CHAPTER 2

RECENT TRENDS IN SMOKING PREVALENCE IN SOUTH AFRICA[1]

2.1 Introduction

The primary aim of a tobacco control strategy is to curb tobacco use and improve public health. As pointed out by Warner (1987: 2081) and Peto et al. (1996), the public health benefits from reduced tobacco consumption take many years to manifest themselves.[2] This is a result of the fact that there is such a long delay between smoking initiation and the onset of tobacco-related diseases. Evidence from the US and other developing countries indicate that the prevalence of tobacco-related diseases started decreasing between 20 and 30 years after tobacco consumption started to decrease. However, the short-term goal of a tobacco control strategy is to reduce smoking prevalence and tobacco consumption. This can be measured relatively easily.

As was pointed out in the previous chapter, South Africa has been actively implementing a tobacco control strategy since the early 1990s, and especially after 1994. The international tobacco control community has acknowledged South Africa's efforts in this regard,[3] and according to eminent tobacco control economists South Africa is regarded as a role model for other developing countries in the area of tobacco control (Ken Warner and Frank Chaloupka, personal communication: 2003). Has the strategy worked?

As was pointed out in chapter 1, numerous studies have investigated aggregate smoking prevalence in South Africa, and one can safely conclude that there has been a pronounced decrease over the past 30 or 40 years. In this chapter, changes in smoking prevalence for various demographic and socio-economic groups for the period 1993 to 2003 are investigated, since this could (and should) direct future tobacco control interventions. A consistent data set

1. This chapter is an extension of a paper published in the South African Medical Journal (Van Walbeek, 2002a). The original paper benefited from comments by Iraj Abedian, Yussuf Saloojee, Nick Wilkins, Tania Ajam, Kalie Pauw, Conrad Barberton and an anonymous referee of the SAMJ.
2. While this is generally true, some health benefits from reduced smoking can be realised in the short term. For example, a sharp reduction in smoking in Poland resulted in a rapid decrease in the incidence of stroke and lung cancer, especially among young males (Joy de Beyer, personal communication, 2005).
3. In 2000 the South African Ministry of Health was awarded the Luther L Terry Award for exemplary leadership in tobacco control by a government ministry at the 11th World Conference on Tobacco or Health in Chicago.

(the All Media and Products Survey) has been used, which will ensure that the data are comparable over time. The focus here is on smoking prevalence, rather than on the quantity of cigarettes consumed. The latter is analysed in depth in chapter 4.

In section 2.2 the data set, as well as its strengths and limitations, is discussed. Some aggregate trends in smoking prevalence are discussed in section 2.3. This is followed by an analysis of smoking prevalence by demographic and socio-economic groups in section 2.4. Some implications of the findings are presented in section 2.5 and the chapter is concluded in section 2.6.

2.2 Data on smoking prevalence

Without meaningful data it is very difficult to evaluate policy of any sort. Tobacco control is no exception. To develop an effective and focused tobacco control strategy, the Department of Health requires data on smoking prevalence, tobacco consumption and people's attitudes towards smoking and smoking restrictions. Internationally, organisations like the World Health Organisation have been instrumental in compiling and collating statistics on smoking prevalence in numerous countries (see Shafey et al., 2003). In South Africa the Medical Research Council has conducted regular surveys on smoking prevalence and other smoking-related aspects, such as opinions about tobacco advertising bans, tax increases, health warnings, etc. (see Yach and Townshend, 1988; Martin et al., c.1992; Reddy et al., 1996; and Steyn et al., 1997). As was pointed out in chapter 1, this information was useful in determining the public's attitude towards tobacco control policies prior to the passing of the Tobacco Products Control Act of 1993 and the subsequent Tobacco Products Control Amendment Act of 1999. However, these prevalence studies suffer from two weaknesses. Because of budgetary considerations, the surveys are often not performed annually. Also, because of changing research priorities, the format of the questionnaire can change from one year to the next. These factors weaken the ability of researchers to analyse trends.

This chapter is based on an analysis of trends obtained from a commercially generated database, known as the All Media and Products Survey (AMPS). It is compiled by the South African Advertising Research Foundation (SAARF), an organisation funded by the Marketing Industry Trust, whose main objective is to direct and publish media and product research.[4] Regular surveys are conducted on between 14 000 and 30 000 respondents.[5] The present study covers the period 1993 to 2003. The primary aim of the AMPS data is to provide

4. The SAARF website can be accessed at http://www.saarf.co.za/. Specialised runs from the AMPS database can be ordered from Interactive Market Systems (tel. +27-11-4477843).
5. In this study, the prevalence figures for the years 1993 to 1996 were based on the annual surveys for those years (biennial surveys were apparently only introduced in 1997); for 1997 to 2000 they were based on the first of the two surveys for those years, for 2001 they were based on the second of the two surveys for that year, and for 2002 and 2003 they were based on the average of the two surveys for these years. While this inconsistency in data is unfortunate, these were the only data available. Also, there is no a priori reason to believe that this would have a significant impact on the results.

businesses with management information regarding consumer trends in advertising and the mass media, as well as product usage of a variety of products. To investigate trends in smoking patterns, the AMPS database has three major advantages:

(1) it is much cheaper than generating data by means of large-scale national surveys that are focused on smoking issues;

(2) because the questions regarding product usage do not change from one year to the next, trends in smoking prevalence can be meaningfully investigated; and

(3) the survey is performed regularly – at least once a year.

The disadvantage of the AMPS database is that the focus is limited. The only relevant information concerns "product usage"; aspects such as opinions about smoking and tobacco control policies, smoking initiation and people's perceived exposure to cigarette smoke are not incorporated into the surveys.

The survey is done by means of personal in-home interviews. The sample is chosen using a multi-stage area-stratified probability sampling methodology. The stratification variables include province and community size. The latter variable is subdivided into the following categories: metropolitan areas, cities and large towns, small towns, villages of less than 500 people, and dispersed rural communities. The data are weighted to represent the South African adult population, based on the most recent Population Census published by Statistics South Africa, and annual adjustments performed by the University of South Africa's Bureau for Market Research. These adjustments take cognisance of mortality and fertility rates, and incorporate the impact of net migration at both macro and micro levels. The weightings ensure that both urban and rural areas are proportionately represented in the resulting data. As such the data are not biased towards any particular population group. However, AMPS's technical director, Piet Smit, points out that more affluent groups may have a higher risk for biases because of high substitution rates due to unavailability, security measures, lack of time, etc. (personal communication, 2001).

Because of sampling and measurement error, the data are subject to random short-term variations. Depending on the size of the sample and subsamples, the standard error of the prevalence percentage variable varies from 0.3 percentage points to 2.4 percentage points.[6] However, for most subsamples, shown in the subsequent tables, the standard error lies between 0.5 and 0.8 percentage points. Graphing the point estimates of the smoking prevalence percentage against time (not shown here) generally reveals a decreasing trend, with some random variations around the trend. Because the observed trend in the smoking prevalence percentage is linear for most socio-economic and demographic categories, the following model was employed:

6. For any demographic or income category, the smoking prevalence percentage is defined as the number of respondents who declare cigarette usage, expressed as a percentage of the population in that category.

$$Y_t = a + bt + e_t, \quad (2.1)$$

where Y_t = smoking prevalence percentage of the socio-economic indicator under surveillance,

a = constant, equal to the regressed value of the smoking prevalence percentage for the relevant socio-economic indicator in the base year (1993, unless otherwise stated),

b = trend coefficient, i.e. the average annual increase in the smoking prevalence percentage,

t = trend variable, equal to 0 in the first year, 1 in the second, 2 in the third, etc., and

e_t = error term.

In each case the statistical significance of the trend coefficient was calculated.

2.3 Overall smoking prevalence

Annual data for some of the most important aggregate measures of smoking prevalence and intensity are shown in Table 2.1.[7] Recorded aggregate cigarette consumption decreased by 33 per cent between 1993 and 2003.[8] As will be pointed out in chapter 4, the sharp increase in real cigarette prices was found to explain most of the decrease in aggregate cigarette consumption. In fact, between 1993 and 2003 the real price of cigarettes has increased by more than 100 per cent, which means that, on average, cigarette price increases exceeded the inflation rate by about 8 percentage points each year.

7. Throughout this dissertation, prices of cigarettes sold in South Africa are expressed in South African Rand (R). The Rand/US dollar exchange rate has been extremely volatile during the period under discussion, depreciating consistently between 1993 and December 2001, and appreciating sharply subsequently. The R/USD exchange rates were as follows:

Year	R/USD	Year	R/USD	Year	R/USD
1993	3.27	1997	4.61	2001	8.60
1994	3.55	1998	5.53	2002	10.52
1995	3.63	1999	6.11	2003	7.56
1996	4.30	2000	6.94	2004	6.45

Source: South African Reserve Bank Quarterly Bulletin.

8. The consumption of smuggled cigarettes is not reflected in the consumption figures. The consumption figures are derived from excise tax revenue data (see ETCSA, 2003: 121-122). Thus, to the extent that cigarette smuggling has increased since 1993, the consumption figures represent an under-reporting of actual consumption. However, as is pointed out later, the evidence does not suggest that cigarette smuggling has increased to the extent that it significantly distorts the official consumption figures.

Table 2.1: Trends in cigarette consumption, prevalence and prices

Year	Aggregate cigarette cons.	Population aged 15+[9]	Per capita consumption (pop. aged 15+)	Estimated smoking prevalence	Estimated smoking prevalence (smoothed data)	Estimated number of smokers (smoothed data)	Average cons. of smokers (smoothed data)	Nominal retail price of cigarettes	Real retail price of cigarettes
	(Mill. packs)	(Millions)	(Packs p.a.)	(Perc.)	(Perc.)	(Millions)	(Packs p.a.)	(R/pack)	(R/pack in 2000 prices)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1993	1802	24.83	72.6	32.6	31.7	7.9	229	2.55	4.17
1994	1769	25.42	69.6	28.8	31.0	7.9	225	2.84	4.26
1995	1708	26.03	65.6	30.2	30.2	7.9	217	3.48	4.81
1996	1690	26.66	63.4	30.3	29.4	7.8	215	3.87	4.98
1997	1577	27.40	57.6	28.4	28.7	7.9	201	4.97	5.89
1998	1495	28.15	53.1	28.5	27.9	7.9	190	6.08	6.74
1999	1422	28.93	49.2	27.9	27.1	7.9	181	7.30	7.69
2000	1334	29.52	45.2	27.1	26.4	7.8	171	8.03	8.03
2001	1276	30.12	42.4	24.5	25.6	7.7	165	8.89	8.41
2002	1234	30.56	40.4	24.8	24.9	7.6	162	9.87	8.55
2003	1210	30.89	39.2	23.8	24.1	7.4	163	10.98	8.99
2004	1208*	31.24	38.7*	Na	Na	Na	Na	12.13*	9.70*
Percentage change 1993-2003	-32.9	24.4	-46.0	-26.4	-24.0	-5.5	-28.9	330.6	115.6

Note: * Forecasts, based on Republic of South Africa, 2004.
Sources: Auditor-General, Republic of South Africa, Central Statistical Service, Statistics South Africa, AMPS

According to the original AMPS data, overall smoking prevalence among adults decreased from 32.6 per cent in 1993 to 23.8 per cent in 2003 (see column 4). To mitigate the impact of random errors in the overall smoking prevalence percentage, a linear trend line, as discussed in section 2.2, was fitted to the data, and the fitted trend values are shown in column 5.[10] Based on the fitted values, overall smoking prevalence among adults has decreased from 31.7 per cent in 1993 to 24.1 per cent in 2003.[11]

Despite the fact that the adult population has grown by 24 per cent between 1993 and 2003, the sharp decrease in overall smoking prevalence has decreased the estimated number of smokers from 7.9 million to 7.4 million over that period. The decrease in the number of smokers was particularly pronounced in the period 2001 to 2003. Table 2.1 also indicates that the average cigarette consumption of smokers has decreased from 229 packs in 1993 to 163 packs in 2003, a decrease of 29 per cent.

9. Midyear estimates of the whole population were used as the base data. The proportion of the population aged 15+ were obtained from the census data in 1991, 1996 and 2001 and from the 2004 midyear estimates. For other years the proportion of the population aged 15+ was interpolated, by gender, and these proportions were applied to the whole population.
10. The regression equation was as follows: $Y_t = 31.7 – 0.76t$, $R^2 = 0.88$, and Student's t-value on the trend coefficient is -8.09.
11. With the exception of 1994 and 2001, the fitted smoking prevalence rates differ by no more than one percentage point from the actual rates, suggesting that the trend line follows the actual values quite closely. The following paragraphs are based on the fitted smoking prevalence rates.

The relationship between smoking *prevalence* (the percentage of people who smoke cigarettes) and smoking *intensity* (the average number of cigarettes smoked by smokers) requires some investigation. As will be pointed out in chapter 3, a number of studies employing individual-level data have focused on the impact of tobacco price changes on smoking prevalence and smoking intensity. Teenage smoking behaviour has been investigated in detail in the US, and most recent studies have found that the impact of a change in cigarette prices on consumption is divided more or less equally between smoking prevalence and smoking intensity (see Chaloupka and Warner, 1999). Some earlier US studies have found that increases in cigarette prices tend to have a more pronounced effect on smoking prevalence, while the impact on smoking intensity is less pronounced (e.g. Lewit and Coate, 1981). For developing countries, recent studies that attempted to quantify the relative importance of changes in smoking prevalence and smoking intensity in explaining changes in tobacco consumption have not yielded a consistent picture (see section 3.4 of chapter 3).

To estimate the relative contributions of changes in smoking prevalence and smoking intensity on overall cigarette consumption in South Africa, the following identity is considered:

$$PCCons = SPP * ACons, \quad (2.2)$$

where PCCons = Per capita cigarette consumption of the population aged 15+ (column 3),

SPP = Smoking prevalence percentage among people aged 15+ (column 5), and

ACons = Average cigarette consumption of smokers (column 7).

By transforming equation (2.2) into natural logarithms and differentiating the resultant equation with respect to time, the relative contribution of each component of the change in per capita consumption (PCCons) can be estimated. Using the logarithmic form of equation (2.2), one calculates the differences between 1993 and 2003 as follows:

$$\{\ln(PCCons_{2003}) - \ln(PCCons_{1993})\} = \{\ln(SPP_{2003}) - \ln(SPP_{1993})\} + \{\ln(ACons_{2003} - \ln(ACons_{1993}) \quad (2.3)$$

Equation (2.3) provides an indication of the growth rates of each element defined in equation (2.2). In order to estimate the relative contribution of the change in SPP and the change in ACons to the change in PCCons, the right hand side elements in equation (2.3) are divided by $\{\ln(PCCons_{2003}) - \ln(PCCons_{1993})\}$. The sum of these two contributions will, by definition, equal 100 per cent. Using this method, 55 per cent of the decrease in per capita cigarette consumption between 1993 and 2003 is explained by a reduction in the average consumption of smokers, whereas a reduction in the smoking prevalence percentage accounts for the other 45 per cent.

2.4 Demographic and socio-economic characteristics

2.4.1 Gender

Internationally, smoking prevalence is higher among males than among females, even though female smoking prevalence has been increasing rapidly, especially in developed countries. According to Table 2.2, approximately 52 per cent of South African males smoked in 1993, decreasing to about 39 per cent in 2003. Smoking prevalence among females was only 13 per cent in 1993 and decreased to 10 per cent in 2003. Between 1993 and 2003 the "prevalence gap" between males and females decreased from about 39 per cent to 29 per cent. The narrowing of the "prevalence gap" is consistent with international experience. In many countries the "prevalence gap" is closing because women are smoking more, while smoking prevalence among men has stabilised. In South Africa, however, the prevalence gap is closing despite the fact that women are smoking less.

2.4.2 Race[12]

It is evident that coloured people have the highest smoking prevalence percentages, followed by whites, Indians and Africans, in that order.[13] Smoking prevalence is dropping rapidly among coloureds (at about 0.7 percentage points per annum for the 1993-2003 period), while the decrease in smoking prevalence among whites and Indians is less pronounced. Africans' smoking prevalence of about 28 per cent in 1993 was the lowest of all race groups and it decreased sharply to less than 20 per cent in 2003. It suggests that cigarette manufacturers have been unable to increase their sales to the African market in the past decade, despite the fact that the political transformation and rapid urbanisation have created new marketing opportunities. Given that Africans comprise about three-quarters of the South African population this is good news for tobacco control advocates.

These race-based smoking prevalence percentages for the different race groups are consistent with most previous findings (see Table 1.1 in chapter 1). Previous studies indicate that

12. Under the apartheid government people were divided into four racial groups: "whites" (previously also termed Europeans), "Africans" (also termed "blacks"), "coloureds" and "Indians". *Whites* are of European origin, have by far the highest standard of living, speak either English or Afrikaans and live predominantly in urban areas. They comprise about 13 per cent of the population. *Africans* comprise about three quarters of the population. A large proportion of Africans live in extreme poverty in rural areas. However, since the 1970s there has been rapid urbanisation. There are nine official traditional African languages. Given the similarities between many of these, they are categorised into either Nguni or Sotho groups. Generally, *coloureds* are of mixed ancestry. Their forebears comprise original inhabitants of South Africa (specifically San and Khoikhoi people), slaves from the former Dutch East Indies, and white settlers. Most coloureds live in the Western Cape, but small numbers also live in the Northern Cape and the Eastern Cape. Afrikaans is the predominant language, but English seems to be gaining ground. *Indians* were brought to South Africa at the end of the nineteenth century and the start of the twentieth century in order to work on the sugar plantations in what was then known as the colony of Natal. The vast majority of Indians are currently still found in KwaZulu-Natal. They are nearly completely urbanised and enjoy relatively high standards of living. Most Indians speak English.

13. Smoking intensity is investigated in section 2.4.4. It will be shown that whites have the highest smoking intensity (with average smoker smoking 16.6 cigarettes per day in 2002), followed by Indians (9.9 cigarettes), coloureds (8.8 cigarettes) and Africans (6.3 cigarettes).

smoking prevalence has been decreasing (albeit erratically) since the 1980s. The current findings confirm the decreasing trend, and suggest that the rate of decrease has accelerated since 1993, especially for Africans and coloureds.

Table 2.2: Smoking prevalence percentages by demographic characteristics

Description	Proportion of population (1993)	Constant (Prevalence in 1993)	Annual trend	t-stat	R^2-value	Prevalence in 2003
Sex						
Male	48.0	51.8	-1.27***	-10.21	0.921	39.0
Female	52.0	13.2	-0.31***	-4.32	0.675	10.1
Race						
White	15.7	36.0	-0.04	-0.27	0.008	35.6
African	73.2	28.4	-0.89***	-9.21	0.904	19.5
Coloured	8.5	50.9	-0.70***	-3.64	0.595	43.9
Indian	2.6	31.5	-0.29	-1.39	0.177	28.6
Age group						
16-24	28.0	23.7	-0.68***	-5.52	0.772	17.0
25-34	25.7	39.0	-1.11***	-12.68	0.947	27.9
35-49	25.5	39.6	-0.91***	-5.62	0.778	30.6
50+	20.8	23.9	-0.32**	-2.75	0.457	20.7

Notes: *** Significant at the 1 per cent level
** Significant at the 5 per cent level (all tests are two-sided).
Source: AMPS (various years)

2.4.3 Age

Since 1994, and especially since 1997, the price of cigarettes has increased rapidly in South Africa. As will be pointed out in chapter 3, the international (mainly US) empirical literature has consistently shown that young people are more responsive to changes in cigarette prices than older people (e.g. Lewit and Coate, 1981; Chaloupka and Grossman, 1996; Chaloupka and Wechsler, 1997). Many countries' tobacco control strategies are premised on the fact that the youth should be discouraged from smoking. Given youths' relatively price elastic demand, increases in the price of cigarettes are held to be a particularly effective means of reducing youth smoking.

The South African empirical evidence shows that smoking prevalence among young adults (aged 16-24) decreased from about 24 per cent in 1993 to 17 per cent in 2003. The smoking prevalence among people aged 25 to 49 decreased from 39 per cent in 1993 to 28 per cent for the 25-34 age group and to 31 per cent for the 35-49 age group in 2003. Smoking prevalence among people aged 50 and older decreased modestly from 24 per cent to 21 per cent over the same period.

In a previous study which covered the period 1993 to 2000, Van Walbeek (2002a) found that there was some tentative evidence to suggest that the decrease in smoking prevalence is

inversely related to age, which would imply that a relatively greater percentage of young people are able to quit smoking, or do not start. While the decrease in smoking prevalence has continued for all age groups in the 2001-2003 period, it seems that most rapid decreases have been achieved in the 25-49 age group. However, at current levels of 17 per cent, smoking prevalence among South Africa's young adults is lower than that of most developed and many developing countries (Shafey et al., 2003), which suggests that smoking has lost some of its allure for this age group.

In 1999 and 2002 comprehensive surveys of the smoking behaviour of school children (grades 8-11) were undertaken under the auspices of the Global Youth Tobacco Survey (GYTS). The survey found that the prevalence of smoking (defined as having smoked on one or more of the 30 days preceding the survey) among school children decreased from 23 per cent in 1999 to 18.5 per cent in 2002. The percentage of "frequent smokers" (defined as having smoked cigarettes on 20 or more of the preceding 30 days) decreased from 10.1 per cent in 1999 to 5.8 per cent in 2002 (Reddy and Swart, 2003 and Swart et al., 2004). While the GYTS and AMPS data are not directly comparable (different age categories and different definitions of product usage), they both come to the conclusion that youth smoking has decreased over time.

2.4.4 Smoking intensity by demographic features

The AMPS survey generally does not investigate how many cigarettes are smoked. The typical question is whether respondents use a product at all, and if they do, whether they are "light", "medium" or "heavy" users of that product. It is then left to the respondent to decide how he/she wishes to categorise his/her usage of the product. However, in 2002 the AMPS survey explicitly included questions on smoking intensity.[14] The results are shown in Table 2.3.

A number of observations follow from the table. Firstly, even though smoking prevalence among females is much lower than among males, on average females smokers smoke slightly more cigarettes per day than men. Secondly, smoking prevalence among whites is higher than that of Indians and Africans, and the average number of cigarettes smoked by smokers is much higher than any other race group. The high smoking intensity of whites is not unexpected, given the fact that their average income is so much higher than any other race group.[15] Thirdly, smoking intensity is positively related to age, i.e. average cigarette

14. Using appropriate data from Tables 2.1 and 2.3, total cigarette consumption based on smoking intensity data is estimated at 1457 million packs for 2002 (calculated as 9.2 cigarettes/day x 28.4 per cent of adult population smoking x 30.56 million adults x 365 days/year) / 20 cigarettes/pack. According to official sources total cigarette consumption in 2002 was 1234 million packs. The discrepancy is most probably attributed to illicit sales and measurement error. Regarding the latter, smokers often report the quantity smoked in multiples of five or ten. The most common modes are at 10, 15 and 20 cigarettes per day.

15. Based on the smoking intensity percentages provided in Table 2.3, and the composition of the South African population in Table 2.2, it can be calculated that, of all cigarettes sold in South Africa in 2002,

consumption per smoker increases with age. Given that younger people generally have less disposable income than middle-aged and older people, that young smokers are generally less addicted than older smokers, and that young people are more likely to smoke occasionally to be "sociable", this finding makes intuitive sense.

Table 2.3: Cigarette consumption by demographic characteristics, 2002

Description	Zero cigarettes	Smoked 1-5 cigarettes per day	Smoked 6-10 cigarettes per day	Smoked 11-20 cigarettes per day	Smoked more than 21 cigarettes per day	Average cigarette use for smokers only
Total	75.2	10.1	8.6	5.2	0.9	9.2
Sex						
Male	59.2	17.1	14.7	7.6	1.4	8.8
Female	89.6	4.0	3.0	2.8	0.6	10.5
Race						
White	63.9	3.4	8.5	19.1	5.1	16.6
African	79.3	11.0	7.4	2.1	0.2	6.3
Coloured	55.3	16.2	19.4	8.2	0.9	8.8
Indian	70.3	7.8	12.3	8.7	0.9	9.9
Age group						
16-24	82.5	8.9	5.6	2.7	0.3	7.4
25-34	70.4	12.2	10.5	6.1	0.8	8.9
35-49	68.7	11.7	11.3	7.0	1.3	9.7
50+	78.5	8.0	7.2	4.9	1.4	10.3

Source: AMPS (2002)

2.4.5 Social characteristics

Trends and levels in smoking prevalence were investigated for four social characteristics: education, language group, type of community and marital status. The salient features of Table 2.4 are the following:

Smoking prevalence is highest among people with (some) primary and secondary education, followed by people with tertiary education. People with no education have the lowest cigarette smoking prevalence. Smoking prevalence has decreased sharply among all educational groups (by about one percentage point per year). The only exception is people with secondary education, where the decrease was about 0.4 per cent per year.

Smoking prevalence among English and Afrikaans speakers has decreased moderately at the rate of less than 0.4 percentage points per annum between 1993 and 2003. On the other hand, smoking among Nguni and Sotho speakers has decreased significantly (at between 0.7 and 0.9

29 per cent were sold to whites, 51 per cent to Africans, 17 per cent to coloureds and 3 per cent to Indians. These four population groups comprise approximately 14, 74, 9 and 3 per cent of the total population, respectively.

percentage points per year) between 1993 and 2003. In 2003 smoking prevalence among Nguni (at 20 per cent) and Sotho speakers (at 21 per cent) is significantly lower than that of English and Afrikaans speakers.

Smoking prevalence is significantly higher in urban areas (metropolitan areas, cities and large towns) (about 29 per cent in 2003) than in small settlements and rural areas (18 per cent in 2003). Between 1993 and 2000 smoking prevalence has decreased significantly in all four community types.

Smoking prevalence among single women (at 7 per cent in 2003) is lower than among married women (at 13 per cent) and divorced or widowed women (at 11 per cent). All three groups were subject to moderate decreases in smoking prevalence over the 1993-2003 period. In 1993 smoking prevalence among men was above 50 per cent, irrespective of marital status. While smoking prevalence among divorced and widowed men did not change much between 1993 and 2003, significant decreases were achieved for married and single men. For the latter two groups, smoking prevalence decreased by more than one percentage point each year.

Table 2.4: Smoking prevalence percentages by social characteristics

Description	Proportion of population (1993)	Constant (Prevalence in 1993)	Trend	t-stat	R^2-value	Prevalence in 2003
Education						
No education	11.4	28.3	-1.03***	-3.66	0.598	18.0
Primary education	26.8	35.1	-1.18***	-5.40	0.764	23.3
Secondary education	52.8	30.7	-0.36**	-2.82	0.469	27.1
Tertiary education	9.0	30.7	-0.97***	-6.28	0.814	21.0
Language group						
English	10.7	35.8	-0.36*	-1.99	0.306	32.3
Afrikaans	16.2	43.6	-0.38**	-2.45	0.399	39.8
Nguni	42.0	26.9	-0.73***	-3.82	0.870	19.7
Sotho	31.1	29.9	-0.94***	-4.06	0.881	20.5
Community						
Metropolitan areas	32.1	36.8	-0.78***	-5.85	0.792	29.0
Cities & large towns	14.9	36.7	-0.86***	-5.54	0.773	28.1
Small towns & villages	11.5	33.6	-0.74***	-5.28	0.756	26.1
Settlements & rural areas	41.5	25.6	-0.77***	-5.16	0.748	17.9
Marital status						
Single women	20.0	9.4	-0.26**	-2.70	0.448	6.9
Married women	24.4	15.8	-0.27***	-3.48	0.573	13.1
Widowed/divorced women	7.6	13.7	-0.24**	-2.53	0.416	11.2
Single men	22.5	49.9	-1.25***	-9.91	0.916	37.4
Married men	23.4	53.7	-1.39***	-7.84	0.872	39.8
Widowed/divorced men	2.1	50.5	-0.12	-0.50	0.027	49.4

Notes: *** Significant at the 1 per cent level
** Significant at the 5 per cent level
* Significant at the 10 per cent level (all tests are two-sided).
Source: AMPS (various years)

Given the highly stratified nature of South African society, many of the smoking prevalence levels and trends presented in this section can be traced back to demographic characteristics. For example, the relatively low cigarette smoking prevalence percentage among people with no education, Nguni and Sotho speakers and people living in settlements and rural areas, is directly correlated with the fact that Africans, as shown in section 2.4.2, have a relatively low cigarette smoking prevalence percentage. Given that demographic characteristics are usually more easily identified than social characteristics, these would probably be more effective targets for tobacco control policies than social characteristics.

2.4.6 Economic characteristics

In South Africa, which has one of the most unequal distributions of income in the world, about a third of the population lived on less than 2 US dollars per day in 2000 (Hoogeveen

and Ozler, 2004). People living in absolute poverty generally do not have any discretionary income for cigarettes, and thus one would expect smoking prevalence among the poor in South Africa to be low.[16] Yet in most developed and developing countries smoking prevalence is higher among the poor than among the rich (Bobak et al., 2000: 45). Townsend and colleagues have found that, in the UK, smoking prevalence among the rich has been decreasing sharply over the past three or four decades, while the decrease among the poor has been less pronounced (Townsend, 1987; Townsend et al., 1994).[17] A similar pattern has been found for other developed countries (Bobak et al., 2000: 50-51).

The situation in South Africa is very different. From Table 2.5 it is evident that most income groups in South Africa had similar smoking prevalence rates in 1993. Only households with monthly incomes of less than R900 had somewhat lower smoking prevalence rates. However, by 2003 the picture had changed dramatically. Smoking prevalence among poorer households was much lower than among more affluent households, as a result of a rapid decrease in smoking among low and middle income households. The decrease in smoking prevalence among high income households (R7000+) was much less pronounced.

The fact that cigarette smoking has become a "high-income group" activity in South Africa and a "low-income group" activity in many other countries requires some clarification. A possible explanation is provided in section 2.5.

Table 2.5: Smoking prevalence percentages by monthly household income

Description	Proportion of population (1993)	Constant (Prevalence in 1993)	Trend	t-stat	R^2-value	Prevalence in 2003
R1 - R499	21.0	29.4	-0.82***	-5.98	0.799	21.2
R500 – R899	20.0	30.7	-1.09***	-5.49	0.770	19.8
R900 – R1399	17.6	32.1	-0.99***	-7.99	0.877	22.2
R1400 - R2499	14.5	33.2	-0.84***	-4.37	0.680	24.8
R2500 - R3999	9.0	34.6	-0.89***	-4.79	0.718	25.7
R4000 - R6999	9.2	35.6	-0.82***	-7.24	0.853	27.4
R7000 - R11999	5.8	34.4	-0.29	-1.13	0.125	31.5
R12000+	2.9	29.2	-0.01	-0.03	0.000	29.1

Notes: *** Significant at the 1 per cent level
** Significant at the 5 per cent level
* Significant at the 10 per cent level (all tests are two-sided).
Source: AMPS (various years)

16. Of course, an alternative view would be that cigarettes are one of the few "pleasures" that the poor can afford.
17. In the 1960s more than 50 per cent of males smoked and more than 40 per cent of females in the UK smoked, irrespective of income level (Townsend et al., 1994: 923). By the early 1990s smoking prevalence among highly-paid professional men had decreased to less than half that of unskilled working men.

2.4.7 Geographic dispersion

Smoking prevalence levels and trends by province are shown in Table 2.6. The highest smoking prevalence is found in the more affluent provinces and those with a relatively high proportion of coloured people: the Western Cape, Northern Cape and Gauteng. The provinces with the lowest smoking prevalence percentages are Limpopo Province, Eastern Cape and KwaZulu-Natal – poor provinces with a high proportion of African people. As indicated in Section 2.4.2, Africans have the lowest smoking prevalence percentage of all population groups.

Smoking prevalence has been decreasing in all nine provinces, by between 0.4 and 1.2 percentage points per annum. Other than in Mpumalanga and the Northern Cape, the decreases have been statistically significant at the 5 per cent level.

Table 2.6: Smoking prevalence percentages by province (1994-2003)

Description	Proportion of population (1994)	Constant (Prevalence in 1994)	Trend	t-stat	R^2-value	Prevalence in 2003
Eastern Cape	12.4	24.5	-0.40***	-3.37	0.586	20.5
Free State	7.1	35.9	-1.20***	-4.99	0.757	23.9
Gauteng	18.6	38.0	-1.03***	-5.70	0.803	27.8
KwaZulu-Natal	20.5	24.4	-0.42***	-3.85	0.649	20.1
Mpumalanga	6.0	27.4	-0.42	-1.16	0.143	23.2
Northern Cape	1.7	38.2	-0.85*	-2.12	0.361	29.7
Limpopo Province	9.1	18.4	-0.65***	-4.87	0.748	11.9
North-West Province	7.8	32.8	-0.89***	-4.91	0.751	23.8
Western Cape	8.8	43.4	-0.52**	-2.58	0.454	38.2

Notes: *** Significant at the 1 per cent level
** Significant at the 5 per cent level
* Significant at the 10 per cent level (all tests are two-sided).
Source: AMPS (various years)

2.5 Policy implications

As was discussed in chapter 1, the South African government has followed a remarkably consistent tobacco control policy since the early 1990s. The Tobacco Products Control Act of 1993, followed by the Tobacco Products Control Amendment Act of 1999, clearly indicated the government's intentions with regard to tobacco control. Furthermore, since 1994 the government has dramatically increased the cigarette excise tax, causing the real price of cigarettes to increase by, on average, about 8 per cent per annum.

As a result, aggregate cigarette consumption decreased by about a third. International evidence and simple logic suggests that (1) fewer people would smoke, and (2) smokers would reduce their average consumption of cigarettes. Concerning (1), overall smoking prevalence decreased from 32 per cent in 1993 to 24 per cent in 2003. Despite 24 per cent

growth in the adult population, the number of cigarette smokers has decreased by about 500 000 within the 10-year period. Furthermore, average cigarette consumption among smokers has decreased by more than 25 per cent over the period. It was found that 55 per cent of the decrease in cigarette consumption in South Africa between 1993 and 2003 is ascribed to a decrease in smoking intensity (i.e. the average number of cigarettes smoked by smokers) and the remaining 45 per cent is ascribed to a decrease in smoking prevalence.

The decrease in overall smoking prevalence can be investigated further. Firstly, cigarette smoking prevalence among Africans is relatively low and is decreasing at a significant rate. This suggests that cigarette manufacturers have been largely unsuccessful in penetrating this large and potentially lucrative market. Secondly, smoking prevalence among young adults (people aged 16 to 24) is significantly lower than the national average, and has been decreasing rapidly over the 1993-2003 period. This may suggest that tobacco is losing its appeal among adolescents. Thirdly, smoking prevalence among males, which was at a level of more than 50 per cent in 1993, has been decreasing at a rate of more than one percentage point each year. Females have not experienced a similar rate of decrease, although it must be said that female smoking prevalence (at 10 per cent in 2003) is much lower than that of males.

Regarding the relationship between income factors and smoking prevalence, the evidence for South Africa is contrary to the experience in the UK and high-income countries.[18] In the UK smoking prevalence among the rich has decreased rapidly over the past four decades and is currently significantly lower than that of the population average. In contrast, in South Africa smoking prevalence among the *poor* has decreased sharply in the past decade and is currently significantly lower than that of the rich. Given that smoking prevalence levels and trends by income levels in South Africa differ so significantly from those of the UK, some further analysis seems appropriate.

High per capita income and a good social security system in the UK mean that few Britons live in absolute poverty. Thus the poor can generally afford to buy cigarettes. The real price of cigarettes has remained relatively constant during the 1960s and 1970s, and rose only moderately during the 1980s.[19] During the 1960s and 1970s the UK government did not increase real tobacco excise taxes, and as a result changes in the real price of cigarettes did not serve as an effective deterrent to smoking. The British government used an information, education and communication ("IEC") campaign to warn people of the dangers of smoking. As has been pointed out in a number of studies (Bobak et al., 2000: 50 and Jha et al., 2000: 168), this strategy is effective in reducing smoking among the rich and the more educated sections of society, but is ineffective in reducing smoking among the poor. Thus, because of

18. Even though the focus in the following paragraphs is on the UK, it applies to most other developed countries as well. The reason for choosing the UK is because (1) the UK experience is well known and well described and (2) because the difference in smoking prevalence between lowest and highest income earners is currently greater than in any other developed country (Bobak et al., 2000: 45).

19. The UK real price of cigarettes rose sharply during the 1990s as part of the country's tobacco control strategy, but this period was not considered by Townsend (1994).

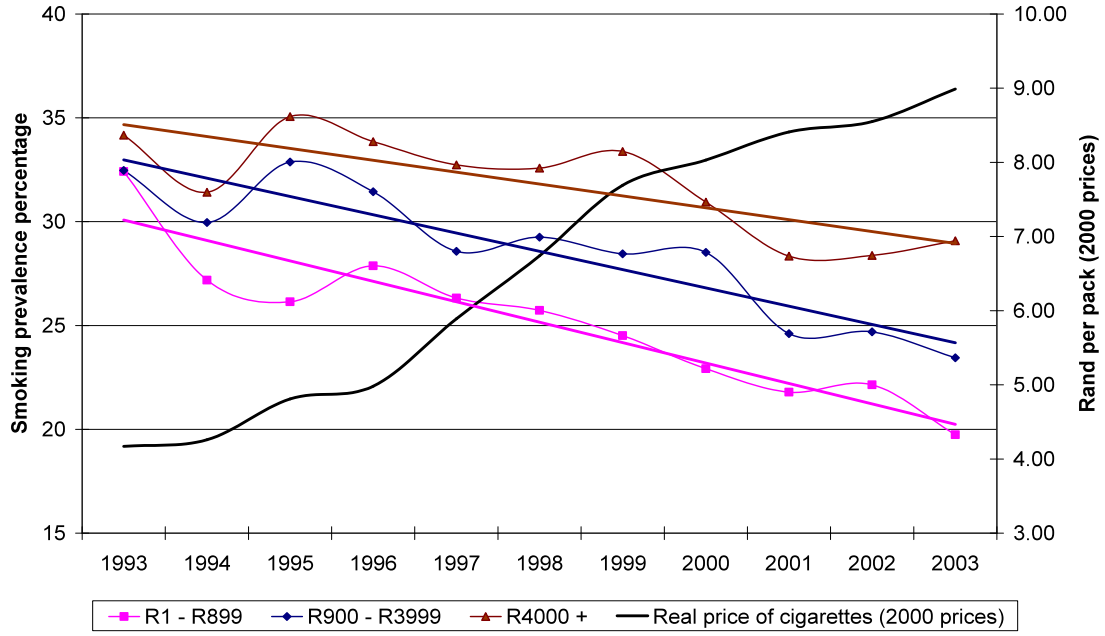
the relative stability of the cigarette price, but different reactions to anti-smoking publicity, smoking prevalence percentages in the UK diverged between rich and poor.

Smoking prevalence in South Africa has never been as high as UK levels. Given much lower per capita income, an unequal distribution of income and an underdeveloped national social security network, many people simply cannot afford to buy cigarettes. For them, cigarette smoking is not an option. However, given that cigarette consumption in South Africa is relatively responsive to changes in income (see chapter 4), there is a distinct possibility that, should the very poor be able to increase their income above a certain threshold, a sizeable proportion would consider taking up cigarette smoking. It is contended, therefore, that the high incidence of absolute poverty in South Africa explains the relatively low prevalence of cigarette smoking among the poor.

Cigarettes, despite the fact that they are more expensive in the UK, are generally more affordable, given that income levels are much higher than in South Africa. As indicated in column 9 of Table 2.1, the real price of cigarettes in South Africa has increased dramatically since 1993, implying that cigarettes have become less affordable. A rapid increase in the price of cigarettes is believed to have a more pronounced effect on poor people's consumption of cigarettes, compared to the rich, since they spend a relatively larger proportion of their income on tobacco (see chapter 6). Their incentive to quit or to reduce their consumption is much stronger. Smoking prevalence percentages among three categories of income, together with linear trend lines, and the real price of cigarettes (on the secondary Y-axis) are shown in Figure 2.1. The decrease in smoking prevalence has been most rapid for low-income households, followed by middle-income households. This graph lends support to the widely held thesis that low-income earners are more sensitive to changes in the price of cigarettes than high-income earners.[20]

20. While the negative relationship between smoking prevalence and the real price of cigarettes is generally supported by Figure 2.1, the sharp decrease in smoking prevalence among all income groups between 1993 and 1994 requires some explanation. While this transitory decrease could be ascribed to sampling error, an alternative explanation is that it reflects the impact of better health information. Health warnings were only introduced in August 1995, but were preceded by substantial press coverage about the impending regulations.

Figure 2.1: Smoking prevalence by household income



Source: AMPS (various years), Statistics South Africa (1998)

The differential response of different income groups to changes in the real price of cigarettes has implications for the regressivity of the cigarette excise tax. As will be pointed out in chapters 3 and 6, cigarette excise taxes are often regressive, because of the comparatively high smoking prevalence among the poor, and because the poor often spend a greater proportion of their income on cigarettes than the rich. However, because an increase in the real cigarette price causes a greater percentage decrease in smoking among the poor vis-à-vis the rich, increases in the real excise tax decreases the regressivity of the excise tax. However, because appropriate data on the numbers of cigarettes consumed by individuals over time are not available, this issue cannot be investigated in more detail here. In chapter 6 the potential regressivity of the excise tax is investigated more fully. Using a different theoretical model and data set, it will be shown that the regressivity of excise taxes in South Africa has decreased since 1990.

Even though the comment that increases in the real price of cigarettes reduces the regressivity of the excise tax is made in the context of a group ("the poor"), one should differentiate between those people that quit smoking completely as a result of the price increase and those that merely reduce their consumption. For the first group, the price increase was the critical point that caused them to quit. As a result, their cigarette tax burden reduced to zero. The second group, unless they are able to *significantly* reduce their cigarette consumption, are burdened with a higher tax burden and would thus be worse off as a result. Most smokers find themselves in the second group, since, as was pointed out in section 2.3, the main impact of cigarette price increases is to cause people to reduce their average consumption, not to quit smoking.

The policy implications of this chapter are as follows: if the government wants to reduce smoking prevalence and aggregate cigarette consumption, it should increase the tax rate. However, if the government wants to reduce smoking prevalence *and* improve the economic position of the poor, it should actively encourage smokers to quit, rather than to simply reduce their cigarette consumption.

2.6 Conclusion

Since 1993 the prevalence of cigarette smoking in South Africa has decreased sharply. This is true for aggregate smoking prevalence and for the prevalence in each demographic and socio-economic subgroup investigated in this chapter. From a tobacco control perspective, this is a very positive finding, and suggests that the government's strategy of discouraging smoking has been successful.

However, while the prevalence of cigarette smoking has decreased, there is the possibility that people switch from smoking cigarettes to other tobacco products, such as roll-your-own (RYO) cigarettes. Should this be the case, it would exaggerate the decrease in the prevalence of cigarette smoking. Unfortunately the current data does not allow one to investigate the possibility of substitution, but it is examined in chapter 6 using a different data set. It will be shown that there has been some switching towards RYO cigarettes, especially among the poor, but the switch has not been large enough change the conclusion that the prevalence of tobacco use has decreased sharply since the early 1990s.

In this chapter, the causes of the decrease in smoking prevalence were not investigated, although mention was made of the fact that the rapid increase in the real price of cigarettes presumably played an important role. In the following chapters the demand for cigarettes is investigated in some detail. In chapter 3 an overview of the existing empirical literature is provided, while the demand for cigarettes in South Africa is investigated in chapter 4.