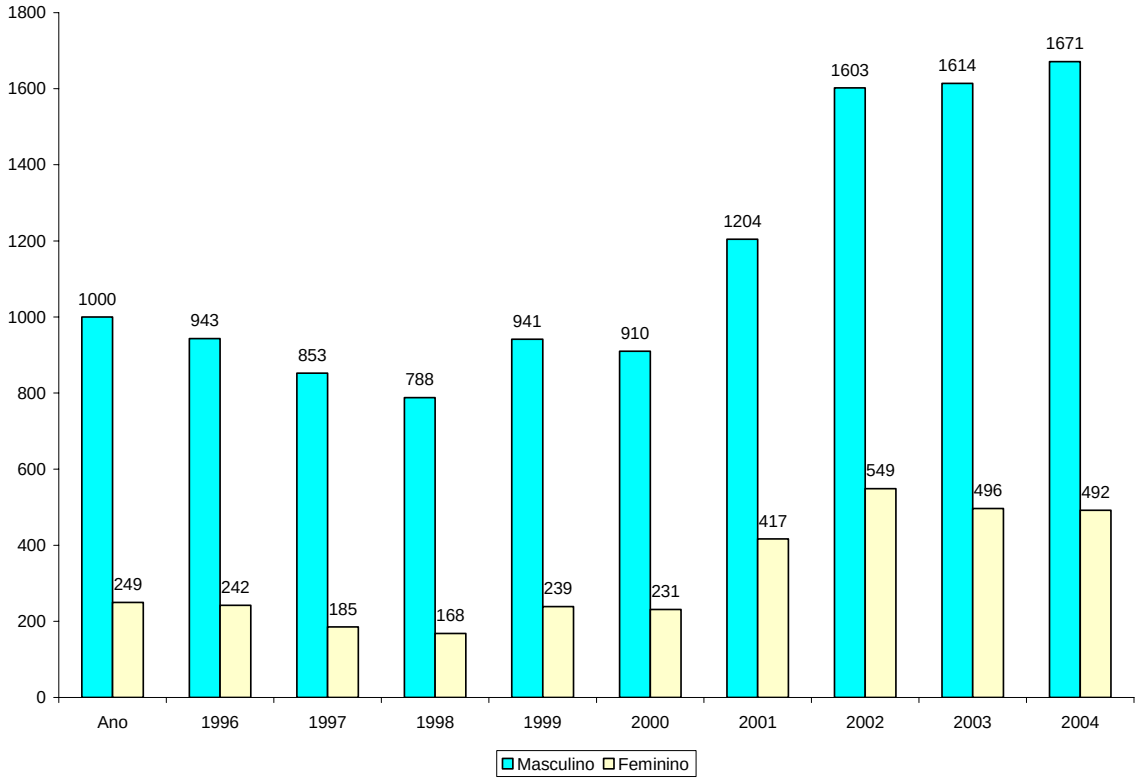
Source: SIH-SUS

Graph 18. Cancer of Lip, Oral Cavity & Pharynx Hospitalizations & Average Costs 1996-2005 - 2005 prices



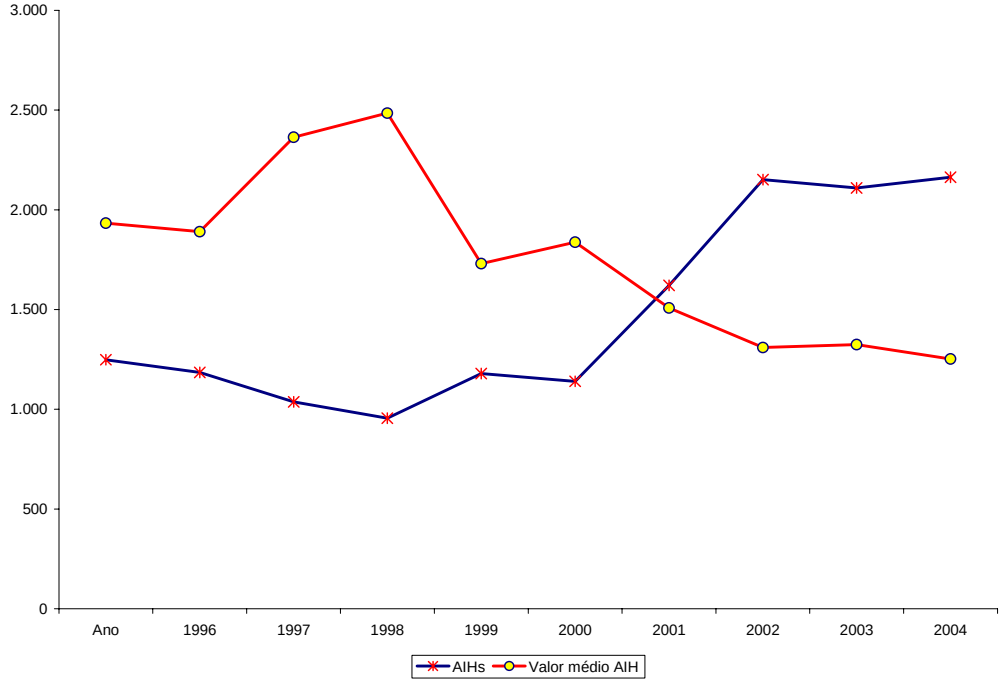
Source: SIS-SUS.

Graph 19. Cancer of the Esophagus Hospitalizations by Gender 1996-2005



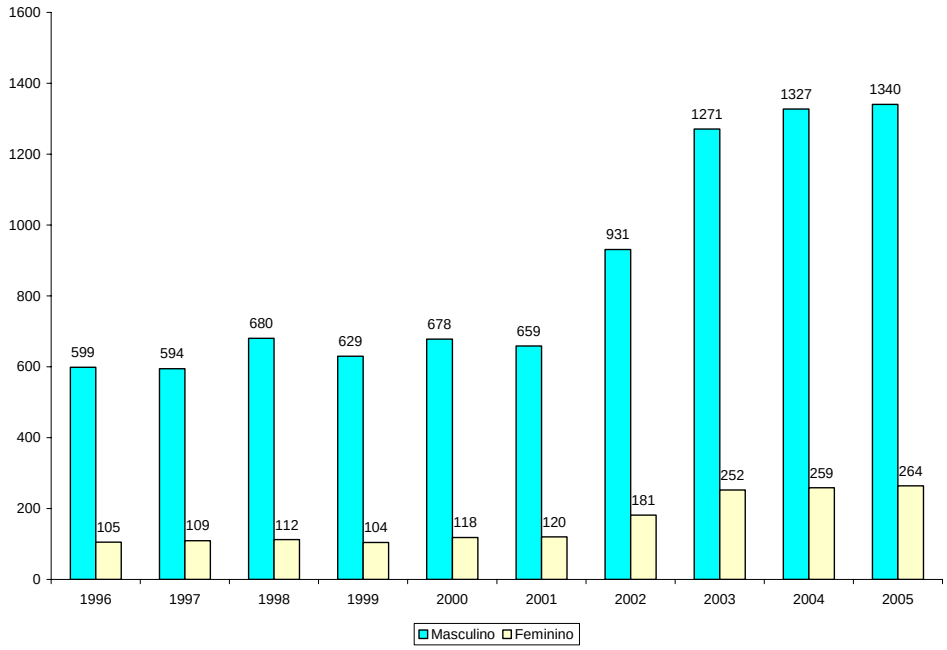
Source: SIH-SUS

Graph 20. Cancer of the Esophagus Hospitalizations & Average Costs 1996-05
2005 prices



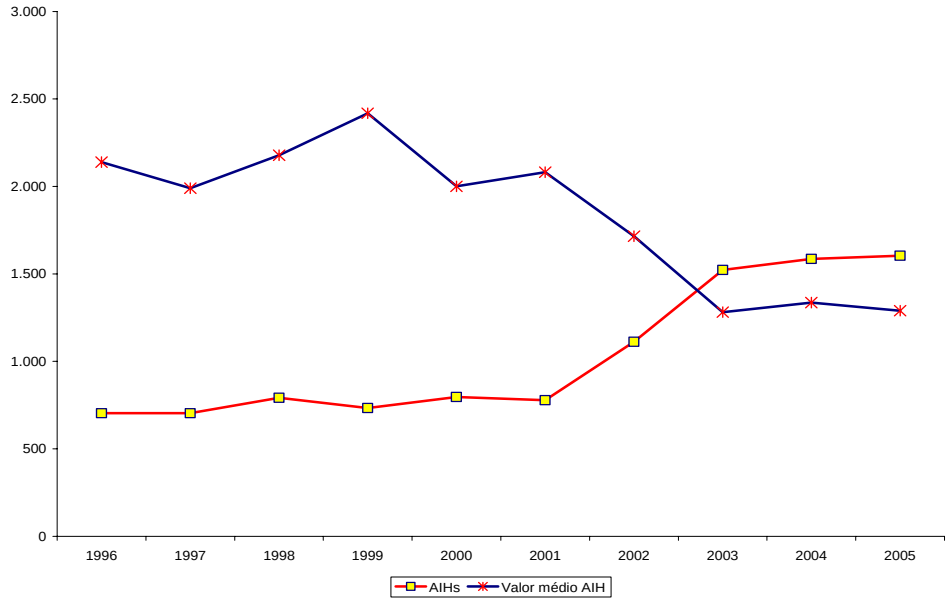
Source: SIH-SUS.

Graph 21. Stomach Cancer Hospitalizations by Gender 1996-2005



Source: SIH-SUS

Graph 22. Stomach Cancer Hospitalizations and Average Costs 1996-2005
2005 prices

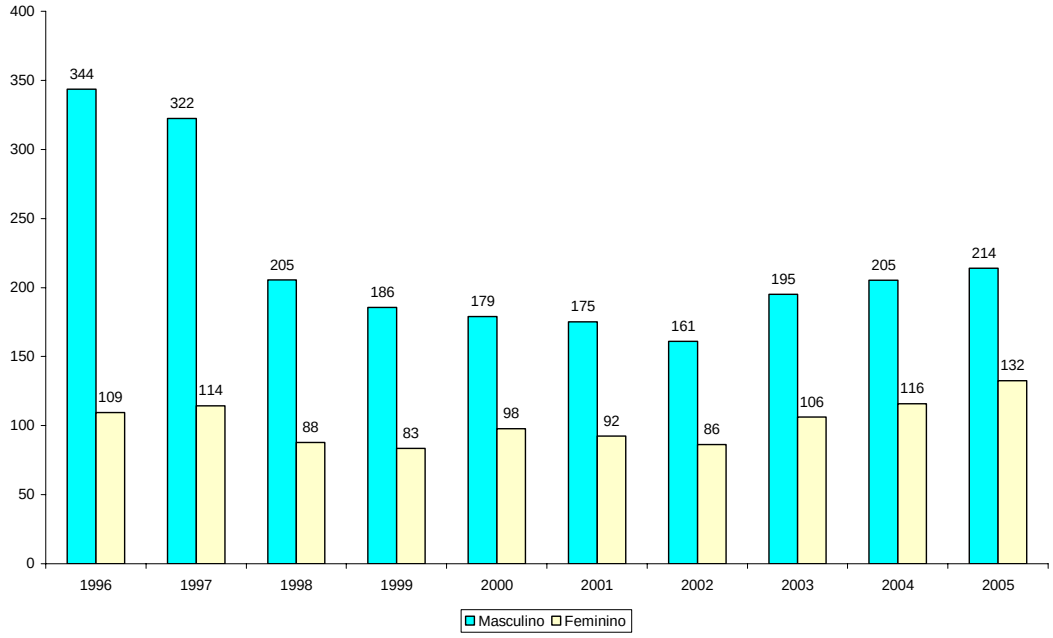


Source: SIH-SUS.

Cancer of the Pancreas

Hospitalization for cancer of the pancreas cost R$5.2 million, of which R$3.6 million were for men and R$1.6 million for women. This cancer registered the lowest expenses for hospitalizations. The total of AIH for men decreased 53 percent between 1996 and 2002, while for women there was an increase of 21 percent between 1996 and 2005. However, there was an increase in hospitalizations for men starting in 2003 (Graph 23).

Graph 23. Cancer of the Pancreas Hospitalizations by Gender 1996 to 2005



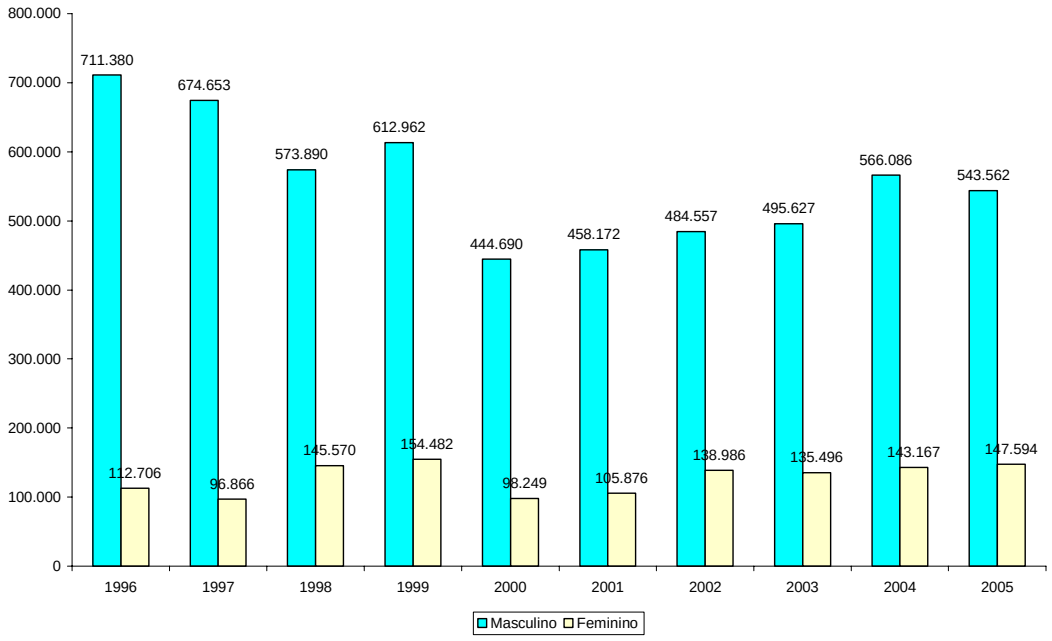
Source: SIH-SUS.

Cancer of the Bladder

The total cost of admissions for cancer of the bladder during the period under analysis was R$6.8 million, of which R$5.6 million were for men and R$1.2 million for women. When compared with the costs of other cancers, with the exception of cancer of the pancreas, this is the lowest cost. As with other cancers, males were responsible for the greater volume of AIH. After an important reduction in the second half of the previous decade, the number of AIH for this disease started to rise in 2000, reaching higher levels in the last year of the period under analysis. The increase recorded between 1996 and 2005 was approximately 9 percent. For females, the number of AIH was extremely low (Graph 24).

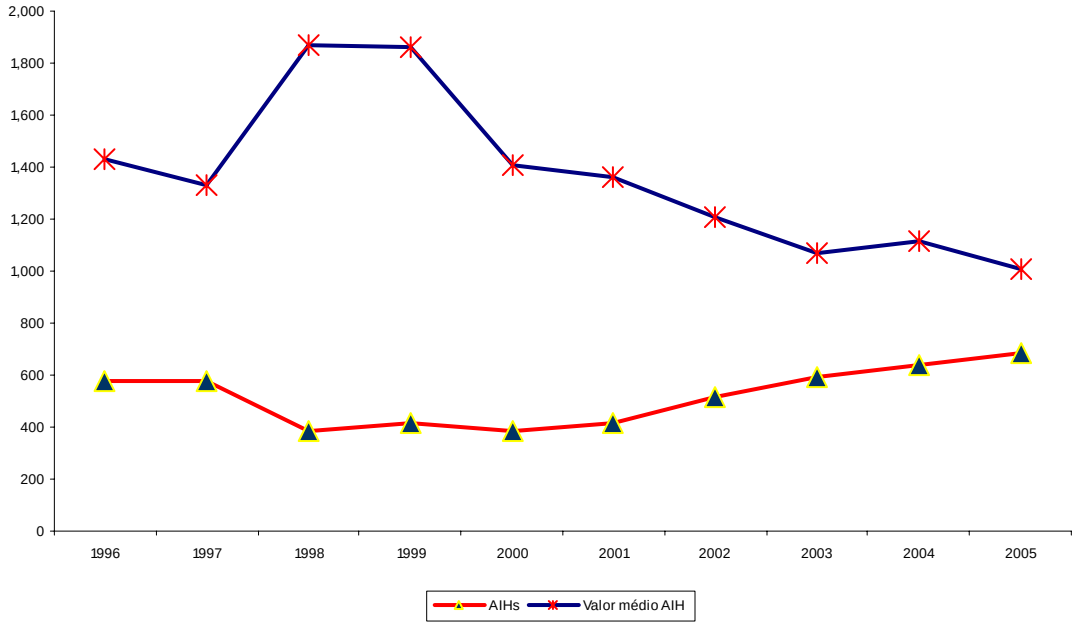
The average value of AIH paid declined over the years, especially since 1999. Between 1996 and 2005, the reduction in the average cost of the AIH was 42 percent. For the years 1998 and 1999, the average costs peaked, indicating a recovery. However, in the following years there is a substantial decline in the average cost, accompanied by an increase in the number of AIH for cancer of the bladder (Graph 25).

Graph 24. Cancer of the Bladder Hospitalizations by Gender 1996-2005



Source: SIH-SUS.

Graph 25. Cancer of the Bladder Hospitalizations and Costs 1996-2005
2005 prices

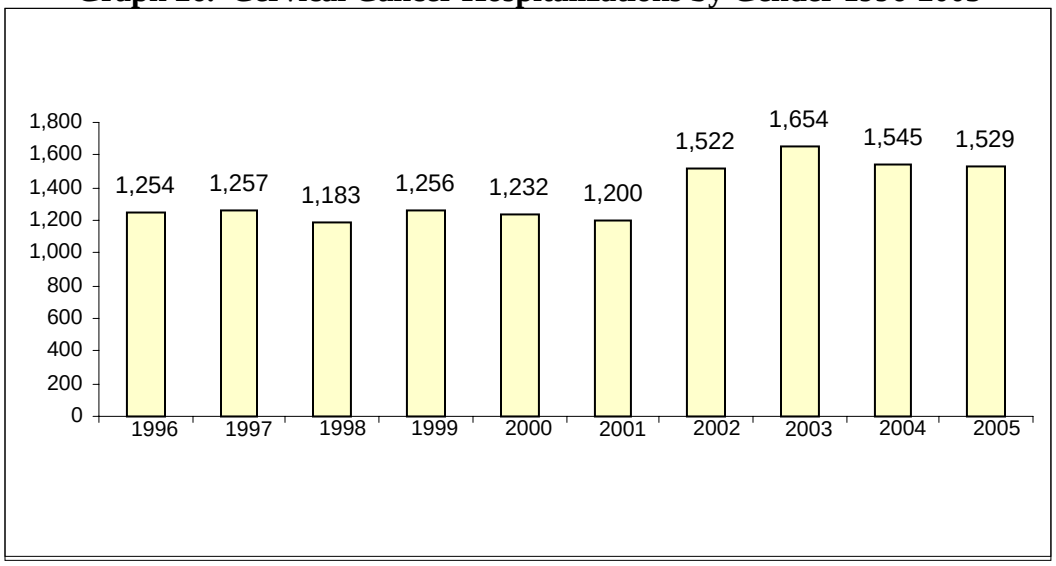


Source: SIH-SUS.

Cancer of the Cervix

The total cost of cervical cancer was R$11.3 million between 1996 and 2006, or R$1.13 million per year. The number of AIH recorded an important increase since 2002, reaching 22 percent during the period (Graph 26). This is the third cancer most common among Brazilian women, only surpassed by skin and breast cancer.[71] The average cost of the AIH fell over the period, notably since 1999, when the number of AIH increased (Graph 27). However, for this cancer, AIH may not reflect the real situation in the country.

Graph 26. Cervical Cancer Hospitalizations by Gender 1996-2005



Source: SIH-SUS

Graph 27. Cervical Cancer Hospitalizations and Costs 1996-2005
2005 prices

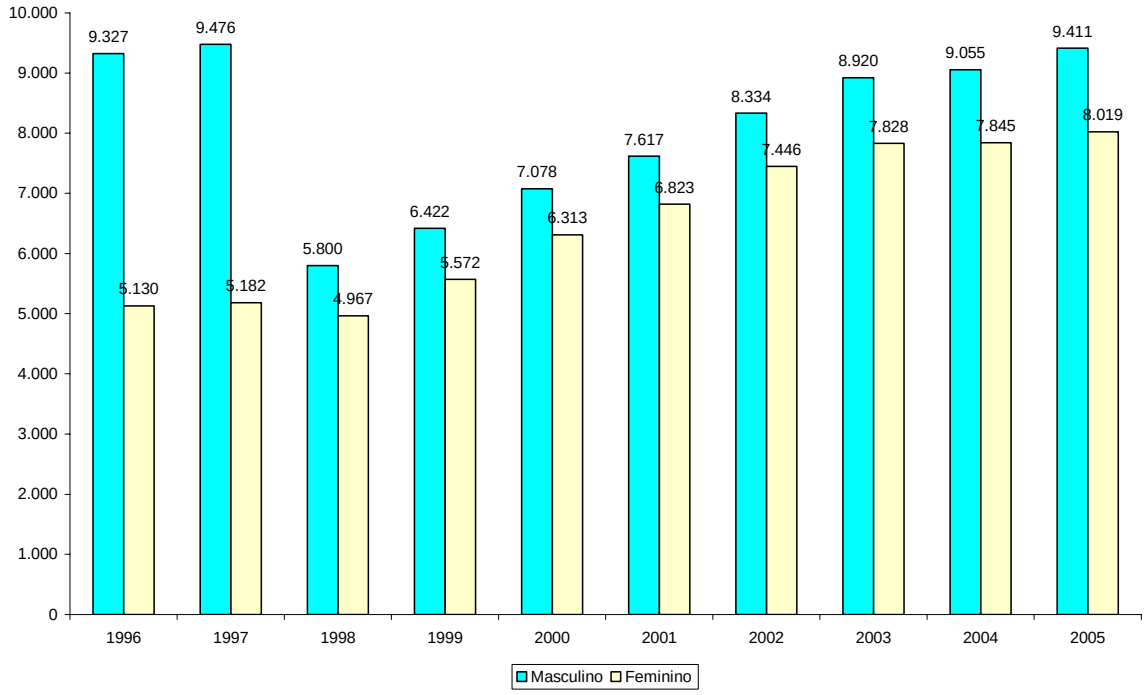
Source: SIH-SUS.

[71] INCA estimates 2006.

Ischemic Heart Disease

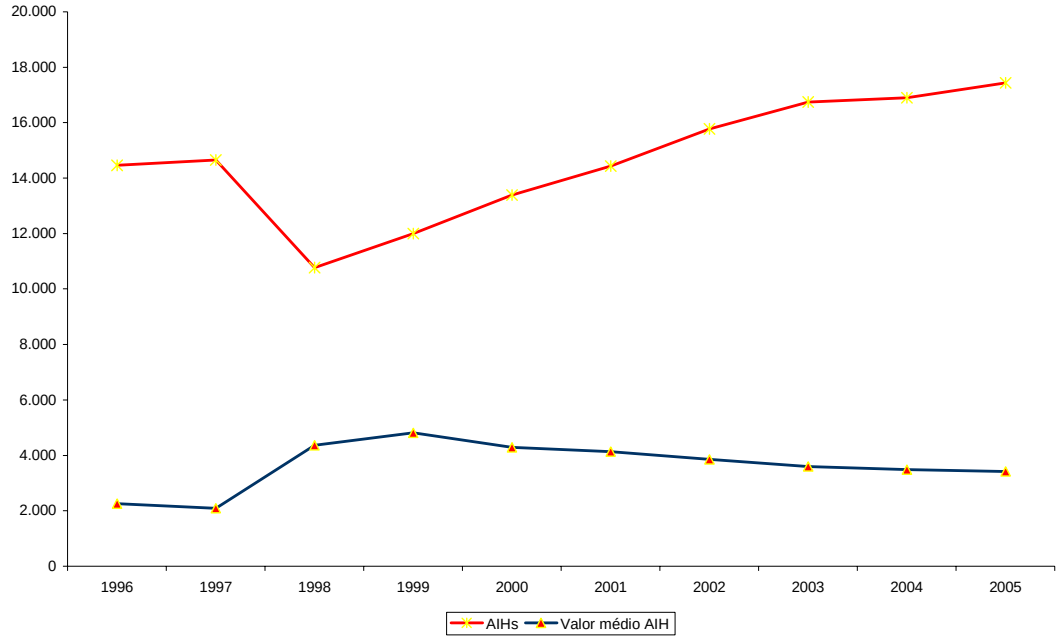
The majority of SUS hospitalizations are due to ischemic heart disease (IHD)[72]. As a consequence, the highest level of expenditure with hospitalization between 1996 and 2005 was due to ischemic heart disease - R$525 million, of which R$389 million were for men and R$136 million for women. Men were responsible for the majority of admissions for IHD attributable to smoking, with high hospitalizations number in the beginning of the period and an increasing trend since 1999. Hospitalizations among women increased since 1998. The IHD costs amount to annual outlays of R$52.5 million. The average cost of hospitalization due to IHD remained the same in the period 2002-2005, despite a significant increase in the number of AIH since 1998 (Graph 29).

Graph 28. Ischemic Heart Disease Hospitalizations by Gender 1996-2005



[72] Laurenti et al 2000.

Graph 29. Ischemic Heart Disease Hospitalizations & Average Costs 1996-05
2005 prices

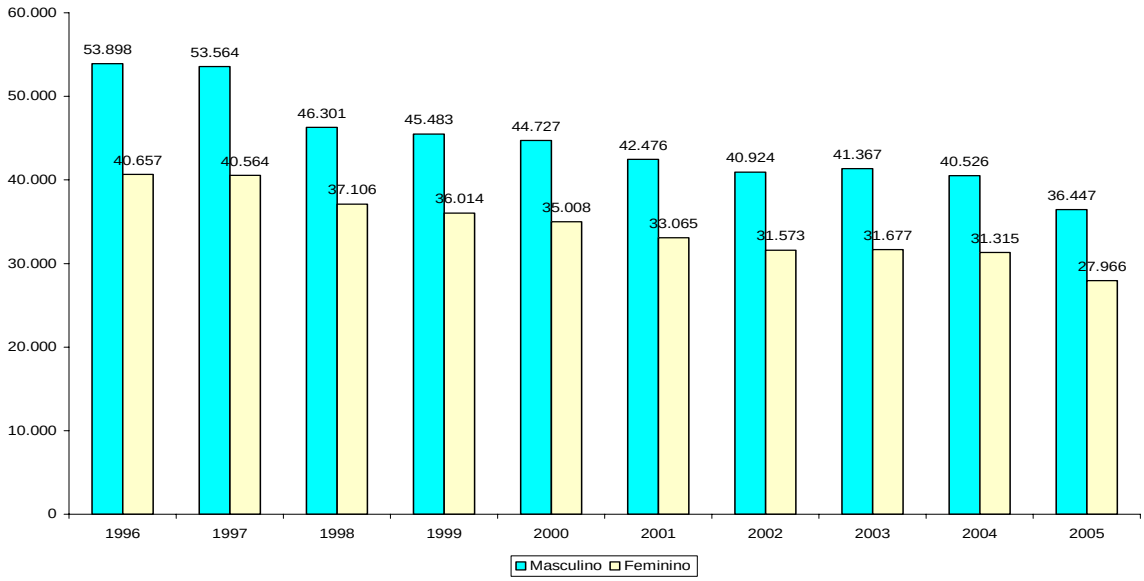


Source: SIH-SUS.

Influenza and Pneumonia

Total costs for influenza and pneumonia amounted to R$410.7 million, of which R$224.2 million were for men and R$186.5 million for women. These hospitalizations may be due to complications from other diseases, such as, for example, lung cancer. Hospitalizations among men were greater than for women, with a gradual reduction for both sexes over the period (Graph 30). Among men, this reduction was of about 48 percent, and among women of about 45 percent. The production and total outlays of hospital admission for influenza and pneumonia decreased over the period, which suggests increased outpatient treatment of these diseases, or difficulties in access.

Graph 30. Influenza and Pneumonia Hospitalizations by Gender 1996-2005



Source: SIH-SUS.

Graph 31. Influenza and Pneumonia Hospitalizations and Average Costs 1996-05
2005 prices

Source: SIH-SUS.

CHAPTER 3

Tobacco Control in Brazil

In this section, non-price and price interventions are reviewed, including those taken by the Brazil tobacco control program, and the impact increases in cigarette prices and taxes could have on revenue. The Brazil tobacco control program has mainly focused on non-price instruments. Price instruments have been used only indirectly, with higher taxes being implemented for fiscal reasons.

The Brazilian Program

The Brazilian tobacco control program includes surveillance, legislation and economic incentives, and education in schools, workplaces and health services. The program identifies as necessary steps to: i) prevent smoking, especially among children and teens; ii) promote actions to encourage smoking cessation; iii) protect non-smokers from environmental tobacco smoke hazards; and iv) promote tobacco harm reduction through product regulation measures.

Information, adequate environment and motivation are key elements to prevent people from starting smoking, and to encourage smoking cessation. There is a need for actions to disseminate knowledge about the health consequences of smoking, restrict the access to tobacco products and encourage people to have healthier lifestyles. Accordingly, the program has been seeking to:

- Monitor consumption trends and impact of tobacco on health, the economy and the environment;
- Disseminate information about the health consequences of smoking;
- Reduce social acceptance of smoking;
- Reduce stimuli for youth to start smoking;
- Protect the population from the risks of environmental tobacco smoke;
- Reduce access to tobacco products;
- Support cessation therapies;
- Counteract the advertisement and propaganda of tobacco among the most vulnerable groups such as women, young and adolescents, and people with less education and lower income;
- Control and monitor all aspects related to marketing of tobacco products, from ingredients and emissions to marketing strategies and dissemination of their features to consumers.

The Brazilian tobacco control program follows three main strategies:

- Mobilization and organization of multi-sector actions at the federal level, especially through national commissions;
- Decentralization of interventions and management of a network of state and municipal coordinators to multiply actions throughout the country; and
- Development of partnerships with non governmental organizations.

Institutional Development

In Brazil, medical authorities started advocating for tobacco control in the 1970s. However, the social context was not conducive to the adoption of anti-smoking policies. Smoking was socially accepted and supported in the media. Therefore, public intervention and a more systematic approach were only initiated in the mid-1980s.

An Advisory Group for smoking control was established in the Ministry of Health (MoH) in 1985. This committee was incorporated into the Division of Pulmonary Health due to the relationship between tobacco use and pulmonary diseases, and because lung disease specialists were the first to discuss tobacco control in the country. In the period 1990-1992, the program was coordinated by the National Division for Chronic-Degenerative Diseases (DNDCD). The MoH regulated tobacco use inside the Ministry, organized national campaigns and hold the first meetings with State Health to organize tobacco control work in the states. However, anti-smoking campaigns did not have a significant impact, as the MoH was more focused on prevention and control of communicable and tropical diseases than non-communicable diseases.[73]

In 1999, to meet the demands of the WHO Framework Convention for Tobacco Control, the government established the National Commission on the Control of Tobacco Use. This Commission comprised representatives of the Ministries of Health, Foreign Relations, Agriculture, Finance, Justice, Labor and Employment, Education, Development, Industry and Foreign Trade, and Agricultural Development. The Executive Secretariat was in the hands of the National Cancer Institute (INCA). The establishment of the National Public Health Surveillance Agency (ANVISA) in the same year enabled the Government to make significant advances in regulatory measures and law enforcement to control tobacco products.

Since then, INCA has run the Brazilian tobacco control program, which has flourished under its management. Having the program managed by an institution outside Brasilia may have protected it from political pressures exerted by the government and the tobacco industry. In the late 1990s, dissemination of information became more complex and structured. This period was also marked by the beginning of multi-sector activities, the development of the first economic study of the industry and demand for cigarettes, and the structuring of a multidisciplinary team to manage the program.

The emphasis was on the decentralization of the program, with the establishment of a state and municipal network for smoking control. INCA has acted as a coordinator of this network of state and local units, and federal or national actors. The network has been active

[73] Cavalcante 2006.

preparing and approving legislation, and creating an environment conducive to legislative restrictions on cigarette advertising and smoking in public places. [74] The first agreements between the National Health Fund and State Health Secretariats were signed in 1999, with INCA as an intermediary. For the first time these agreements offered the opportunity for states to structure themselves and develop regular smoking control activities. [75]

The state agreements, multi-sector activities and team restructuring led to the inclusion of smoking control in the formal structure of INCA. Two other factors contributed to further structuring of the tobacco control program. Firstly, NGOs became more involved in the process starting with the First Brazilian Congress for Tobacco Control, in 1996. Secondly, INCA was designated a WHO Cooperating Center in the area of tobacco and health, benefiting from increased international cooperation and exchange of experiences with other countries.

The decade closed with an important step in the multi-sector global strategy to prevent and control smoking. A legal directive established the National Commission on the Control of Tobacco Use, responsible for assisting the government in international negotiations related to the preparation of the WHO Framework Convention for Tobacco Control.

In 2003, the National Commission for the Implementation of the WHO Framework Convention for Tobacco Control (CONICQ) replaced the previous commission. Through this new commission, INCA and other MoH departments have been working with other public institutions to implement tobacco control measures and to fill the gap between domestic legislation and the legal requirements of the Framework Convention. It is considered that the action of the National Commission in support of interdepartmental initiatives related to administrative and legislative issues brought significant advances for tobacco control in different areas. Some of these advances were:

- Obligation to include warnings on tobacco products;
- Prohibition of work by minors (under 18 years) in the tobacco industry;
- Prohibition of use of public credits from the National Program for Family Agriculture for tobacco production;
- A legal proposal prohibiting the sale of cigarettes in vending machines.

Legal Framework

The Brazilian legal framework has made significant progress in four key aspects of tobacco control policies: advertising bans, warning labels, restrictions of sales to young people and smoking restrictions in public places. Brazilian legislation and its enforcement appear to be best practice on advertising bans and warning labels. Progress made in terms of smoking restrictions in public places is less clear, as there have been obstacles to implement the existing legal framework. Municipal health authorities are responsible for

[74] Cavalcante 2005.
[75] Costa e Silva 2006.

clean-air environment control and for penalty enforcement. However, lack of precise and legal definitions for designated smoking areas in enclosed environment has been undermining effective enforcement of the legislation.

INCA is also concerned with the enforcement of regulations related to cigarette sales. Apparently, the ineffectiveness of control mechanisms has hindered compliance with regulations on the sale of tobacco products. For example, restrictions on the retail sale of cigarettes refer to 20-unit cigarette packs. However, cigarettes are being sold by the unit, both in regular establishments and the illegal market. Another difficulty has to do with the ban on sales of cigarettes to children, contained in the Children and Adolescent Statute, which is often disregarded by commercial establishments.

The first attempt to establish any type of control over tobacco use occurred in 1985, through a legal directive issued by the MoH, which created the advisory group for smoking control (full list of legal documents in Annex 1). The following year, a law established August 29 as National No-Smoking Day. The MoH also regulated tobacco use inside the Ministry.

In terms of anti-smoking legislation, the 1990s can be divided into two periods. During the first period (1990-94), legislation progressed at a slower pace: decrees regulated advertising of tobacco products, according to the 1988 Constitution. The main two innovations were the prohibition of the sale of products that may create chemical dependence in persons under 18 years, and prohibition of deceptive advertising. The program was focused on non-price instruments, with much less attention paid to price instruments, which was partly due to the fact that decisions to raise tobacco taxes and prices were taken without consulting the MoH.

During the second period (1995-99), tobacco control actions were more energetic, as proven by the number of legal documents enacted as compared with the previous period. Legislation was approved on:

- Dismantling the positive image of smoking;
- Imposing restrictions on advertising of tobacco products;
- Specifying conditions under which cigarettes should be marketed, requiring that the packaging shows clearly tar, nicotine, and carbon monoxide levels and health warnings;
- Restricting tobacco consumption in public places;
- Prohibiting tobacco consumption on vehicles traveling on interstate and international highways; and
- Increasing fiscal control on cigarettes.

The cornerstone of legislative action of the second half of the 1990s was a law that established a general framework for tobacco control in the country. Among its main dispositions, the law forbids the use of cigarettes, cigars, pipes or any other tobacco product in collective areas, whether public or private, such as government offices, hospitals, classrooms, libraries, workplaces, theatres and cinemas, except in proper designated

smoking areas. Also, this law restricts advertising, and introduced warning labels for cigarette packages.[76]

At the end of the decade, ANVISA regulated cigarettes, cigars, and other smoke-producing products derived from tobacco. A MoH decree modified warning labels, establishing the use of more direct phrases regarding the damage caused by smoking, such as "Nicotine is a drug and creates dependency" and "Smoking causes sexual impotence."

Since 2000, legislative measures and institutional improvements on tobacco control have been significant. Legislative measures have focused on:

- Restricting tobacco advertising and sponsorship of public events;
- Prohibiting smoking in airplanes and other public transport vehicles;
- Limiting tar and nicotine levels in cigarettes;
- Establishing more severe warnings and introducing images on cigarette packages and tobacco products;
- Increasing regulation of tobacco products;
- Restricting public credit to tobacco growers who were producing under the integrated system involving the tobacco industry;
- Establishing a register of national importers, exporters, and producers of tobacco products for fiscal purposes;
- Strengthening controls on the marketing of cigarettes through the use of control stamps and use of counting equipment.

A federal law approved in 2000 bans advertising, sponsorship and smoking in public places, and:

- Restricts advertising of tobacco to posters and display stands inside the places where it is sold, while prohibiting it in magazines and newspapers, on television and radio, and on outdoor billboards;
- Prohibits advertising via any electronic medium, including the internet; indirect contract advertising (merchandising), and advertising in stadiums, at racetracks, on stages, or in similar public places;
- Forbids tobacco industries from sponsoring international sports and cultural events starting in 2003;
- Prohibits use of tobacco products on aircraft and other public transportation vehicles;
- Increases the value of fines;
- Identifies enforcement agencies.

In 2001, the Central Bank of Brazil banned granting of government loans to tobacco producers who produced in an integrated system involving the tobacco industry, under a public program to support family agriculture (PRONAF). Subsequently, it was established that tobacco producers who carried out this activity in partnership regimes, could apply for costing and investment credits, provided they were not intended for the cultivation of

[76] Law 9294/96.

tobacco, and were to assist and support the diversification of activities, crops and livestock farming and the conversion of family tobacco farms. The cultivation of tobacco outside partnerships or integration regimes continued to be financed through PRONAF.

In 2002, several measures of fiscal control of cigarette production and distribution were implemented to help monitor and identify possible cases of tax evasion. A provisional measure increased penalties on control stamps that do not conform to the criteria established by the Federal Revenue Secretariat. The Secretariat implemented a program for declaration of fiscal information related to cigarette taxation. This census will make it possible to directly monitor cigarette manufacturing companies in the areas of import, export, distribution and tax collection. A 2003 law expanded the prohibition of selling cigarettes in educational, health and public institutions, as well as the sale of tobacco products to minors under 18. The law established a temporary and limited lift on tobacco sponsorship and advertising in international sports events. However, Formula 1 races in Brazil have been free of tobacco ads since 2006.

Product Regulation

Brazil has a very advanced legal framework for tobacco product regulation, and it was the first country in the world to prohibit the use of descriptors that may induce complacency in consumers regarding the consumption of tobacco products. In 2001, an ANVISA resolution set the maximum allowable levels of tar, nicotine, and carbon monoxide in the primary smoke stream for cigarettes marketed in the country, and prohibited the use of descriptors, such as “light,” “ultra light,” “mild” and others. A provisional measure stipulates that advertising material and the packaging of tobacco products have to include warnings accompanied by images that illustrate their meaning, the telephone number of “Disque Pare de Fumar” (Dial Quit Smoking), and it prohibits the use of any type of box or device that covers up or makes it difficult to see anti-smoking warnings.

Another ANVISA resolution from 2001 regulates the annual registration of smoke-producing products and requires that the tobacco companies present periodic reports on the products they market, together with information on their physical and chemical characteristics and on sales. This resolution also requires companies to pay R$100,000 a year for each marketed brand. These resources finance a database (SISTAB) that stores information provided by the companies, the construction of a laboratory to monitor compliance with the legislation, and laboratory and clinical surveys on the biological effects of nicotine dependence.

To prevent smoking initiation and its diffusion among young people, an ANVISA resolution of 2002 prohibits the production, importation, marketing, advertising and distribution of food shaped as cigarettes, cigars, cigarettes, or any other smoke-producing product, whether or not it is derived from tobacco. It also prohibits the use of food packaging to simulate or imitate cigarette packages and the use of brand names of smoke-producing products, whether or not they are derived from tobacco. In 2003, another

ANVISA resolution prohibited the sale of tobacco products on the internet to reduce sales to minors.

In addition, Brazil is taking steps to comply with three articles of the Framework Convention on Tobacco Control.[77] Article 9 establishes that the parties will propose guidelines for testing, measuring and regulating the contents and emissions of tobacco products. Tobacco companies in Brazil are required to test the contents of their products in authorized laboratories. Also, the maximum levels of certain substances are set. In the future, an ANVISA laboratory will examine the substance contents of tobacco products. Article 10 establishes that manufacturers and importers of tobacco products will be required to disclose information about contents and emissions of tobacco products. ANVISA is implementing a database with information about the contents of regulated tobacco products. Also, it is planning to monitor trends in substance contents of established products and compare them with new products. ANVISA is also planning to disseminate information about relevant aspect of tobacco products. Article 11 regulates the characteristics of packaging and labeling of tobacco products. As Brazilian regulation already contemplates the main points of this article, ANVISA main strategy is to improve surveillance capacity that contributes to the enforcement of approved legislation.

Smoke Free Environments

Brazil has legislation for protection from exposure to tobacco smoke in indoor workplaces and public places, and public transport. Use of tobacco products is forbidden in collective spaces, private or public, except in an isolated area exclusively dedicated to smoking. Collective spaces are bars, restaurants, cultural spaces and workplaces where more than one person regularly works; public offices, schools, hospitals, health care units, classrooms, libraries and theaters and cinemas. Eventually, the prohibition was extended to airplanes and other collective transportation. The law is ambiguous in what concerns the definition of an exclusively dedicated area, which hindered its implementation and more restrictive municipal regulations.

To effectively implement laws on non smoking environment and protect non smokers from exposure to tobacco smoke, public health authorities are implementing a strategy which comprises three elements. First, ANVISA is preparing a legal instrument to define precisely the designated smoking area, and specify the technical conditions of ventilation and air renovation. Second, in 2005, a MoH legal directive established the transfer of resources from the Health Surveillance Fund to states and capitals for prevention of non communicable diseases. Part of these resources will be used to train the national network of health surveillance inspectors and implement actions to enforce the legislation of smoke free environments. ANVISA is developing a guideline on how to apply the legislation, and public agents and fiscals were trained to implement the law in 2006.[78] Third, public health authorities are planning to develop national education campaigns to explain the legislation and the need to protect non smokers from passive smoking.

[77] CONICQ Agenda 2006.
[78] Costa e Silva 2006d.

The Brazil tobacco control program promotes laws requiring provision of information to the population about the risks of tobacco use, and on protection from environmental tobacco smoke and from advertising of smoking. INCA has been establishing surveillance, and monitoring of smoking trends, and carrying out information and education actions to change beliefs, attitudes and practices related to tobacco consumption. These actions, which are targeted at specific groups and the whole society, include educational activities, smoking-cessation promotion and support activities, and mobilization and articulation of different sectors in support of tobacco control legislation. Although the real extent of program implementation could be underestimated, dissemination of information about smoking risks does not appear to be extensive. INCA should establish systematic monitoring of national campaigns, which are an important element for dissemination of information about the risks of tobacco.

The starting point for the development of educational actions is the dissemination of scientific knowledge about the health consequences of smoking. However, as receiving such information does not necessarily lead to behavior changes, the program has also developed social and environmental interventions to trigger positive behavior change once knowledge is disseminated. For the development of educational actions, the program selected three settings: schools, workplaces and health care units. In these settings, information is disseminated along with actions that foster a favorable environment for behavior change. Continuous information on the risks of smoking, especially of passive smoking, must be accompanied by smoking restrictions and support for smoking cessation in these settings.

The School Health Knowledge Program aims at fostering critical awareness in children related to marketing manipulation used to promote harmful lifestyles and smoking. Smoking is portrayed as a socially unacceptable behavior, and the program advocates the inclusion of strategies to promote healthy lifestyles in the school curriculum. The program focuses on teachers, students and school employees, and all aspects related to smoking (health, ecology, citizen rights, history, and economy) are addressed by different disciplines. A Smoke-Free Schools Module encourages tobacco-related behavior changes among teachers, school workers, students and the community that interacts with the school.

The Smoke-Free Workplace Program “Saber Saúde” includes a set of educational, regulatory and organizational actions to encourage changes in the culture of the organization that would lead employees to reduce smoking. Its activities include continuous dissemination of information on the risks of smoking, especially passive smoking, implementation of regulation to restrain smoking in the workplace, the display of smoking restriction signs and qualification of occupational health professionals to support smoking cessation and treat nicotine dependence among smokers.

The Tobacco-Free Health Care Program prepares health care services to provide smoking cessation support to smokers who seek health care for routine visits. It is essential that health care facilities offer a model of healthy habits and lifestyles, which requires smoke free health units and professionals. The program fosters cultural changes concerning rejection of smoking in health care facilities, and supports health professionals who smoke to quit the habit.

A Health Promotion Policy was recently approved. The Brazilian Unified Health System (SUS) Health Agreement recently signed also refers to health promotion and tobacco control activities, and SUS provides tobacco cessation treatment. In 2002, a MoH legal directive established reference centers for smoking cessation treatment. Treatment of smokers following a cognitive behavioral approach, nicotine replacement and anti-anxiety treatment, began to be provided free of charge in special health care units. In 2004, cessation treatment was extended to the health system in general. Health units accredited for smoking cessation treatment receive materials and medication. To be accredited, the units have to meet several requirements, such as having smoke restrictions in their facilities, and the assistance of tobacco control experts. Training on smoking cessation started recently.

Tobacco control in Brazil has moved from the margins of the national health system to the formal agenda of the SUS, but only recently has SUS started financing tobacco control at the local level, especially smoking cessation. However, SUS regular funding to ensure adequate resources for state and municipal activities remains a challenge. There is still irregular access to treatment, low awareness and reduced capacity in the health care system to support smoking cessation interventions. It is expected that usual channels as health community agents and family doctors promote tobacco control at local level.

Networking and Decentralization to States and Municipalities

Due to Brazil's territorial size and regional differences, in 1995 INCA decentralized the tobacco control program to states, which in turn decentralized it to municipalities. To reach the entire country and spread actions equitably, the program established a network of management units in state and municipal health secretaries. INCA identified program managers in State Health Secretariats (SES), and got financial resources to finance working agreements between the National Health Fund and the SES for tobacco control action. The State Working Agreements were crucial for the implementation and development of the program, as they allowed the SES to start organizing the necessary infrastructure, train municipal coordinators, and reach municipalities with tobacco control campaigns.

INCA coordinates the decentralized network; provides technical support to SES to prepare work plans, and supervises their implementation; develops models for continuing education in health units, workplaces and schools; and trains staff through a cascade program. INCA trains SES staff, which is in turn responsible for training municipal health secretaries' staff. State coordination units are expected to identify and train municipal health coordinators in cities not yet involved in the program, to enhance the network and implement all proposed actions. Municipal coordination offices are responsible for the development of educational actions in schools, health care units and workplaces in their respective cities.

Each state or municipal coordinator is appointed by the Health Secretary from the Chronic-Degenerative Diseases Division, Family Health Program, Workers Health Program or other public-health related program. State coordinators are responsible for four tasks: i)

to structure the State Coordination Unit; ii) to develop and implement the state tobacco control program; iii) to train municipal coordinators and assist them to implement actions in schools, workplaces and health units; and iv) to evaluate the program. Their role includes articulation of campaigns and other focused actions, encouraging, guiding and consulting health care units, companies/industries and schools in program implementation, encouraging the city council to approve and enforce municipal laws aimed at reducing exposure to cancer risk factors, as well as assess and monitor program implementation in their cities.

The main roles of municipal coordinators are to: i) organize tobacco control activities in the respective city; ii) conduct annual campaigns; iii) train leaders and municipal staff to implement the program trough various channels; and iv) monitor program implementation.

The decentralized tobacco control network conducts public surveys. In 2006, INCA, the Health Surveillance Secretary (SVS) and ANVISA adopted a strategy for implementation of the law on smoke free public places, by strengthening and capacitating state health inspections and applying penalties. Educational campaigns are being carried out to encourage the population to exercise greater social control over smoking in public spaces.

Although a formal program evaluation process has not been established yet, state and municipal coordinators and program implementation are evaluated according to progress in training and the implementation of annual campaigns and actions in schools, workplaces and health care units. INCA has information on actions carried out at local level in schools, workplaces and health care units; and number of municipalities trained. Additional information is available from state coordinators annual meeting reports. In addition, INCA regularly visits states to supervise activities and ensure the fulfillment of program targets. In these visits, INCA staff works with a detailed plan of interviews, apply structured questionnaires about implementation issues and verify the execution of actions. However, there are no databases of state and municipal laws related to tobacco control. According to INCA, failure to record activities and monitor results at municipal level may partly explain the low level of program implementation.

Main Results. By 2005, almost all states had more than 50 percent of their municipalities integrated into the tobacco control program. Seven states (Espirito Santo, Mato Grosso do Sul, Paraíba, Paraná, Rio Grande do Norte, Santa Catarina e Sergipe) had more than 80 percent of the municipalities with staff trained on tobacco control activities; and over 3,700 municipalities (68 percent of all Brazilian municipalities) had staff trained to carry out general campaigns and administrative tasks, as well as to implement more complex and content-focused actions in schools, workplaces and health care units.

However, tobacco control interventions were implemented in a small proportion of municipalities with trained staff, in Paraiba, Minas and São Paulo, although other states, such as Ceará, Espirito Santo, Roraima, Santa Catarina and Distrito Federal, had good performance in some areas. About 3,000 municipalities were trained to carry out tobacco control activities in schools, which were implemented by about 40 percent of them,

reaching over 13,000 schools and 2.3 million students. Less than 10 percent of municipalities with trained staff implemented actions in health care units and workplaces. The 364 municipalities that implemented actions in health care units reached 1,553 establishments, or an average of 4 establishments per municipality. The 322 municipalities that implemented the program in workplaces reached an average of 5.4 workplaces and 11 workers per establishment.

Table 24 shows coverage of the tobacco control program as a percentage of total municipalities in each State. About 60 percent of municipalities with tobacco control interventions implemented in schools were located in three states – Minas, Paraíba and São Paulo. About 37 percent of municipalities with interventions carried out in workplaces were in Paraiba, a state with a low population density. Finally, 50 percent of all municipalities that carried out actions in health care units were from Minas Gerais.

Table 24. Municipalities Covered by Tobacco Control Program by State 1999-2005

States	# Municipalities	# Actions Schools	%	# Actions Workplaces	%	# Actions Health Units	%	# Smoke Cessation Programs	%
AC	22	1	4.5	0	O	0	0	1	4.5
AL	101	4	4	1	1	7	6.9	1	1
AM	62	1	1.6	0	0	0	0	1	1.6
AP	16	6.3	0	1		0	0	1	6.3
BA	416	3	0.7	5	1.2	0	0	11	2.6
CE	184	91	49.5	6	3.3	21	11.4	50	27.2
DF	20	6	30	1	5	5	25	14	70
ES	78	67	85.9	9	11.5	22	28.2	13	16.7
GO	242	15	6.2	3	1.2	8	3.3	70	28.9
MA	217	1	0.5	1	0.5	0	0	9	4.1
MG	853	259	30.4	47	5.5	183	21.5	15	1.8
MS	77	30	39	5	6.5	2	2.6	18	23.4
MT	126	6	4.8	3	2.4	1	0.8	6	4.8
PA	143	1	0.7	1	0.7	0	0	13	9.1
PB	223	150	67.3	118	52.9	0	0	8	3.6
PE	185	21	11.4	9	4.9	22	11.9	13	7
PI	221	1	0.5	1	0.5	0	0	1	0.5
PR	399	56	14	19	4.8	0	0	35	8.8
RJ	91	11	12.1	15	16.5	14	15.4	36	39.6
RN	166	6	3.6	1	0.6	0	0	15	9
RO	52	0	0	0	0	0	0	1	1.9
RR	15	10	66.7	1	6.7	0	0	1	6.7
RS	467	30	6.4	19	4.1	69	14.8	97	20.8
SC	293	91	31.1	12	4.1	1	0.3	56	19.1
SE	75	8	10.7	1	1.3	0	0	18	24
SP	645	292	45.3	42	6.5	8	1.2	89	13.8
TO	139	1	0.7	1	0.7	1	0.7	7	5
Total	**5,528**	**1,162**	**21**	**322**	**5.8**	**364**	**6.6**	**600**	**10.9**

Source: INCA 2005. Report on tobacco control program implementation in states and municipalities.

In 2004, the Federal University of Pelotas carried out a case-control study of effectiveness of tobacco-control interventions in 32 schools, involving 2,209 students aged 13-14 years, who were randomly selected.[79] The study, which was sponsored by WHO and INCA, considered other risk factors such as lack of physical activity and overweight. The

[79] Federal University of Pelotas 2005.

study found that tobacco-control interventions increased knowledge among teachers and students about the health consequences of smoking, and found signs of behavior change among teachers. However, there were no changes of smoking behavior among students. The study presented some explanations for this result: the evaluation took place after a very short period of anti-smoking campaign; and the quality of the intervention varied. The study recommended the involvement of parents and media to increase the effectiveness of tobacco control actions among students; increasing the length of training; and carrying out monthly meetings with teachers to strengthen initial training.

In 2006, Moraes carried out an evaluation of the effectiveness of a program to reduce smoking prevalence at the Santa Cruz Hospital in São Paulo.[80] Data on smoking prevalence among hospital staff, and perceptions of about 500 staff who participated in the program, were analyzed. Staff participation in the program was relatively high and staff opinions were favorable to the program. The study concluded that the tobacco control program at the Santa Cruz Hospital was successful, as smoking prevalence decreased by about 53 percent among staff members.

Main Issues. In terms of tobacco control infrastructure, Brazil has created a network of public state and municipal health secretary's focal points and programs in major cities of the country. This network attempted to bring and adapt tobacco control actions and regulations to the local level, creating the necessary instruments to advance tobacco control at community level. It was instrumental in raising social awareness in support of federal initiatives to curb the epidemic. Nevertheless, the network has been weakened in recent years, as the mechanism previously used by INCA to transfer funds from the federal level to states and municipalities is no longer available, and no other mechanism has replaced it. This suggests the need to include tobacco control actions in the general health care system funding mechanism, as part of Brazil's Unified Health System (SUS). Smoking cessation support as part of a universal access policy to nicotine dependence treatment is still a challenge and deserves further attention and strategic direction.

In the last couple of years, limited training and no annual evaluation meetings were carried out. States and municipalities experience the same difficulties, especially high turnover of professionals; little or no integration of the tobacco control program into the state and municipal health agenda, and into primary health care; failure to allocate resources to smoking control; and health promotion is not considered a priority. Information available indicates that municipal coordinators are the weakest part of the chain. They do not stay long on the job, suffer from political pressure, and have to deal with many issues at the same time. After the municipal elections in 2000, about 27 percent of trained municipal staff was dismissed. This is a significant issue not only for the tobacco control program, but throughout the health system.

In 2001, in the context of the state coordinators annual meeting, a qualitative evaluation had already identified the main issues of program decentralization: frequent changes and lack of commitment of coordinators; lack of personnel exclusively dedicated to the program; prioritization of other campaigns; professionals trained without a multiplier

[80] Moraes 2006.

profile; and difficulties of coordination with municipal education secretaries and health units.

Table 25. Main Issues in Program Decentralization

Main Issues	Causes and characteristics
Management and staff lack of awareness of smoking and other cancer risk factors	Failure to recognize smoking as a major public health problem Prioritizing other campaigns such as hypertension and diabetes
Municipal Coordination	Frequent changes of municipal coordinators for political reasons Lack of commitment of older municipal coordinators due to other responsibilities
Municipal staff training	Lack of adhesion from municipalities for political reasons Majority of municipalities at basic training level Professional trained without multiplier profile
Program Teams	Lack of exclusively dedicated staff Commitment difficulties on the part of some trained professionals Staff dismissal and rejection of contracts Low salaries and lack of motivation
"Saber Saude" Program	Inadequate provision of equipment to municipalities and schools
Health Care Units Program	Professional resistance Lack of trained professionals Failure to observe smoking bans
Administrative issues	Delay in release of Agreement funds Minimum use of Agreement funds Delays in procurement Lack of vehicles to carry out external activities Delays in the licensing process

Source: INCA 2001.

In 2002, during the third and last national evaluation meeting, INCA stated that the program had heterogeneously attained its objective of establishing pedagogical relationships and partnerships with the state technical teams. Some of the reasons identified for the mixed results were insufficient INCA institutional capacity (few technical staff and limited resources for traveling) to reach all states; and local issues that inhibited the development of state teams. Three factors were found to determine the quality of the local team and its capacity to disseminate information: good quality training, experience on the job and daily time spent on the task.

In 2005, INCA conducted a survey to identify main issues in the state and municipal coordination of the program. Only 19 of the 27 federal units answered the questionnaire. Most units (17) still had funds from the agreement signed between the states and the National Health Fund in 2002. More than 50 percent, of the respondents did not have another source of funding to support its activities. However, lack of additional funds did not have a clear impact on state performance. Some states that did not receive additional funds had municipal coverage better than average for at least two activities. Only 16 states had a coordinator and a team working on the program. Rio Grande do Sul, Brazil's major tobacco producer, with a metropolitan smoking prevalence above average, and the highest

lung cancer mortality in the country, did not have a tobacco control program team. Only 10 teams worked exclusively for the tobacco control program. Few coordinators were trained at higher than basic levels of knowledge. The majority (11 out of 19) had been working on the program for less than 4 years.

In 2006, the National Secretary of Surveillance (SVS/MOH) carried out an assessment of the tobacco control program, including an opinion poll targeting INCA, ANVISA, other relevant MoH staff, state and municipal coordination units, and non-governmental organizations[81]. The majority of annual state plans included anti-smoking activities. However, no reference to allocation of financial resources was made, suggesting that the survival of the program depends on individual efforts and creativity.

Human capital and INCA's technical capacity, as well as the INCA team commitment to the coordination of the program at the national level, were considered the strongest parts of the program. The main weak points identified by respondents were:

- The vertical structure of the program, with states lacking decision-making capacity;
- The program is INCA's responsibility and is parallel to SUS, which is not conducive to reaching agreements on targets and financial resources, and does not provide incentives to SUS management for program participation;
- Lack of prioritization and management accountability;
- Lack of evaluation and updating of coordinators, in addition to limited assistance and lack of supervision;
- Training model needs to be revised;
- Fragmentation and limited reach of the program in schools, workplaces and health units;
- The smoking cessation program was publicized without backing from the SUS; and
- The health hotline provides misleading information.

In general, there was consensus that despite the recognized advances in Brazil's tobacco control program, much emphasis was given to international activities such as treaty requirements, and collaboration with other countries. However, despite the successful performance of the Brazilian Commission for the implementation of the WHO FCTC, with tobacco control measures being considered by other governmental sectors, the process is still restricted to the federal level. Respondents considered that low priority was assigned to the national network with reduced capacity development activities, lack of supervision, monitoring and evaluation, including annual planning meetings, and that the former existing structure was being dismantled in many states due to lack of funding.

Cigarettes Prices and Taxes

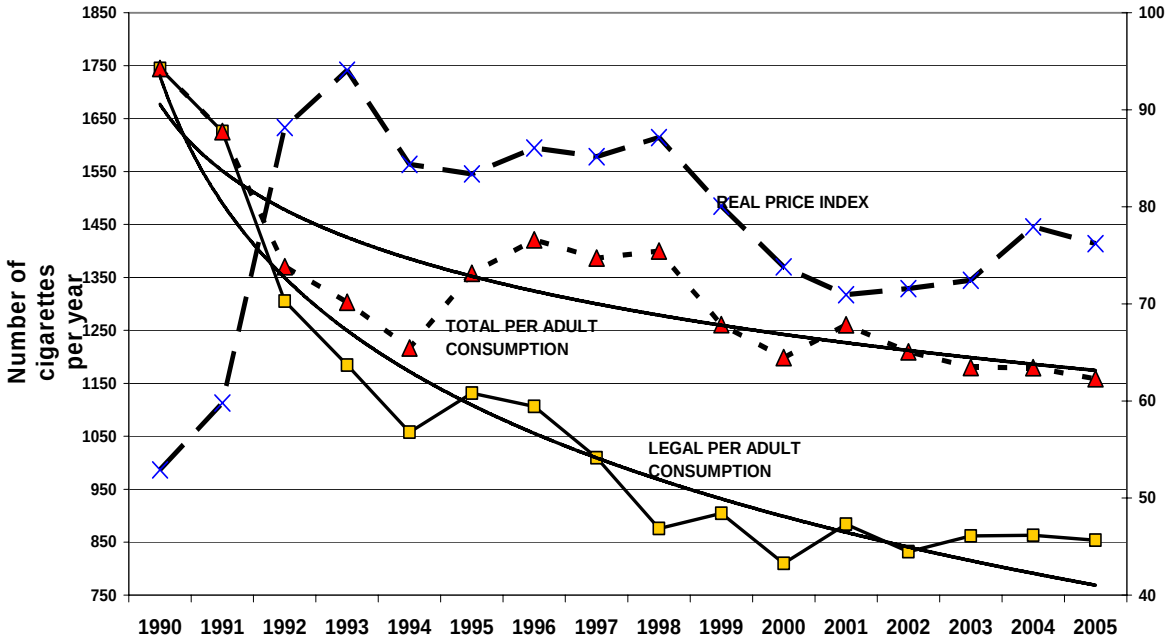
Legal cigarette consumption per adult in Brazil has not declined further as the country has managed to maintain low real cigarette prices in absolute terms, in terms of

[81] Costa e Silva 2006.

average income, and as compared to developed and developing countries, including in the region. Price instruments are not being used in line with best practices. Cigarette price decisions in Brazil are not subject to systematic public health considerations, and tax decisions, which affect retail prices, are normally taken in isolation by the Minister of Finance and the Secretariat of Federal Revenue.

The decline of cigarette prices in terms of the price index and salaries affected the evolution of consumption per adult in the country. As previously mentioned, real price of cigarettes increased significantly between 1990 and 1993, representing a real increase of 78 percent, despite high inflation. The real price remained high, although lower than the 1993 level, until 1998. After that, the price began to decline until 2001. Between 2001 and 2005, real prices showed a positive trend, but 2004-05 levels are still lower than the 1992-98 average. At the end of 2003, after a year of high inflation (9.3 percent), the National Commission for the Implementation of the Framework Convention for Tobacco Control and its Protocols (CONICQ) was able to press for a new tax increase to rebuild the real value of the specific tax. After that, with inflation rates between 5 percent and 7 percent per year, real price and real tax collection on tobacco products suffered new reductions (Graph 32).

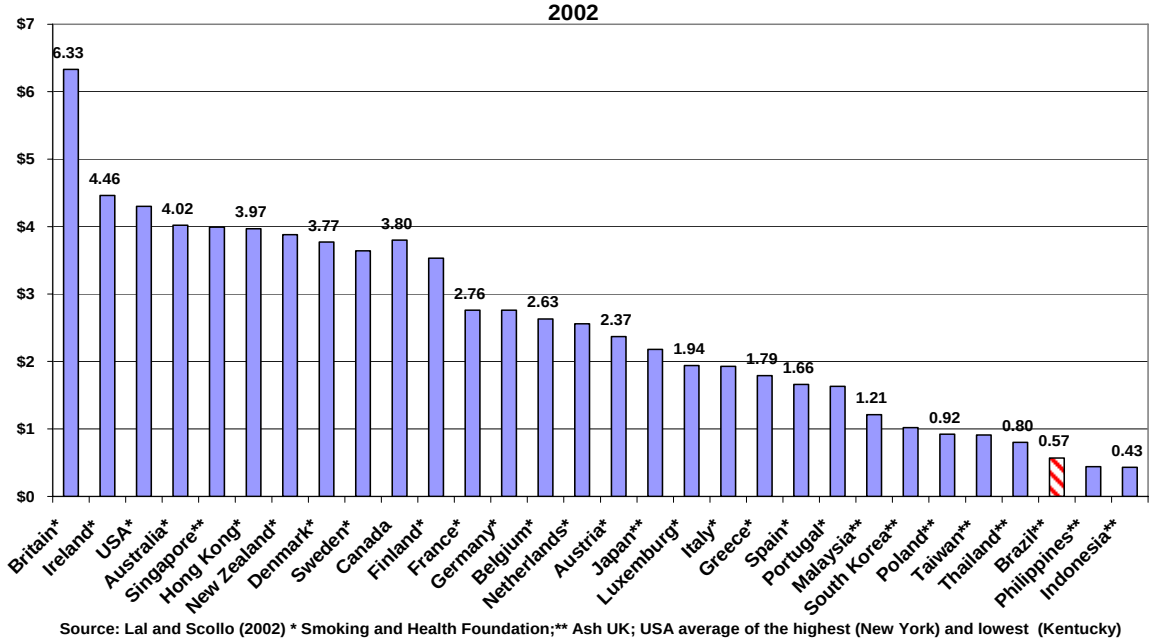
Graph 32. Legal and Total Cigarette Consumption per Adult and Real Price Index
Dec 93=100



Source: Secretary of Federal Revenue, IBGE and External Trade Secretary.

In 2002, Brazilian cigarette prices were one of the lowest (US$0.57) among developed and other developing countries (Graph 33).

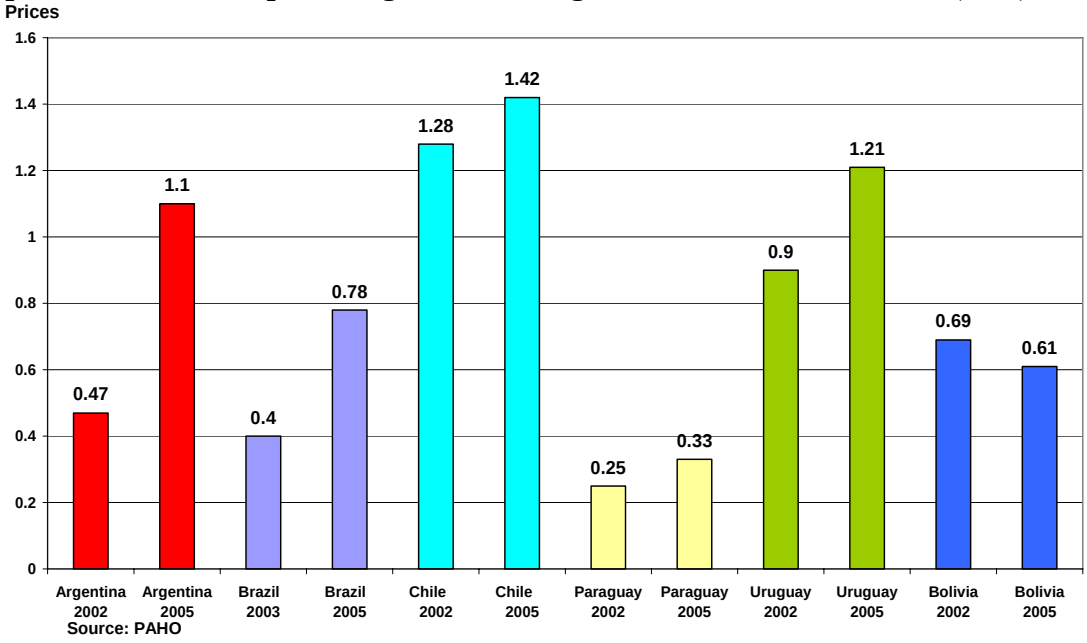
Graph 33. Price of 20 cigarettes in Brazil 2002 (US$)



Source: Lal and Scollo (2002) * Smoking and Health Foundation;** Ash UK; USA average of the highest (New York) and lowest (Kentucky)

In 2005, the price of cigarettes in Brazil was still the lowest among regional countries (US$0.88), with the exclusion of Paraguay (Graph 34).

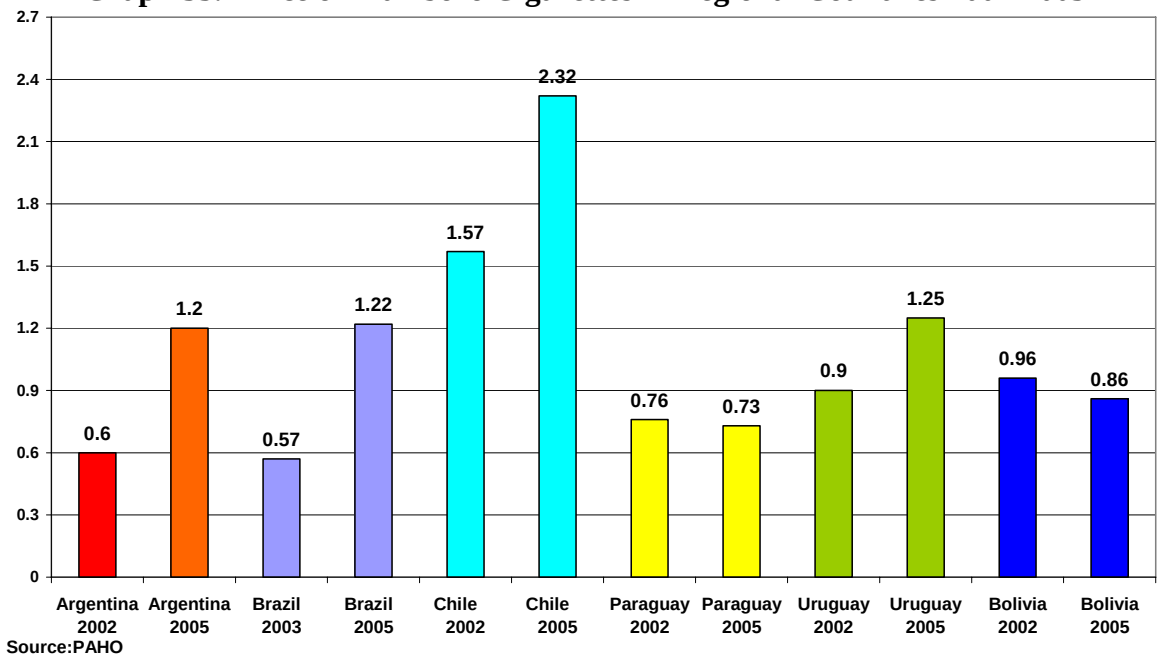
Graph 34. Prices of Popular Cigarettes in Regional Countries 2002-2005 (US$)



Source: PAHO

The relative situation of Brazilian cigarette prices is not better when Marlboro packs are compared. In 2003, Brazilian Marlboro was the cheapest in the region, and in 2005 Brazilian prices of Marlboro cigarettes were lower than in Chile and Uruguay (Graph 35).

Graph 35. Price of Marlboro Cigarettes in Regional Countries 2002-2005



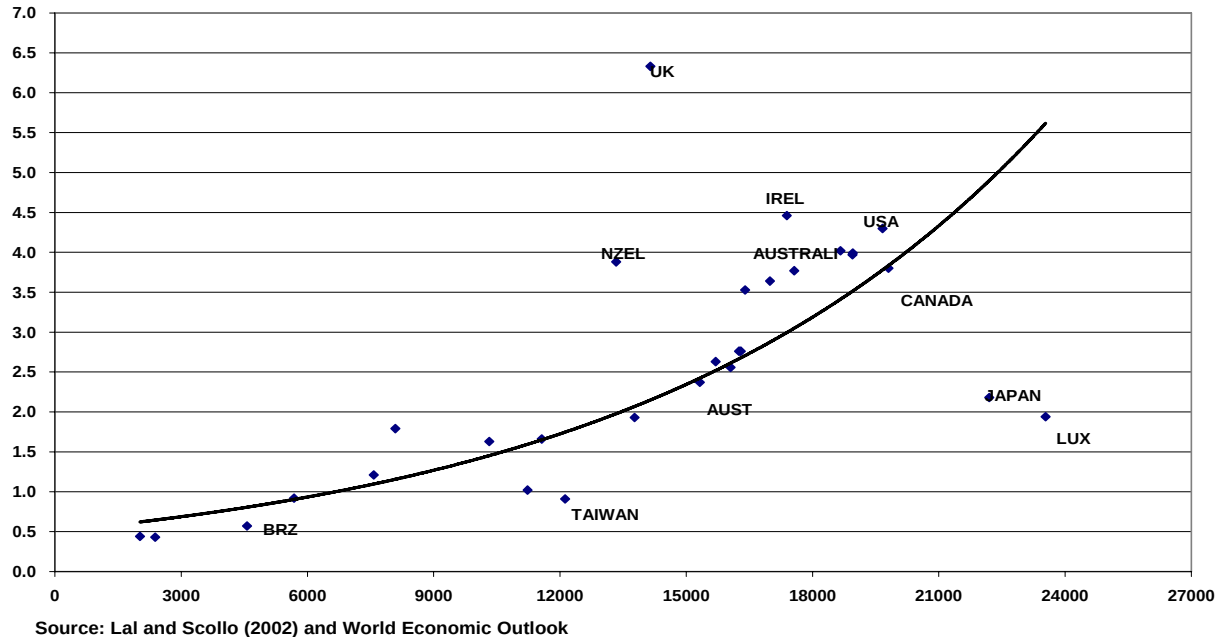
Source:PAHO

Prices of similar products may vary as a function of the level of development, as more developed countries have higher wages and larger service prices. In the case of cigarettes, taxes are an important factor to explain price differences. GDP level is also relevant as it affects affordability. A higher GDP level makes higher taxes and prices affordable. Consequently, it is necessary to compare cigarette prices controlled for development stage. Graph 36 plots cigarette prices and 2002 GDP per capita for a set of countries. Clearly, developed countries tend to have higher prices. The graph also presents an exponential trend for those observations.

In 2002, the Brazilian cigarette price was lower than expected for its level of development. One possible explanation is that dollar prices of Brazilian products were depressed as a consequence of the large devaluation of its currency in 2002. However, when compared to other South American countries, Brazilian prices do not perform well. In 2003, the Brazilian domestic currency began an appreciation process, so dollar prices of Brazilian products where higher than in 2002. Nevertheless, in 2005, when the effect of devaluation diminished, the Brazilian price of popular cigarettes was still one of the lowest in the region. Argentina, Chile and Uruguay, with similar GDP per capita, had but higher cigarette prices than Brazil. The price of a pack of cigarettes in Brazil was 20 percent lower than in Argentine, although Argentine has had its currency devalued since 2002.

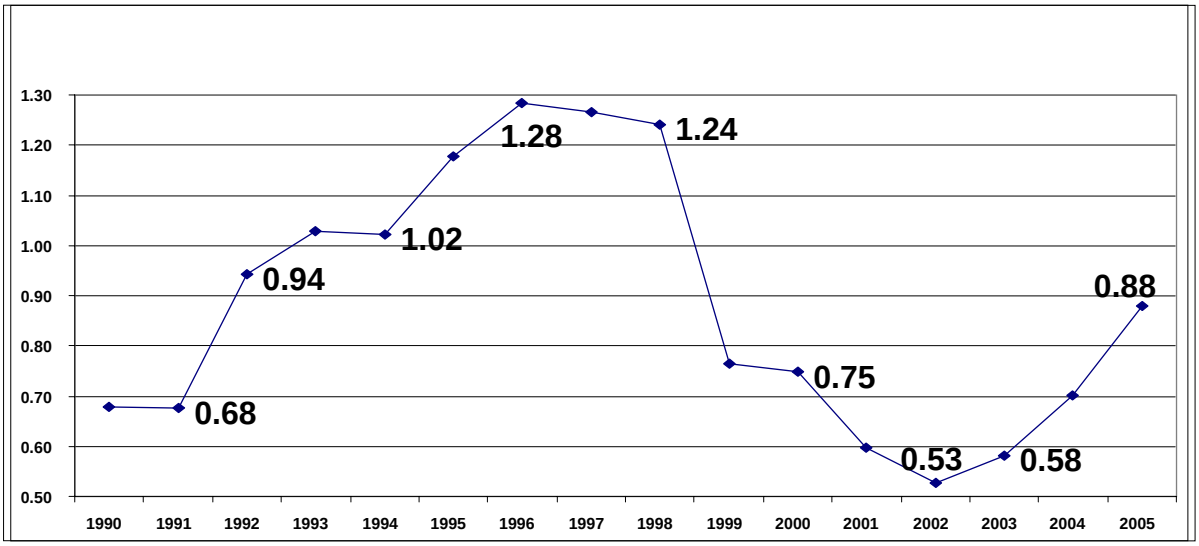
The decline of Brazilian cigarette prices is not a recent phenomenon. Graph 37 shows the evolution of the dollar price of an average pack followed by the National Institute of Statistics (IBGE) in the Consumer Price Index estimates. After the 1999 devaluation, Brazilian cigarette prices dropped and reached their lowest level in 2002. However, after three years of domestic currency appreciation, the Brazilian cigarette price was US$0.88, still a low value in regional terms.

Graph 36. Price of 20 Cigarettes v. GDP per Capita 2002



Source: Lal and Scollo (2002) and World Economic Outlook

Graph 37. Price of a Cigarette Pack in Brazil 1990-2005 (US$)

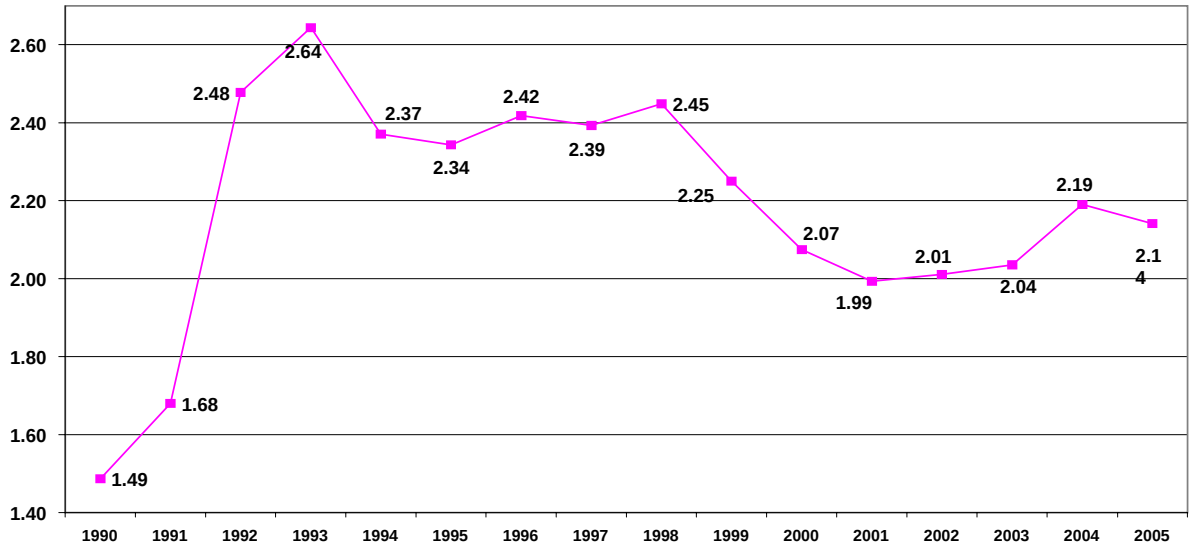


Source: IBGE-CPI and Central Bank of Exchange Rate.

Another way to analyze trends is to examine the evolution of real prices of cigarette.[82] The 2005 price should have increased by 23.4 percent to achieve the 1993 value, or 14.1 percent to achieve the 1992-99 average real value. However, real prices decreased in Brazil since 1993 (Graph 38).

[82] Annual nominal prices were divided by the Consumer Price Index (2005=1). Cigarette prices increased less than inflation between 1993 and 2005.

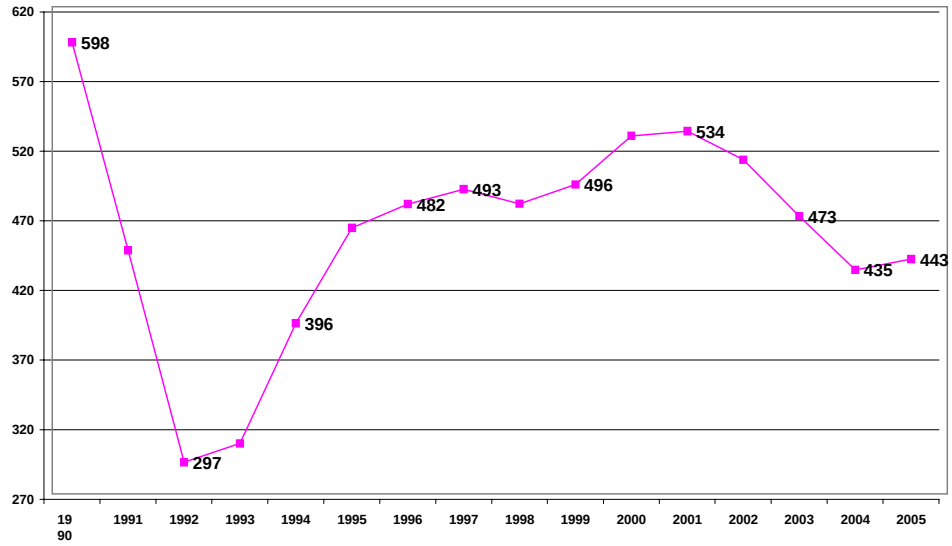
Graph 38. Real Price of a Cigarette Pack in Brazil 1990-2005
2005 values



Source: IBGE–CPI and Central Bank for exchange rate

A key variable in the decision to consume cigarettes is the ratio of wages to cigarette prices. An increase in the ratio means that average wages can buy more cigarette packs per month. After a low point in 1992-1993, when average wages would buy around 300 packs per month, the purchasing power of wages in terms of cigarette packs increased, reaching 534 packs in 2001. After that, there was a reduction in the purchasing power of wages, but it was still high at 443 cigarette packs per monthly wages in 2005 (Graph 39).

Graph 39. Cigarette Packs Purchased by Average Income in Brazil 1990-2005



Source: IBGE CPI and Monthly Survey on Employment and Wages.

Tax Policy

Price decline in Brazil was accompanied by a reduction of the proportion of tobacco tax collected per package. In turn, tax policy has favored the declining trend of real prices. Collection of the Industrial Production Tax (IPI) on cigarettes has decreased in real terms since 1996. This phenomenon was accentuated after the IPI on cigarettes became a specific tax. Evidence indicates that quantities sold in the domestic market remained almost constant in recent years, and real prices did not show a strong declining trend. As a consequence, the main factor behind the drop of real tax collection has been the reduction of the proportion of IPI tax collected per cigarette package.

The management of the IPI on cigarettes, which is a federal tax, explains the cigarette price decline. Manufacturers pay the IPI when cigarettes leave the factory for distribution to sellers. Until 1999, this assessment was an *ad valorem* aliquot corresponding to 41.25 percent of the retail sale price of cigarettes, and after that date it became a specific tax. This change was not successful: revenue collection on tobacco IPI decreased in real terms. Inflation undermined nominal rates and the Secretariat of Federal Revenue was not able to maintain real tax pressure on cigarettes.

For the purpose of the IPI tax, cigarettes are divided into classes according to their packaging and length. Class I includes brands offered in soft packs up to 87 mm in length; class II includes brands offered in soft packs measuring more than 87 millimeters; class III includes hard packs and versions of the same brands offered in soft packs measuring up to 87 mm in length; Class IV includes brands offered in hard packs or boxes (R), and versions of the same brands offered in soft packs (M) measuring more than 87 mm in length. Table 26 shows IPI rates since June 1999.

Table 26. Cigarette Taxes since 1999

Classes	Until June 1999	June 1999-Nov 2002	Dec 2002-Dec 2003	Since Jan 2004
	IPI Rate %	IPI Value R$/per package 20 units		
I	330	0.35	0.385	0.469
II	330	0.42	0.460	0.552
III–M		0.49	0.535	0.635
III–R	330	0.56	0.610	0.718
IV–M		0.63	0.685	0.801
IV–R	330	0.70	0.760	0.884

Source: Secretariat of Federal Revenue.

PIS and COFINS are general taxes applied to cigarettes. These taxes are calculated at time of invoicing according to the following formulas: PIS = 0.65 percent * 1.38 * retail sales price; and COFINS (R$) = 3 percent * 1.18 * retail sales price. Thus, the PIS share is 1.38 percent, and COFINS share is 1.18 percent; 0.65 percent and 3 percent are multiplication factors for tax substitution purposes. A value-added tax (ICMS) is collected by the states and its aliquot is about 18 percent (in the cigarette trade between Southern and

Southeastern states, it is 12 percent). However, cigarettes and tobacco derivatives are one of the groups of products affected by tax substitution, on which taxes are levied at the time of distribution, which facilitates collection. The aliquot corresponding to the ICMS is 25 percent, and the basis for its calculation on cigarettes is different from what it is for other tobacco products. In the case of cigarettes, the ICMS imposed as they leave the factory is based on the consumer sales price established by the manufacturer, while with other tobacco products leaving the factory it is based on the tax substitution price, which includes IPI, freight and other expenses.[83]

IPI on cigarettes is the main source of revenue from cigarette companies. The IPI collection increased in real terms from 1992 until 1996, but declined since then. In 2004, after a tax increase at the end of 2003, there was a real recovery of IPI collection. In 1996, the specific tax on tobacco contributed with US$2.9 billion to federal revenues, but in 2005 with only US$945 million (Table 27).

Table 27. Federal Taxes on Cigarettes in Brazil 1992-2005

	Gross IPI	Other Taxes	Total Taxes	Gross IPI	Other Taxes	Total Taxes	Gross IPI	Other Taxes	Total Taxes
	R$ Million			US$ Million			R$ Million -2005 Prices (CPI)		
1992	2.75	-	2.75	1661.59	-	1661.59	4372.0	-	4371.96
1993	59.35	-	59.35	1808.85	-	1808.85	4654.0	-	4654.04
1994	1287.72	-	1287.72	1995.54	-	1995.54	4640.8	-	4640.82
1995	2488.4	-	2488.4	2711.56	-	2711.56	5402.1	-	5402.15
1996	2874.05	-	2874.05	2859.18	-	2859.18	5390.0	-	5390.03
1997	2840.24	-	2840.24	2633.02	-	2633.02	4981.6	-	4981.56
1998	2537.43	-	2537.43	2185.37	-	2185.37	4312.7	-	4312.66
1999	2282.5	416.5	2699	1257.02	229.38	1486.40	3699.6	675.09	4374.73
2000	1997.82	670.7	2668.52	1092.00	366.6	1458.60	3025.1	1015.58	4040.69
2001	2006.78	667.1	2673.88	853.15	283.61	1136.76	2844.1	945.45	3789.59
2002	1923.37	792	2715.37	658.35	271.09	929.44	2513.5	1035.01	3548.53
2003	1993.53	876.7	2870.23	647.61	284.8	932.41	2271.0	998.74	3269.76
2004	2304.7	925.1	3229.8	787.90	316.26	1104.17	2463.0	988.65	3451.67
2005	2302.7	1053.1	3355.8	945.90	432.59	1378.49	2302.7	1053.1	3355.80

Source: Secretariat of Federal Revenue and IPEADATA (www.ipeadata.gov.br)
Includes IPI and other federal taxes (PIS, Cofins and Income tax).
In current Reais, in dollar and in real terms (prices of 2005)

The declining collection of IPI tax on cigarettes is neither related to a reduction of the tax burden of the Brazilian economy, nor to a GDP contraction. As a consequence, the participation of IPI tax on cigarettes in the total IPI, federal revenues and in GDP declined (Table 28).

[83] http://members.fortunecity.com/icmsbrasil/manual/id115.html.

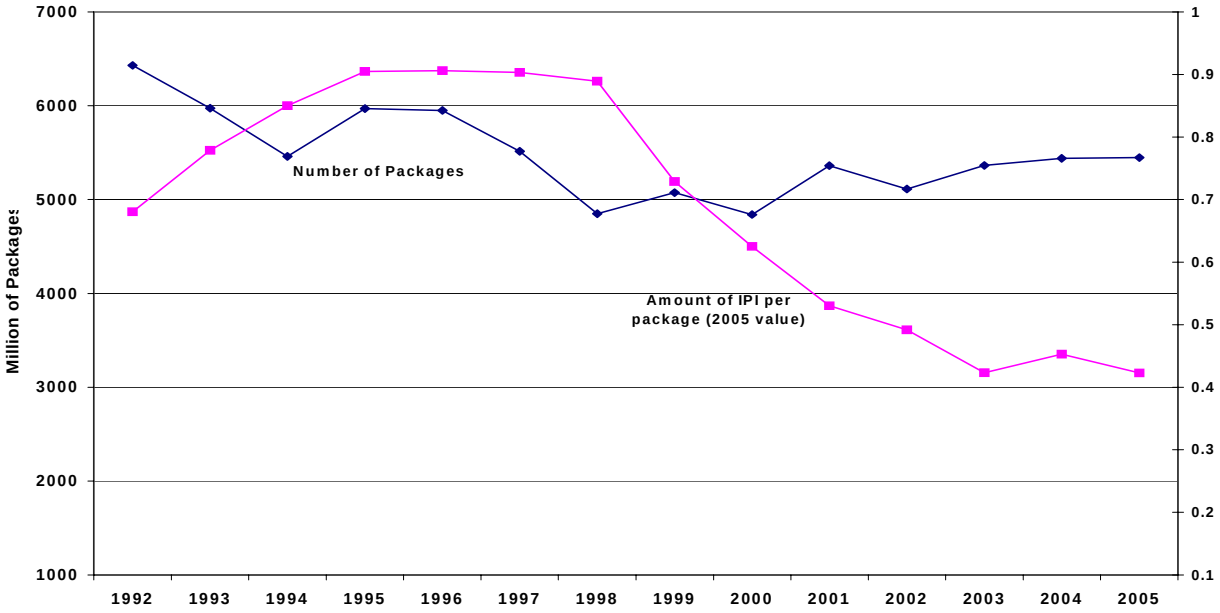
Table 28. Proportion of IPI on Cigarettes in Total IPI, Fed. Revenue and GDP

	Gross IPI %	Federal Revenue %	GDP %
1992	18.35	3.94	0.43
1993	17.09	3.56	0.42
1994	16.68	2.67	0.37
1995	18.25	2.88	0.39
1996	18.53	2.96	0.37
1997	16.87	2.45	0.33
1998	15.56	1.82	0.28
1999	13.83	1.44	0.23
2000	10.60	0.83	0.18
2001	10.31	0.74	0.17
2002	9.71	0.58	0.14
2003	10.13	0.54	0.13
2004	10.06	0.53	0.13
2005	8.73	0.46	0.12

Source: Secretariat of Federal Revenue and IPEADATA (www.ipeadata.gov.br)

Three elements affect IPI real collection: the number of packages of cigarettes sold in the domestic market, the real price of cigarettes, and the proportion of IPI tax collected on each package. The amount of IPI tax collected per package has decreased in real terms since 1999, when the government implemented the new tax policy. Quantities sold in the domestic market remained almost constant around 5,000 million packages (Graph 40).

Graph 40. Cigarette Packages Sold and IPI per Package in Brazil 1992-2005

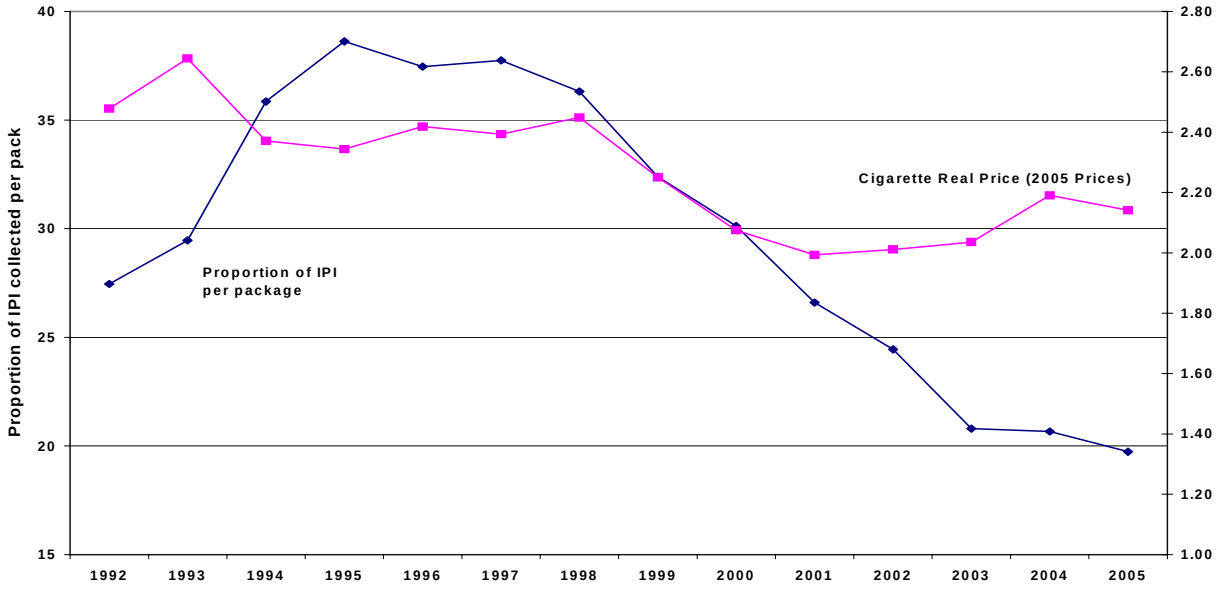


Source: Iglesias e Nicolau 2006.

In recent years, the proportion of IPI collected on each package has decreased from 37 percent in 1996-98 to close to 20 percent in 2003-2005. Real prices have decreased as

well, and this has contributed to the reduction of IPI tax collection in real terms. However, the main factor behind IPI reduction in real terms was the reduction of the tax burden per pack.

Graph 41. Proportion of IPI per Cigarette Package and Real Price of Cigarette Package in Brazil 1992-2005



Source: Iglesias e Nicolau 2006.

Cigarettes in Brazil have had a specific tax since 1999. In 2005, the total collection of IPI on cigarettes was R$2,302 million, and the average amount of IPI collected per package was R$0.427. As average nominal price per package in 2005 was R$2.14, the IPI tax represented almost 20 percent. Although the ratio of IPI tax over price has been declining since 1995, the downward trend was accelerated after the introduction of the specific tax (Table 29).

Table 29. IPI Collection and Ratio of Cigarette Package IPI Tax in Brazil 2000-2005

	IPI on Cigarettes R$ Million	**Packages Sold** Millions	**IPI per Package** R$	**Average Nominal Price per Package** R$	**Ratio of IPI Tax over Price**
2000	1997.8	4840	0.4127	1.37	30.124
2001	2006.8	5363	0.3742	1.41	26.602
2002	1923.4	5112	0.3762	1.54	24.445
2003	1993.5	5364	0.3717	1.79	20.800
2004	2304.7	5439	0.4237	2.05	20.674
2005	2302.7	5447	0.4227	2.14	19.739

Source: Secretariat of Federal Revenue and IBGE.

Increase in Revenue from Raising Taxes

The study estimated increases in public revenue that increased tobacco tax collection would generate (Table 30).[84] Study simulations indicate that the 2005 cigarette price has to increase 23 percent to return to the 1993 price – the highest price since 1980 – and 14 percent to return to the 1992-98 prices. This latter price would require an increase in the specific tax (IPI) of 72 percent. The IPI has to increase 30 percent just to compensate for accumulated inflation between 1999 and 2005. A tax increase of 30-40 percent over 2005 values reaches significant lower price increases than the necessary to achieve real prices comparable to those in the 1990s. In terms of tax collection, these tax increases would not significantly alter revenue collection from IPI on cigarettes (Tables 30 and 31). However, achieving real prices similar to the 1990s would translate into significantly higher revenue, similar to the average of that decade.

There are however two important issues in the management of cigarette taxes. First, tobacco companies may decide to pass through only part of a tax increase, which would mean a smaller impact on price. This is particularly important in a context of low inflation as the present one. Tobacco companies would not be able to completely absorb an increase of 70 percent of the specific tax, but they could manage to partially pass through increases of only 30-40 percent. Second, inflation may undermine the real value of fixed nominal rates. In 1999, tax authorities fixed specific rates. However, the accumulated inflation rate between 1999 and 2002 was of about 34 percent. Meanwhile, tobacco nominal rates were only adjusted by 10 percent. Tax administrators and tobacco control coordinators should follow, and agree on, the evolution of real prices and real rates of the specific cigarette tax to prevent this situation from happening again and, at least, maintain nominal specific rates in the future.

Table 30. Impact of Excise Tax Increase on Revenue in Brazil

Change in the Excise Tax %	**Change in Average Nominal Price** %	**Change in Government Revenue from cigarettes** %	**New Government Revenue from cigarettes** R$ million 2005 values	**New Revenue from cigarettes as a percentage of Total Federal Revenue** %
Price objectives				
71,6	14.1	64.8	3,795	0.8
118.8	23.4	107.6	4,780	1
Specific tax objectives				
30	5.9	27,2	2,929	0.6
40	7.9	36.2	3,136	0.6
50	9.9	54.3	3,553	0.7

Source: Study estimates.

[84] Based on The World Bank Toolkit N 4, Design and Administer Tobacco Taxes.

As a fixed amount per category, the Brazilian IPI penalizes cheaper brands, which are those that poor people smoke. Therefore, increasing taxes will penalize poor people. However, a tobacco tax increase is a very cost-effective public policy instrument aiming at significant collective health improvement rather than at income redistribution, which is better pursued through other instruments and policies.

Table 31. Gross IPI Revenue from Cigarettes

R$ Million -2005 prices

	Gross IPI-Cigarettes
1992	4372.0
1993	4654.0
1994	4640.8
1995	5402.1
1996	5390.0
1997	4981.6
1998	4312.7
1999	3699.6
2000	3025.1
2001	2844.1
2002	2513.5
2003	2271.0
2004	2463.0
2005	2302.7

Source: Secretariat of Federal Revenue

Price and Income Elasticities of Total Demand

The study estimated price and income elasticities for legal cigarette demand by analyzing aggregate quarterly figures of cigarette consumption per adult, from the first quarter of 1991 to the last quarter of 2005. Results indicate that a 10 percent price increase will reduce consumption per adult by 2.7 percent, in the short run, and 4.8 percent in the longer run. An increase of 10 percent in smoking restrictions, which means a higher level of legal and other restrictions, will reduce 1.3 percent of consumption per adult in the short run; and 2.3 percent in the longer run.

Table 32. Selected Elasticities for the Brazilian Economy

	Price
Short Run	**- 0.27**
Long Run	**-0.48**
	Smoking restrictions
Short Run	**-0.13**
Long Run	**-0.23**
	Income
Short Run	**0.45**
Long Run	**0.80**

The model, which was tested in both linear and logarithmic form, can be represented schematically as follows:

Per adult consumption (t) = f (constant; consumption per adult (t-1); real price of cigarettes t; real per capita income, time trend, restrictions on smoking, dummy on seasonal per adult consumption).

Table 33 presents a summary of modeling of legal consumption per adult between the first quarter of 1991 and the last quarter of 2005. The dependent variable is quarterly consumption of cigarettes per adult (variables and econometric procedures are summarized on Annex 2). The impact of real prices and smoking restrictions on legal consumption of cigarettes per adult are significant. As legal consumption is a function of past consumption, the negative effect of real price and smoking restrictions is transmitted over time. Per capita gross domestic product is not significant.

Table 33. Factors on Decrease in Legal Cigarette Consumption

OLS	Eq (1)	Eq (2)
Constant	2.73	1.52
	[1.50]	[0.82]
Trend		-0.004
		[-2.14]*
Consumption Per Adult (t-1)	0.54	0.44
	[5.3]*	[4.17]*
Real Price of Cigarettes(Nominal/CPI)	-0.263	-0.27
	[-2.97]*	[-3.14]*
Per capita Gross Domestic Product (pc)	0.07	0.45
	[-0.19]	[1.20]
Smoking Restriction Index	-0.187	-0.13
	[-3.6]*	[-2,21]*
Seasonal dummy (2 quarter)	-0.08	-0.08
	[-3.64]*	[-3.64]*
Adjusted R-Squared	0.84	0.88
Log likelihood	72.13	74.62
DW	2.25	2.12
Akaike info criterion	-2.24	-2.29
Schawrz criterion	-2.03	-2.04
F-statistic	77.39	69.58

I…t-statistic; *1% significant level

Table 34 presents the decrease in legal consumption per adult in selected periods and the change of model variables. In each period, the accumulated change of consumption per capita, GDP per capita, real price and smoking restrictions was estimated as the percentage variation of the last two quarters of a period over the first two quarters of the same period. The periods were selected according to perceived trends of consumption per adult.

Real price increases were the main factor behind the reduction of cigarette consumption in the mid-1990s. Lack of control of the illegal market allowed a partial

reorientation of consumers towards cheaper illegal cigarettes. Eventually, restrictions on the sources of the illegal market (export tax to Paraguay in 1998 and real devaluation in 1999) reduced it. In the period 1998-2000, combined smoking and contraband restrictions led to lower levels of total cigarette consumption, in a context of real price reduction. However, since then, consumption has been stable at around 1,200 cigarettes per adult per year. The illegal market has been gradually shrinking, while the legal market has slightly increased. Given the present trend of legal consumption, and that real price in 2005 was 12 percent lower than in the previous period 1992-98, further control measures, particularly in the price area, are necessary.

Table 34. Factors on Decrease in Cigarette Consumption Over time

Period	Consumption Per adult	GDP Per Capita	Real Price	Smoking Restrictions	Smuggling
	% Change	% Change	% Change	% Change	
1991.1 – 1993.4	-20.46	8.69	78.63	No change	NA
Contribution to change in consumption		3.91*	-37.74		
1994.1 -1998.1	-10.35	8.61	-1.13	Increase	From 158 to 523 illegal cigarettes per adult per year
Contribution to change in consumption		3.87*	0.54	-23	
1998.2 -2000.3	-5.77	1.03	-13.68	Increase	From 523 to 388 illegal cigarettes per adult per year
Contribution to change in consumption		046*	6.57	-11.5	
2000.4 -2005.4	-2.11	5.89	5.07	No change	From 388 to 300 illegal cigarettes per adult per year
Contribution to change in consumption		2.65*	-2.43		

Source: Study estimates. * Income variable is not significant

During the period 1991-2005, there were three fundamental transformations in the cigarette market: (i) a strong real price increase in the period 1991-1993; (ii) an expansion of smuggling activities, especially during the 1994-1998 period; and (iii) approval of comprehensive smoking restrictions and more information about the health impact of smoking, which led to changes in smoking attitudes among informed consumers.

The cigarette price increase in real terms of the beginning of the 1990s was accompanied by a rise in the ratio of cigarette price to wages, because worker remunerations did not experience similar increases. These related movements led low-income consumers or low-wage earners to reduce their consumption of legal cigarettes and/or to leave the legal market, searching for cheaper illegal cigarettes.

Smuggling and smoking restrictions produced a decrease in legal cigarette consumption. Both phenomena are difficult to assess, as there are no quarterly and reliable series on illegal cigarettes prices, which does not allow for direct assessment of the impact of illegal prices on legal demand for cigarettes. Smuggling is a complex issue, resulting from the interaction of lack of border control, corruption and economic incentives, such as the legal to illegal price ratio. Due to lack of data and the nature of this issue, no proxy variables were found in order to assess the impact of smuggling in legal consumption. A smoking restriction index[85] was used to capture part of the structural changes produced by public policy. The restriction index variable produced significant results when it was included in the econometric specification.

All the accumulated evidence indicate that the major bulk of illegal cigarettes were cheaper than legal cigarettes. The difference in cost between legal and illegal price stimulates supply and demand in the illegal market. Low-income consumers without enough money to buy legal cigarettes purchased cheaper illegal cigarettes. The rise in the dollar price of domestic legal cigarettes, as result of the industry price decision (1991-93), and real appreciation of the real/dollar exchange rate (1994-98) made room for marketing illegal and smuggled cigarettes that were less expensive.

Brazilian smoking restrictions and anti-tobacco campaigns produced changes in the average consumption pattern of more informed consumers, leading to less cigarette consumption among this kind of consumer. Consumers of legal and more expensive cigarettes are on average people with higher educational levels, and therefore more sensible to health information and smoking restriction campaigns. Consumers of illegal cigarettes are less educated people with less access to information and less sensible to the health content of the campaigns. Because of this asymmetry in education among consumers of both markets, health campaigns had a more powerful impact on legal consumption.

[85] Based on World Bank 2003. Economic Analysis of Tobacco Demand, Tool 3.

CONCLUSION

The objective of this study was to assess the smoking situation in Brazil, and the role of the tobacco control program in the country, and compare it to global best practice and experience in other countries. Although the Brazil tobacco control program is considered one of the most comprehensive national tobacco control program in the developing world, the program was not evaluated before.

The study reviewed trends in smoking prevalence, consumption and expenditures, as well as the illegal market. Smoking prevalence decreased in Brazil in the last decade. About 16 percent of the adult population smoke, especially uneducated people, who may also be the poorer; and poorer groups spend a larger proportion of their income on tobacco compared with groups from higher income brackets. The largest differences in smoking prevalence between less educated and more educated people were found in northern and northeastern cities. However, large cities in the South and the Southeast of the country have higher smoking prevalence rates. Curitiba, Florianópolis and Porto Alegre have the highest female smoking prevalence rates in the country.

Overall tobacco consumption declined in Brazil in the 1990s, as the decrease in legal consumption was not fully offset by the rise in consumption of illegal cigarettes. In this decade, legal consumption has remained stable at around 850 cigarettes per adult per year. The illegal trade of cigarettes accounts for about 30 percent of total cigarette consumption in Brazil. While legal cigarette consumption decreased since 1986, illegal consumption increased between 1992 and 1998, reaching 500 cigarettes per adult, and then gradually decreased, reaching an annual average of 310 cigarettes per adult in recent years. Trends in adult consumption of legal cigarettes in the 1990s and in the present decade are not totally explained by traditional determinants such as cigarette real prices and income.

Cigarettes are the main component of tobacco expenditure in Brazil. Tobacco and cigarette expenditure decreased between 1996 and 2003, as a proportion of total spending. Evidence from developing countries indicates that the proportion of expenditure that goes on tobacco is larger among lower income groups. In Brazil, poorer groups also spend a larger proportion of their income on tobacco as compared with higher income groups.

Brazil prevalence rates are lower than those in neighboring countries, which may be the result of tobacco control policies implemented in the country in the 1990s. Brazil experienced a large increase in consumption of cigarettes one decade later than OECD countries such as the UK and US. However, the level of consumption per capita was always much lower in Brazil than in the US, Canada and EU countries such as France, Germany, Italy, even at its pick in the 1980s. Nowadays, after the impact of tobacco control interventions was felt throughout all these countries, Brazil continues to consume fewer cigarettes per capita than all other countries, with the exception of the UK.

The study analyzed trends in lung cancer mortality and health care costs of smoking-related diseases. Male lung cancer rates due to smoking have decreased in Brazil, but this is partly offset by increases in female lung cancer rates. Although these findings have some limitations, they are consistent with the idea that tobacco control policies in Brazil have spurred cessation among males, but cessation among females is not as common. This suggests that efforts to counter the specific targeting of young women by the tobacco industry (the "Virginia Slims" approach) require more aggressive use of price instruments and counter-advertising.

Tobacco-related hospitalizations are responsible for an important part of total hospitalizations; and the number of hospitalizations due to tobacco-related diseases increased significantly during the period. Total costs for inpatient care are significant - R$1.1 billion, corresponding to 8 percent of hospital costs for adults over 35 years. The study found that average costs for inpatient care for some tobacco-related diseases were either stable or decreased during the period, which suggests that less costly procedures are used or prices were not updated to account for inflation.

The study reviewed non-price and price tobacco control interventions, including those taken by the Brazil program. The National Cancer Institute (INCA) has been implementing the tobacco control program since 1987, and ANVISA was given the mandate to regulate tobacco products since 1999. National campaigns and dissemination of information, with the establishment of a state and municipal tobacco control governmental network, contributed to create an environment favorable to smoking restrictions. The program made progress in the areas of advertising, promotion and sponsorship bans, packaging and labeling and smoke-free environments and cessation therapies. New actions and instruments in these areas will be implemented in the near future.

Compared to the mid-1990s, Brazil is experiencing today lower real prices of cigarettes and smaller real collection of tax on cigarettes. This is contrary to what is recommended as best practice for tobacco control policies. Real price increases were the main factor behind the reduction of cigarette consumption in the mid-1990s. In the period 1998-2000, in a context of real price reduction, combined smoking and contraband restrictions ensured a lower level of total cigarette consumption. However, legal cigarette consumption per adult in Brazil has not declined further as the country has maintained low real cigarette prices in absolute terms, in terms of average income, and as compared to developed and developing countries, including in Latin America.

The present issues of Brazilian cigarette policies are illustrated by regional comparisons. In 2005, Brazilian popular cigarette prices were lower than in Argentina, Chile and Uruguay. The rationale behind this tax policy could have been to maintain low price differentials with bordering countries to discourage smuggling. However, low real taxation and relative prices are not good strategies to fight illegal activities. The Brazilian experience is an example that this is a mistake. Real prices and real taxes decreased, but the illegal cigarette market remained above 300 cigarettes per adult per year or around 30 percent of total consumption.

Recommendations

The Brazil tobacco control program has achieved impressive results. The chief recommendation to ensure further reductions in death and disease due to smoking, especially among women, youth and the uneducated, is for Brazil to adopt more comprehensive control interventions such as raising the price of cigarettes, and enforcing non-price measures such as smoke free environments.

Uneducated and poorer smokers may react positively to price and tax increases, and better control of the illegal market. However, evidence highlights the difficulty of reaching highly educated people with information and other interventions of the tobacco control program. Simple messages or frightening photographs may not be the best way to motivate this group. Methods to decrease female smoking involve more aggressive control of advertising and promotion.

Higher Cigarette Taxes and Prices

Tobacco taxes are the most cost-effective instrument to reduce cigarette consumption while increasing public revenue due to the low price elasticity of cigarette demand. It is at least paradoxical that a country such as Brazil, with a high public debt to GDP ratio, spends public money on tobacco control measures without effectively using price and tax instruments. Returning to the situation of the mid 1990s in what concerns prices and taxes on cigarettes, would reap revenue and public health gains.

According to study simulations, the 2005 average price should be increased by 23 percent to return to the 1993 real price, which could be accomplished by increasing the average specific tax rate (IPI) by 119 percent. Tax collection at 2005 prices would be increased by 108 percent, and reach about R$4.7 billion. Because of the low value of price elasticity, this tax increase would unequivocally augment real tax revenue.

Price instruments are underused except for a one-time price increase in the early 1990s, and are not being used in line with best practices. Given that real price in 2005 was 19 percent lower than in 1993, authorities may want to consider increasing the price of cigarettes. Returning to the situation of the mid 1990s in what concerns prices and taxes on cigarettes, would reap public revenue and public health gains.

The cigarette tax increase could be accomplished by (i) increasing the specific tax on cigarettes (IPI) and the proportion of tax collected on each package; (ii) switching back to an ad valorem tax, which is not susceptible to be eroded by inflation; and/or (iii) establishing a mixed specific plus ad valorem tax, as in the European Union. If a specific tax is maintained, Brazilian authorities need to increase the IPI on cigarettes and the proportion of the tax collected in each package. The tax should be indexed so it automatically increases with inflation.

To reshape price and tax policy on cigarettes, authorities may want to consider changing decision mechanisms and redefine the parameters of cigarette price and tax policy. Cigarette price and tax adjustments are decided in isolation by the Ministry of

Finance. However, tobacco taxes are not only a matter of fiscal policy, but are also a powerful instrument of public health policy. CONICQ could act as a forum to discuss, and propose to the Ministries of Finance and Health tobacco price and tax policies to achieve desirable public health gains. Based on those proposals, tax administrators and tobacco control coordinators would then agree on the evolution of real prices and real rates of the specific cigarette tax.

Effective Action against Cigarette Illegal Trade

In conjunction with tax increases, the government should counter illegal sales of cigarettes. However, controlling the cigarette illegal trade is more than a tax issue. It is necessary to legally enforce policies to reduce the illegal cigarette trade and increase the effectiveness of tobacco health policies. Policies to control the illegal market seek to:[86]

i) Reduce the demand for illegal cigarettes through counter-propaganda;
ii) Increase the probability of smugglers being caught and the severity of their punishment through greater control and enforcement of the law;
iii) Adopt excise and value-added taxes that are paired with anti-smuggling technologies, including product tracing and use of prominent tax stamps with warning labels in local language, and enhanced punishment of illegal street sales.

In 2004, a commission including representatives of several government departments and tobacco producer associations drafted a document containing several proposals for addressing the illegal market issue. The essence of the proposals was improved intergovernmental coordination, combined with improved legal coordination with the government of Paraguay. Increased oversight over Paraguayan cigarette producers is key to reduce tobacco illicit activities in Brazil. However, as the illegal network involves other countries, it would be important and desirable to extend illicit trade control to all MERCOSUR countries. Combating smuggling can and should be the job of MERCOSUR, with emphasis on exchange of information and harmonization of smuggling control policies.

An important area that needs improvement is the oversight of domestic tobacco producers. There are numerous producers outside the system in a position to supply illegal factories within the country and in neighboring countries. Brazilian authorities should increase oversight, not only of companies that are registered and monitored, but also of illegal companies in Brazil and the illegal distribution network within the country.

It is necessary to develop specific competencies for combating organized crime, as contraband is more than tax evasion, to improve oversight. This should be a coordinated task undertaken by various government departments, under the guidance of authorities and specialists competent in combating organized crime. It would be advisable to establish a

[86] Merriman D, Yurekli A, de Beyer J 2003

multi-sector commission, under the lead of the Ministry of Justice, to coordinate the fight against contraband, exchange information, and maximize common efforts.

Unless the government, especially the Federal Revenue Secretariat (SRF), increase intelligence aimed at combating crime and expanding surveillance into the streets and businesses, illegal producers and vendors, which are protected in peripheral neighborhoods of major metropolitan regions and cities of the interior, will not be eliminated. The SRF and Federal Police should systematically study seizures of illegal cigarettes to identify patterns such as origin, type, means of transportation, and other important variables, to better understand the pathways of organized crime. In addition, it would be desirable to cooperate with multilateral agencies specialized in combat of smuggling to carry out intelligence tasks and improve the ability of the Brazilian state to combat organized crime.

The government should also focus on mass media campaigns and other efforts designed to raise social awareness about the issue of illegal cigarette trade and distortions resulting from this contraband. A partnership with the private sector is fundamental to broadening the reach of this campaign, and to mobilize more funds. Several institutions in Brazil are dedicated to improving the enforcement of intellectual property rights, including patent and trademark rights. These institutions would be able to participate in communication initiatives against the consumption of contraband and counterfeit tobacco products.

Finally, the best mechanism for enforcing regulation is to increase the possibility of violators being caught and to make penalties stricter. In this case, the role of the judiciary is fundamental in strengthening the mechanism of the law. Sentences and legal interpretations that clearly set penalties for contraband discourage criminal action and reduce the need to strengthen control measures and policing. A review of legislation on the subject would be helpful to further develop the legal framework in this area.

Strengthening the Tobacco Control Network

Study results point to the need to organize the coordination of the Brazil tobacco control program as a think tank able to identify trends and program issues, and evaluate its impact, to reshape actions and improve the use of public resources.

Further reductions in smoking prevalence and increases in smoking cessation require financing of, and strengthening the state and municipal tobacco control programs. Revitalization of the state and municipal governmental network should be pursued to keep the outreach of program activities at the local level. The establishment of a regular financial mechanism is crucial to the sustainability of the program, as well as joint planning and evaluation consultations with state and municipal governmental stakeholders. State and municipal coordinators require more support from the MoH (SVS) for the implementation of decentralized programs, including training and annual planning and evaluation meetings.

It is also necessary to further review program implementation. Municipalities where tobacco control actions have been implemented are a small proportion of those trained by

the program. This issue is particularly important considering the new tobacco control challenges in the country, such as smoke free environments and cessation treatment.

There is also demand for scaling up the smoking cessation program, which requires staff training and provision of cessation aids, as well as coordination of the national tobacco control program with the SUS. The regular involvement of the Unified Health System (SUS) in areas that go beyond smoking cessation should be considered, including municipal level core tobacco control activities. Participation of health community agents and family doctors in the program should be pursued.

Improvements in Monitoring and Evaluation

A better understanding of the results and impact of different tobacco control program interventions are central to increase the program's effectiveness and efficiency. Reliable surveys of smoking prevalence and cessation, and studies of the impact of smoking on mortality are necessary. Reliable monitoring of smoking mortality should document the often unexpected hazards of various types of tobacco use, to maintain public support for regulating tobacco and evaluate control programs. Innovations such as including information on smoking habits in death certificates could also be considered. Finally, the Brazil tobacco control program should carry out studies that analyze costs of tobacco to households, health system, labor market and the economy, and the impact of price and tax increases on smoking habits and burden of disease. Specifically, some of the areas that may benefit from increased monitoring and evaluation are the following:

- Smoking prevalence and cessation;
- Identification of new groups of smokers;
- Decision-making on smoking;
- Impact of different interventions, including national campaigns, school-based programs and tobacco cessation, on smoking and quitting behavior;
- Impact of tobacco control messages and images on cigarette packs on different groups of smokers, including poorer and highly educated smokers;
- Impact of different interventions on social acceptance of smoking;
- Reasons for uneducated and poorer people, women and professionals to be less receptive to tobacco control actions;
- Continue tracking ex-smoking rates through national representative surveys;
- Impact of smoking on mortality;
- Include smoking questions on death certificates;
- Role of states and municipalities on tobacco control, as well as NGO efforts;
- Economic and financial analysis of tobacco and control program, including analyzes of tobacco-related prevention and treatment budgets and expenditures, smoking impact on household expenditures, health care expenditures, labor market and the economy, and the impact of price and tax increases on smoking habits and burden of disease.

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ANNEX 1. TOBACCO CONTROL LEGISLATION

Legislation	Number	Date	Content
MoH Legal Directive	655	16/09/85	Ministry of Health advisory group on smoking control in Brazil
Law	7488	11/06/86	National Anti-Smoking Day (August 29)
MoH Legal Directive	428/GM	28/08/87	Establishes National Anti-Smoking Program and restricts smoking on MoH premises
Interministerial Legal Directive	3257	22/09/88	Restrictive measures on smoking in workplaces; smoking areas; certificates of merit to companies with noteworthy anti-smoking campaigns
Federal Constitution	-	05/10/88	Regulates tobacco advertising
MoH Legal Directive	731/GM	31/05/90	Regulates advertising of smoke-producing products
Law	8069	13/07/90	Statute on Children and Adolescents; prohibits sale to children or adolescents of any products with components that can cause physical or psychological dependency
MoH Legal Directive	1050	08/08/90	General provisions on smoke-producing products
Law	8078	11/09/90	Establishes Consumer Protection Code; prohibits deceptive and excessive advertising
Interministerial Legal Directive	477	24/03/95	Recommends that TV stations avoid broadcasting images where interviewees, guests or public figures are shown smoking
Federal Council of Narcotics Resolution	1	10/05/96	Packaging of cigarettes and similar products, and advertising, must indicate tar and nicotine levels
Law	9294	15/07/96	Restricts the use and advertising of smoke-producing products, alcoholic beverages, drugs, therapeutic products, and agricultural supplies
Decree	2018	01/10/96	Regulations of Law 9294/96
Law	9503	23/09/97	Establishes the Brazilian Traffic Code, making unlawful to drive under the influence of a narcotic substance or one that causes physical or psychological dependency, or to drive a vehicle with only one hand, except when making regulation hand signals, changing gears, or operating equipment
Decree	2521	20/03/98	Passengers of interstate or international highway transportation services shall be denied boarding or asked to disembark when using smoke-producing products within the vehicle
Decree	2637	25/06/98	Cigarettes may only be sold in packages of 20 cigarettes
Decree	2876	14/12/98	Cigarettes exported to South and Central American countries shall be subject to an export tax corresponding to 150 percent

Legislation	Number	Date	Content
Law	9782	26/01/99	Establishes ANVISA, which is responsible for regulation and control of smoking products, including those from tobacco
MoH Legal Directive	695	01/06/99	Warnings on harmful effects of consuming tobacco and of its derivatives
Decree	3157	27/08/99	Smoking is allowed on airplanes and collective vehicles after one hour of travel time has elapsed, as long as there is an adequately isolated area dedicated exclusively for smoking, separated by any means that effectively impedes the transfer of smoke
ANVISA Resolution	320	21/07/99	Annual registration of smoke-producing products; requires the presentation of reports.
Law	10167	27/12/00	Changes Law 9294/96, restricting advertising of cigarettes and other smoking products to posters, panels and billboards inside sales points.
Ministry of Labor and Employment Legal Directive	6	05/02/01	Prohibits minors under the age of 18 to work in harvesting, processing, or manufacturing tobacco
ANVISA Resolution	46	28/03/01	Sets maximum allowable levels of tar, nicotine and carbon monoxide in the primary smoke stream for cigarettes marketed in Brazil
Central Bank Resolution	2833	25/04/01	Prohibition of use of public credits from the National Program for Family Agriculture for integrated tobacco production
Provisional Measure	2134	24/05/01	Changes the provisions of Law 9782/99, which establishes the National Public Health Surveillance System and creates ANVISA, and Law 6437/77, which specifies infractions against federal health legislation and establishes the respective penalties, among other measures
ANVISA Resolution	104	31/05/01	Regulates the use of images in warning labels on packages of smoke-producing tobacco products
ANVISA Resolution	105	31/05/01	Establishes provisions relating to the census of national manufacturers, importers, or exporters of products derived from tobacco, whether smoke-producing or not
Provisional Measure	2190-34	23/08/01	Changes the provisions of Law 9294/96, determining that smoking product packages, with the exception of those destined to export, and advertising materials should include information and pictures about smoking risks
Federal Revenue Secretariat Official Instruction	95	28/11/01	Standards for control stamps that apply to cigarettes
MoH Legal Directive	1324	23/07/02	National commission responsible for evaluating and defining policy directives on health promotion and prevention and control of non-communicable diseases
Interministerial Legal Directive	1498	22/08/02	Recommends that health and teaching institutions implement programs to promote smoke-free environments and awards certificates of merit for noteworthy anti-smoking campaigns

Legislation	Number	Date	Content
MoH Decree	1575	29/08/02	Consolidates the National Smoking Control Program and creates reference centers for outreach and treatment of smoking habit
Provisional Measure	66	29/08/02	Increases the penalties for stamps that do not conform to the requirements established by the Federal Revenue Secretariat
Federal Revenue Secretariat Official Instruction	194	29/08/02	Approves the program for generating the Special Declaration of Fiscal Information related to the taxation of cigarettes
ANVISA Resolution	304	07/11/02	Prohibits the production, importation, marketing, advertising and distribution of food shaped as cigarettes, cigars, cigarettes, or any other smoke-producing product, whether or not it is derived from tobacco. It also prohibits the use of food packaging to simulate or imitate cigarette packages and the use of brand names of smoke-producing products, whether or not they are derived from tobacco.
Decree	4542	26/12/02	Changes the aliquot for the IPI tax on cigarettes
ANVISA Resolution	15	17/01/03	Prohibits sale of tobacco products over the internet
Law	10702	15/07/03	Changes the provisions of Law 9294/96 on temporary and limited lift on prohibition of tobacco sponsorship and advertising in sport events until September 2005. However, the law imposed that tobacco advertising should be compensated by tobacco control messages and extended the prohibition of selling cigarettes in educational, health and public institutions, as well as the sale of tobacco products to minors under the age of 18
ANVISA Resolution	199	24/7/03	Regulates Law 10702/03 about Ministry of Health messages broadcast during international sports and cultural events
Decree	-	01/08/03	Establishes the National Commission on Implementation of the Framework Convention on Tobacco Control and its Protocols
ANVISA Resolution	335	21/11/03	Warnings with images on packages of smoke-producing tobacco products and advertising
ANVISA Resolution	346	02/12/03	Regulates census of companies that process or export tobacco and any of its products
Decree	4924	19/12/03	Raises the value of the Industrial Products Tax (IPI) imposed on cigarettes
Federal Revenue Secretariat Official Instruction	396	09/02/04	Special Declaration of Fiscal Information related to the taxation of cigarettes

Legislation	Number	Date	Content
MoH Ruling	1035	31/05/04	Provision of free support for smoking cessation, including cognitive therapy and pharmacotherapy
Secretary of Health Care Directive	442	13/08/04	Approves plan for implementation of smoking cessation program in SUS, and clinical protocol for treatment of nicotine dependence
Legislative Decree	1012	28/10/05	Approves the text of the Tobacco Framework Convention, signed by Brazil on June 16, 2003
MoH Directive	2439	08/12/05	Approves the national cancer care policy
MoH Directive	2608	28/12/05	Allocates financial resources from Health Surveillance for surveillance, prevention and control of non-communicable diseases activities in state and municipal health secretaries
MoH Directive	300	09/02/06	Establishes the program “Ministry of Health free of tobacco”
MoH Directive	399	22/02/06	Health Agreement 2006, which consolidates SUS
MoH Directive	687	30/03/06	Approves Health Promotion Policy
ANVISA Directive	527	22/09/06	Establishes working group to prepare technical regulation for smoking spaces
ANVISA Directive	528	22/09/06	Establishes working group to implement the program “Smoke Free Environments”
Decree	6006	28/12/06	Establishes the aliquot for the IPI tax on cigarettes
ANVISA Resolution	10	15/02/07	Changes the logo of the service Dial Quit Smoking
Decree	6072	03/04/07	Increases the aliquot for the IPI tax on cigarettes
Law	11488	15/06/07	Requires tobacco products producers to install counting equipment that allow for control and follow up of products throughout the territory, enabling identification of legal origin and restricting illegal production, import and commercialization of illegal products
Federal Revenue Secretariat Official Instruction	753	10/07/07	Regulates Decree 6072/07, increasing the aliquot for the IPI tax on cigarettes

Source: INCA. Highlighted legislation that is in force.

ANNEX 2. ECONOMETRIC ANALYSIS

Variables

Per adult consumption (Index: 1993.4= 100). This is not an observed variable. It was constructed using the definition of apparent consumption, which is equal to production (P) plus imports (M) minus exports (X).

Per adult consumption (quarter t) = P t + M t–X t/ Population over age 15 (units: cigarettes)

Quarterly production figures were not available. To construct quarterly production, data on the annual value of cigarette production published by ABIFUMO and by the Secretariat of Federal Revenue (SRF) were used. IBGE has data for monthly production in its monthly production survey (PIM_PF). Annual production values have been used to establish production levels and the IBGE indexes have been used to determine monthly distribution. The production data were adjusted for total exports and imports for that quarter (To assume that quarterly production is exported or that quarterly imports are consumed seems acceptable in the case of a product such as cigarettes. The original per adult consumption series was transformed to an index (where the fourth quarter of 1993 is equal to 100), dividing each value of the series by the 1993 fourth-quarter value and multiplying it by 100[87].

Real price of cigarettes (Index: 1993.4 = 100). The average price of a basket of five cigarette brands was used as nominal prices for the period. IBGE has published the average price for September 1999 and also monthly variations. We applied these monthly variations to the price as of September 1999. It was only possible to construct a monthly series from 1989:6 until 2005:12. The quarterly price is a mean of monthly prices. To obtain the real price, the quarterly nominal price was divided by the consumer price index (CPI). The original series of real price of cigarettes was transformed to an index (where the fourth quarter of 1993 is equal to 100), dividing each value of the series by the 1993 fourth-quarter value and multiplying it by 100.

Real income per capita (Index 1993.4=100). Real Gross Domestic Product from IBGE National Account was used. The real product was divided by total population, which was also provided by IBGE. Real product per capita presented seasonal regularities, which were adjusted. The real wage-mass and the average income of employed workers were tested as other income variables with no results.

[87] As a result of very high inflation, economists and econometricians express variables as indexes instead of monetary value, which is the most typical way of expressing deflated nominal quantities. Although consumption data do not need to be transformed into an index, this study used one as indexes were used for real prices and real per capita disposable income. Changing the units of relevant variables (consumption per adult, disposable income per capita and real prices) into indexes does not change the values of price elasticities and income elasticities. This transformation changes the value of the intercept.

Other variables were used to test other factors affecting tobacco use, such as:

- **Index of restrictions on smoking in Brazil**. A national index was constructed following the World Bank methodology explained in Economic Analysis of Tobacco Demand, Tool 3. A number between zero and one was assigned to each year (1991 and 2005). Values near 1 imply higher smoking restrictions. To assign a value to smoking restrictions in each year, legislative restrictions and its implementation were reviewed. Between 1991.1 and 1996.2, the value of the index was 0.25. After that, the index increased to 0.50, reflecting the approval of the Law 9294 and its regulation. This new law imposed further restriction on the use and advertising of smoke-producing products. In the first quarter of 2000, the index increased to 0.75, reflecting the implementation of several restrictive measures in the second half of 1999. A preliminary version of the index was discussed with INCA staff.
- **Advertising**. The study attempted to find a proxy for advertising. No data were available giving aggregate expenditures on advertising and promotion of tobacco products as a proportion of total expenditure on advertising.
- **Trend Variable**. A trend variable capable of capturing the structural changes that are not captured by the other relevant variables was used.
- **A Real Plan dummy**. A dummy was used to capture the Real Plan, which had an impact on consumption and the market. The objective was to capture the relative stabilization of the declining trend of cigarette consumption per adult during the first years of the Brazilian Real. The Real Plan dummy had values of 1 between 1994.3 and 1998.4, and zero in other years.
- **Real exchange rates**. Two definitions of real exchange rates were tested: an effective real exchange rates and a bilateral real exchange rate in Brazil and Paraguay. The idea was that a real exchange rate appreciation reduces the relative prices of imported products vis-à-vis domestic products. This could stimulate demand of smuggled products, which become relatively cheaper.

Tests For Non-Stationarity

ADF Test and Phillips-Perron Tests of Relevant Variables

Variable	Testing whether Stationary in:	Trend	Intercept	Number of Lags	ADF Test T-Value	PP Test Statistic	Level of Integration
Per Adult Cigarette Consumption	Levels	Yes	Yes	2	-3.29		I(0) *
	Levels	Yes	Yes	2		-3.88	I(0) **
	First differences	No	Yes	1	-7.13		I(0)***
Per Capita Real Gross Domestic Product	Levels	No	Yes	5	-2.76		I(0)*
(seasonally adjusted)	Levels	Yes	Yes	4		-3.4	I(0)*
Real Cigarette Price	Levels	No	Yes	1	-4.04		I(0)***
	Levels	No	Yes	3		-2.75	I(0)*

***Significant at the 1 percent level

** Significant at the 5 percent level

*Significant at the 10 percent level

The variables are stationary. The log of consumption per adult is stationary with a linear trend, which indicates the convenience to include the trend in the specification of the equation.

Econometric Analysis

Variables used in the econometric model are presented in the table below. All variables were in log, so the econometric model has a double log functional form. The trend variable is significant, but its coefficient is very small. [88] In fact, the trend has different coefficients according to the selected period of the regression. When the regression period considered lasted until the fourth quarter of 1998, the coefficient of the trend variable was -0.02. Although this is a small coefficient, the trend variable must be included in the model, because it is an omitted variable when the equation 1 model was considered. Additionally, the inclusion of a trend variable seems to reduce the impact of the elasticity of the smoking restrictions.

Price endogeneity was tested on both specifications of the model.[89] In Brazil, real price of cigarettes is an exogenous variable. Two factors help to explain this. First, real price is a ratio of nominal cigarette prices and consumer price index. This ratio is not affected by events of particular product markets in a high inflation economy. Second, cigarette nominal prices, particularly at the beginning of the 1990s, were a decision of manufactures, quite independently of consumer reaction.

After testing the trend variable as omitted variable in equation (1), equation-two specification was selected:

> Log of Per Adult Consumption (t) = 1.5 –0.004 Time trend +0.44 Log of Per Adult Consumption (t-1) –0.27 log of Real Price + 0.45 Log of Real per capita GDP –0.13 log of Smoking restriction index – 0.08 Second Quarter Dummy.

As an addictive demand models, short run and long run price elasticities are different, because price impacts in t affect consumption in t+1 through the lagged consumption variable. The long run elasticity is equal to:

> Long Run elasticity = Short run elasticity/ [1- coefficient of log of per Adult consumption (t-1)]

All specification and diagnostic tests for the selected equation were implemented and the results showed that it was not possible to reject the hypotheses of: no serial correlation; normality of residuals and stability of the coefficients.

[88] This variable is a time trend with value equal to 1 in 1991.1 and 60 in 2005.4. It is used when the dependent variable varies around a trend (upward or downward). In the case of legal consumption per adult, the variable has a negative trend.
[89] Following the methodology explained in Iglesias and Nicolau 2006.

Model Variables
Index 1993.4=100

	Per Adult Consumption	Gross Domestic Product (Per Capita)	Real Price	Smoking Restrictions
1991 T1	124.25	87.88	58.13	0.25
1991 T2	115.94	99.82	52.21	0.25
1991 T3	133.54	106.16	48.80	0.25
1991 T4	112.86	98.57	76.17	0.25
1992 T1	107.93	91.79	85.92	0.25
1992 T2	91.57	96.10	83.50	0.25
1992 T3	97.05	99.65	88.18	0.25
1992 T4	97.33	96.86	98.29	0.25
1993 T1	89.21	93.34	96.29	0.25
1993 T2	87.30	100.01	95.69	0.25
1993 T3	91.05	104.00	97.10	0.25
1993 T4	100.00	100.00	100.00	0.25
1994 T1	85.16	95.68	98.18	0.25
1994 T2	75.01	101.07	93.90	0.25
1994 T3	90.76	108.46	88.61	0.25
1994 T4	97.85	109.26	82.92	0.25
1995 T1	96.29	104.47	82.98	0.25
1995 T2	92.00	106.81	90.09	0.25
1995 T3	89.95	108.78	85.81	0.25
1995 T4	83.12	105.89	90.36	0.25
1996 T1	81.74	100.73	87.75	0.25
1996 T2	74.04	106.83	90.55	0.25
1996 T3	89.34	114.01	91.66	0.50
1996 T4	89.76	109.59	90.83	0.50
1997 T1	80.86	104.01	88.94	0.50
1997 T2	79.29	110.44	87.33	0.50
1997 T3	78.87	114.57	87.83	0.50
1997 T4	64.45	110.20	93.00	0.50
1998 T1	79.14	103.49	96.90	0.50
1998 T2	66.44	110.84	90.82	0.50
1998 T3	60.23	113.09	88.75	0.50
1998 T4	59.77	106.50	88.99	0.50
1999 T1	70.26	102.94	87.28	0.50
1999 T2	63.87	108.99	85.64	0.50
1999 T3	67.96	111.05	82.86	0.50
1999 T4	69.21	108.53	80.28	0.50
2000 T1	62.74	106.95	79.09	0.75
2000 T2	60.29	112.11	78.55	0.75
2000 T3	59.08	114.13	76.46	0.75
2000 T4	63.54	111.25	75.63	0.75
2001 T1	67.15	109.58	74.72	0.75
2001 T2	67.10	112.75	73.66	0.75
2001 T3	65.29	113.08	71.84	0.75
2001 T4	65.80	109.01	77.21	0.75
2002 T1	63.52	107.60	77.32	0.75
2002 T2	61.35	112.84	75.51	0.75
2002 T3	59.91	114.92	72.36	0.75
2002 T4	61.84	111.77	75.07	0.75
2003 T1	64.20	108.21	77.88	0.75
2003 T2	60.05	110.21	75.42	0.75
2003 T3	63.44	111.77	73.97	0.75
2003 T4	66.19	110.30	76.57	0.75
2004 T1	66.83	110.52	81.68	0.75
2004 T2	54.67	115.46	83.39	0.75
2004 T3	66.83	118.39	80.52	0.75
2004 T4	63.24	115.56	81.34	0.75
2005 T1	62.66	112.20	81.60	0.75
2005 T2	61.38	118.60	80.09	0.75
2005 T3	62.69	118.05	79.59	0.75
2005 T4	65.24	115.78	78.38	0.75

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