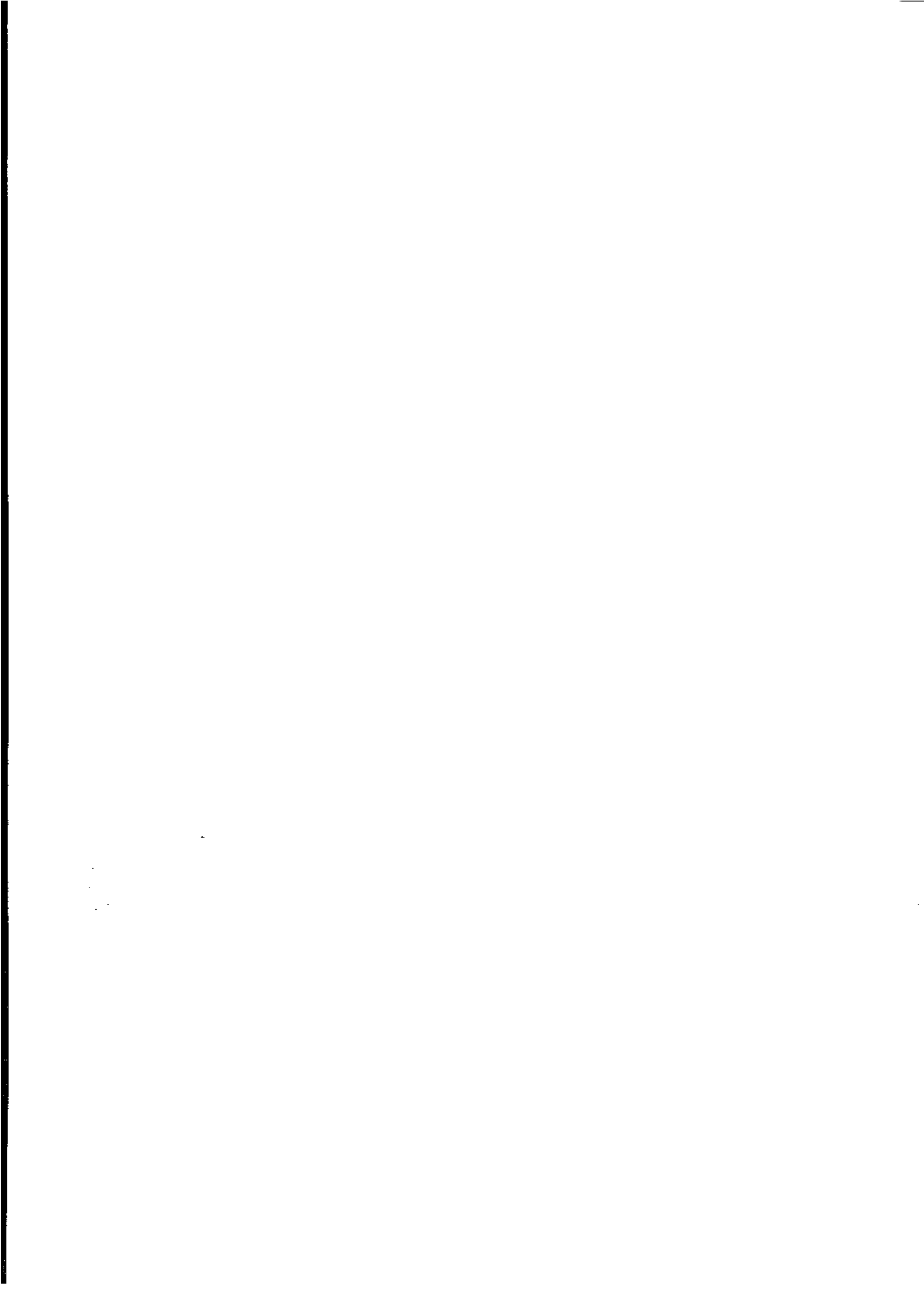




## **Occasional Paper**

# **Cigarette Smoking Among Indigenous Australians**

**1994**



New  
Issue

**Occasional Paper**

# **Cigarette Smoking among Indigenous Australians**

**1994**

**JOAN CUNNINGHAM**

This Occasional Paper is intended to make the results of current research available to other interested parties. The aim is to present accounts of developments and research work or analysis of an experimental nature so as to encourage discussion and comment.

Views expressed in this paper are those of the author and do not necessarily represent those of the Australian Bureau of Statistics. Where quoted or used, they should be attributed clearly to the author.

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Cigarette smoking is an important risk factor for a variety of diseases and conditions, including circulatory disease, respiratory disease, cancer and low birth weight (Australian Institute of Health and Welfare 1996). These conditions are major factors in the observed disparity in health between Indigenous and non-Indigenous Australians. About half of all deaths among Indigenous people are due to circulatory disease, respiratory disease or cancer. While these diseases are also responsible for a large proportion of deaths among non-Indigenous people, they result in about 1.5–8 times more deaths than expected in Indigenous people after adjusting for age (Anderson et al. 1996). Low birth weight (less than 2,500 grams) is associated with maternal smoking and is about twice as common among Indigenous babies as non-Indigenous babies (Plunkett et al. 1996). Babies of low birth weight are less likely to survive and more likely to have a variety of problems than babies of normal birth weight (Alberman 1994).

There is growing evidence that smoking is more common among Indigenous people than among non-Indigenous people. In a number of local or regional studies, adult smoking rates of 50% to almost 90% have been observed (Watson et al. 1988; Kamien 1978; Lake 1989; Stephenson 1990; Guest et al. 1992; Knowles & Woods 1993). Until the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS), however, there were no reliable national figures on the prevalence of smoking among Indigenous people. Some estimates of smoking prevalence have already been released from the survey (e.g. Australian Bureau of Statistics 1995, 1996a), but these have necessarily been limited in detail.

Little is known about the factors associated with cigarette smoking among Indigenous people. The 1994 NATSIS provided an opportunity to explore the relationships of several cultural, socioeconomic and other variables with smoking because information was collected on a wide variety of topics.

This report provides more detailed information on the prevalence of cigarette smoking among Indigenous adults and presents the results of an analysis of a wide range of factors which may be associated with smoking, using data from the 1994 NATSIS. As no information was available from the NATSIS on other forms of tobacco such as pipes, cigars or chewing tobacco, this report is limited to cigarette smoking.

## CHAPTER 2

## METHODS .....

### THE SURVEY

The first NATSIS was conducted by the Australian Bureau of Statistics in 1994. The survey was conducted in response to a recommendation of the Royal Commission into Aboriginal Deaths in Custody and was designed to collect a wide range of information about Indigenous people throughout Australia.

Approximately 15,700 participants were selected using a multistage stratified sample, with stratification by census collector district (CD) within the 35 Aboriginal and Torres Strait Islander Commission (ATSIC) regions and the Torres Strait Area (map 2.1). Respondents were asked questions in the broad areas of family and culture; housing; education and training; employment and income; law and justice; and health. Detailed information about sampling and survey design has been published elsewhere (Australian Bureau of Statistics 1995, 1996b).

### ANALYSIS

The main analysis of smoking was limited to the 8,783 Aboriginal and Torres Strait Islander respondents who were aged 15 years or more, were not prisoners, and for whom information on smoking was available. Males ( $n = 4,023$ ) and females ( $n = 4,760$ ) were analysed separately.

Because smoking initiation may be of interest, some information is also presented about the prevalence of smoking among males and females aged 13–14 years. No information about smoking was available for children less than 13 years old.

Weights appropriate to the sampling design were used in all analyses, and unless otherwise stated, the results presented here are weighted estimates for the Indigenous population of Australia.

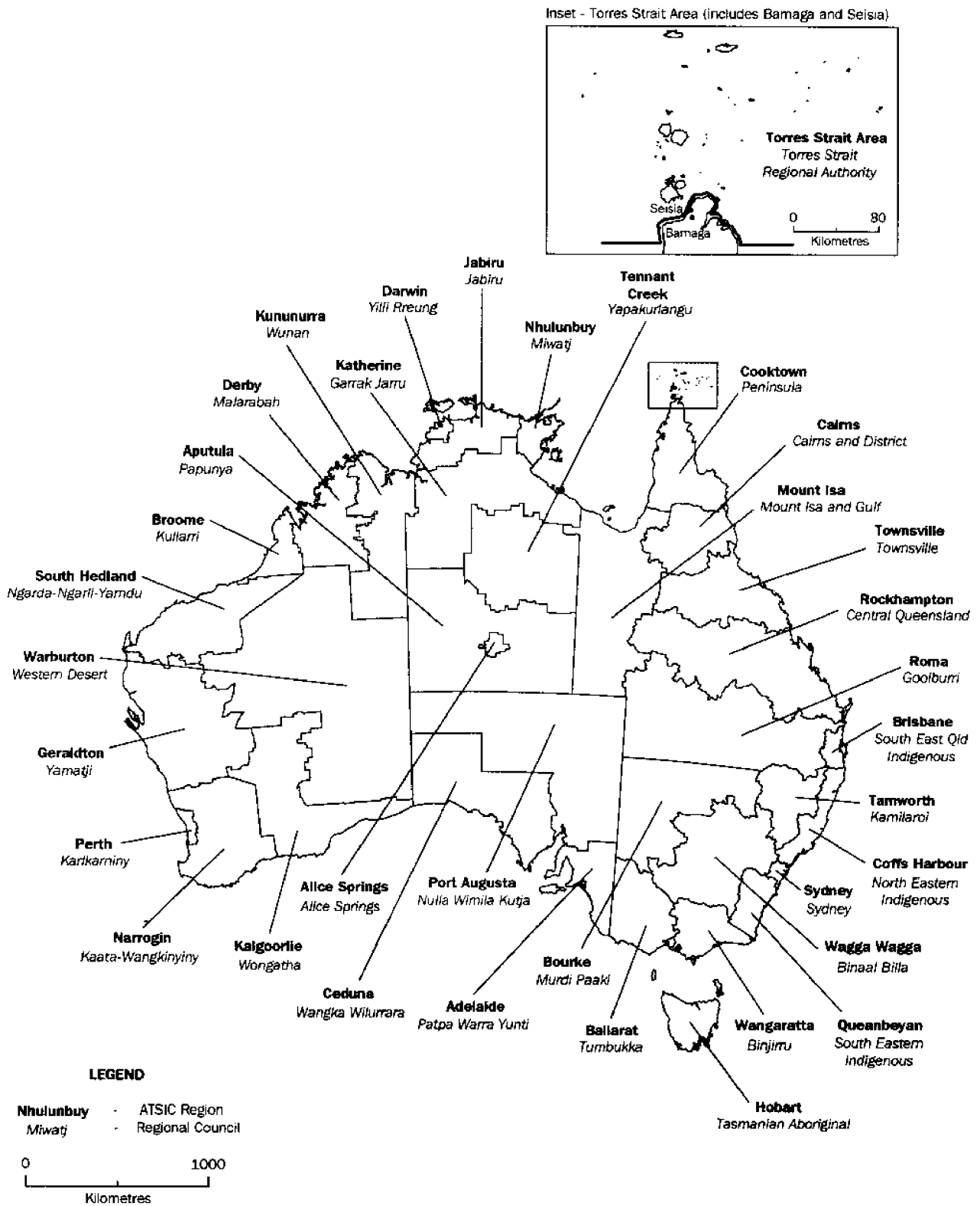
### VARIABLES EXAMINED

Participants in the survey were asked whether they smoked cigarettes. People who answered 'yes' or 'sometimes' were asked how many cigarettes they usually smoked per day. Those who answered 'yes' to the question on smoking were considered to be smokers, as were those who said they 'sometimes' smoked and who indicated that they usually smoked at least one cigarette per day. No information was available about past smoking.

A range of demographic, socioeconomic and cultural factors were examined in relation to smoking. The most important of these factors are shown in table 2.2.



2.1 ATSI REGIONAL AND THE TORRES STRAIT AREA



## 2.2 VARIABLES OF INTEREST

Variables	Categories	Males(a)	Females(a)
		%	%
Age	15-24 years	34.9	32.8
	25-44 years	46.0	46.2
	45 years and older	19.1	21.0
Region	35 ATSI regions and the Torres Strait Area (see map 2.1)		
	smallest % of Indig. pop.	0.6	0.5
	largest % of Indig. pop.	7.5	8.8
Area of residence	capital city	26.8	27.6
	other urban area	40.7	42.9
	rural	32.5	29.5
State or Territory	New South Wales	26.3	26.7
	Victoria	6.4	6.4
	Queensland	26.2	26.2
	South Australia	6.1	6.2
	Western Australia	15.4	15.3
	Tasmania	3.4	3.2
	Northern Territory	15.3	15.5
	Australian Capital Territory	0.9	0.5
Labour force status	employed, CDEP(b)	12.9	5.6
	employed, non-CDEP(b)	32.1	21.6
	unemployed	27.6	17.4
	not in the labour force	27.4	55.5
Highest year of school completed(c)	still attending	7.2	7.3
	less than year 10	49.9	47.5
	year 10 or year 11	34.6	35.3
	year 12 or more	7.9	9.3
Home ownership	owner/purchaser	21.3	18.5
	renter or other	78.7	81.5
Household composition	Indigenous members only	72.6	73.5
	both Indigenous and non-Indigenous members	27.4	26.5
Most recent alcohol consumption	within the past week	53.7	32.8
	more than 1 week ago	31.3	37.1
	never	15.0	30.0
Main language is English	yes	82.4	82.4
	no	17.6	17.6
Considers the role of elders important	yes	83.9	85.7
	no	16.1	14.3
Recognises homelands	yes	75.7	76.1
	no	24.3	23.9
Taken away from family as a child	yes	7.9	8.2
	no	92.1	91.8

(a) Non-prisoners aged 15 years or more.

(b) Community Development Employment Projects scheme.

(c) A small proportion of respondents did not state their highest year of school completed.

OVERALL PREVALENCE

An estimated 56% of Indigenous males and 48% of Indigenous females aged 15 years and over were current smokers at the time of the 1994 survey. This is in sharp contrast to the estimated prevalence in the Australian population as a whole, in which about 27% of males and 20% of females aged 18 years and over said they smoked in 1995 (Australian Bureau of Statistics 1996d). The proportion of people who said they smoked was higher for Indigenous people than for all Australians in all age groups studied (table 3.1).

3.1 COMPARISON OF SMOKING PREVALENCE, Age Group .....

Age group in years	Indigenous	Indigenous	All Australians(b)
	males(a)	females(a)	
	%	%	%
18-24	59	53	30
25-34	66	60	31
35-44	61	53	25
45-64	51	39	21
65 and over	38	16	11

(a) 1994 NATSIS.

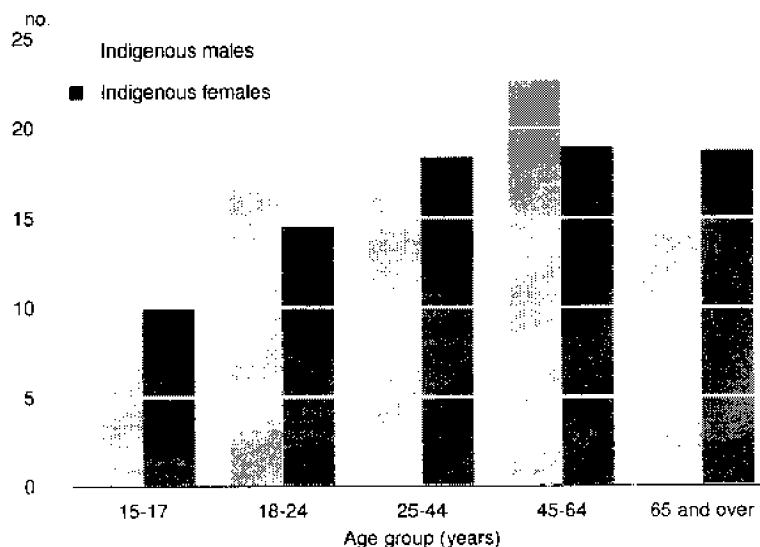
(b) 1995 National Health Survey; Australian Bureau of Statistics 1996d.

NUMBER OF CIGARETTES PER DAY

Among smokers, the reported number of cigarettes smoked per day increased with age up to age 65 (graph 3.2). Only about 1 in 10 smokers aged 15-17 years old said they smoked more than 20 cigarettes per day, while this was true for over 4 in 10 smokers aged 45-64 years old. Males were more likely than females to report smoking more than 20 cigarettes per day.

The number of cigarettes smoked per day by Indigenous smokers appears to be less than or similar to the number smoked by their non-Indigenous counterparts. Among smokers aged 25-64 years old, the proportion who said they smoked more than 20 cigarettes per day was similar in the NATSIS to what was observed among all Australians in the 1989-90 National Health Survey (Australian Bureau of Statistics 1992). In the National Drug Strategy surveys of 1993 and 1994, however, daily cigarette consumption was reported to be lower among urban Indigenous smokers than among smokers in the general urban community, with 12% of Indigenous regular smokers and 32% of general urban regular smokers reporting that they smoked more than a pack per day (Commonwealth Department of Human Services and Health 1996).

### 3.2 MEAN NUMBER OF CIGARETTES SMOKED PER DAY



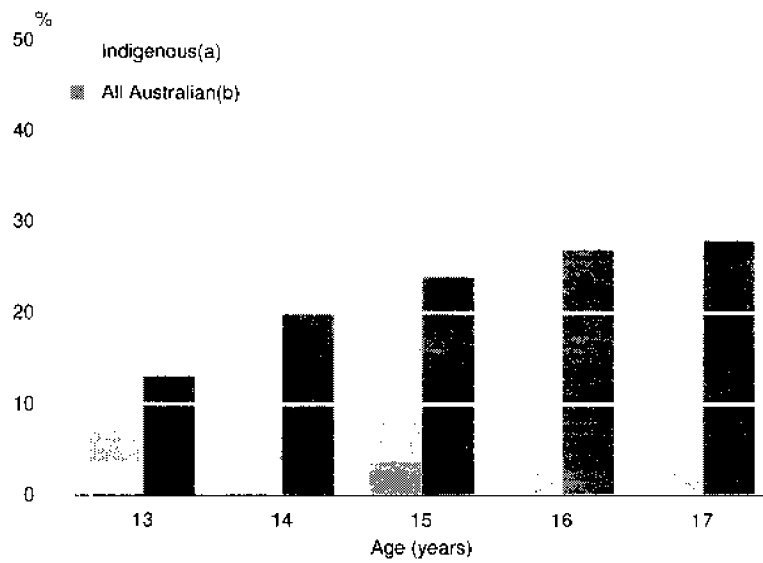
Source: 1994 NATSIS.

#### YOUTH SMOKING

About 15% of Indigenous males and 14% of Indigenous females aged 13–15 years said they smoked. This proportion was lower than that observed in the 1993 Australian Cancer Society survey of school children (Hill et al. 1995). By age 16–17, however, smoking was reported by a higher proportion of Indigenous males and females than by all Australian school children (graphs 3.3 and 3.4). Unlike the Australian Cancer Society survey, the NATSIS included children who had left school, and some of the difference at age 16–17 may be related to the lower prevalence of smoking among those still attending school compared with those who have left school (see p.11). The definitions of smoking used in the two surveys were not identical, and care must be used in making comparisons.

About 40% of Indigenous males and 38% of Indigenous females aged 16–18 years said they smoked. Among 19–21 year olds, these figures were 58% for males and 54% for females. By age 22–24, about 63% of Indigenous males and 54% of Indigenous females said they smoked.

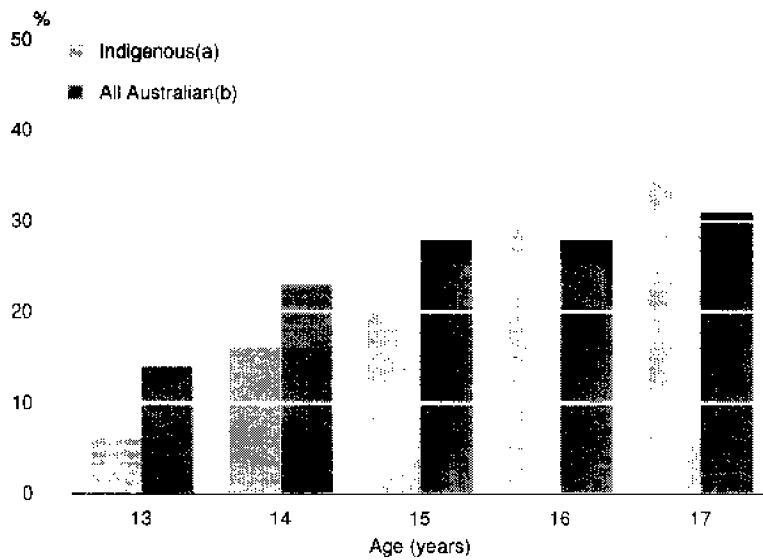
**3.3 PREVALENCE OF SMOKING, Teenage Males**



(a) 1994 NATSIS.

(b) 1993 Australian Cancer Society; Hill et al. 1995.

**3.4 PREVALENCE OF SMOKING, Teenage Females**



(a) 1994 NATSIS.

(b) 1993 Australian Cancer Society; Hill et al. 1995.

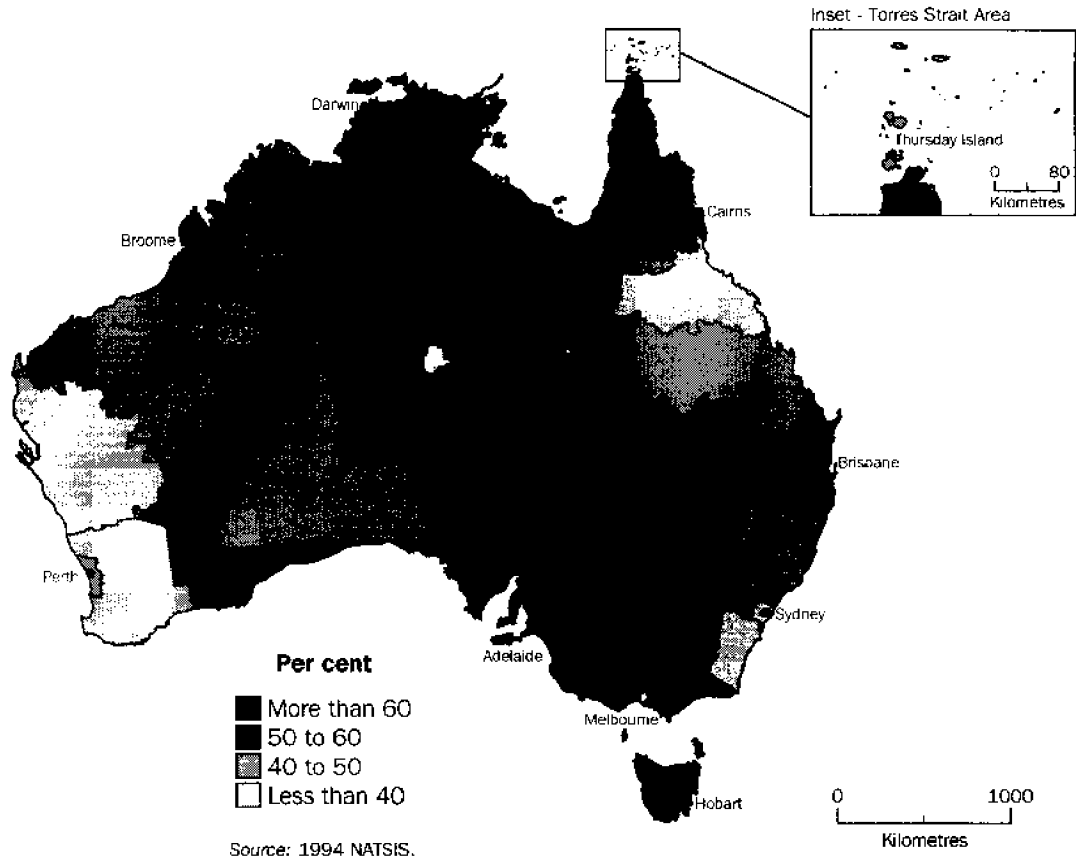
## GEOGRAPHIC FACTORS

Among Indigenous adults aged 15 years and over, reported smoking was high in all States and the Northern Territory (table 3.7). More than half of the males in each State and the Northern Territory said they smoked, as did more than half of the females in New South Wales, Victoria and South Australia. Victoria was the only State in which the proportion of smokers was higher for females than for males. The Northern Territory was notable in having the highest proportion of smokers among males but the lowest proportion among females. No estimates were available for the Australian Capital Territory due to small sample size.

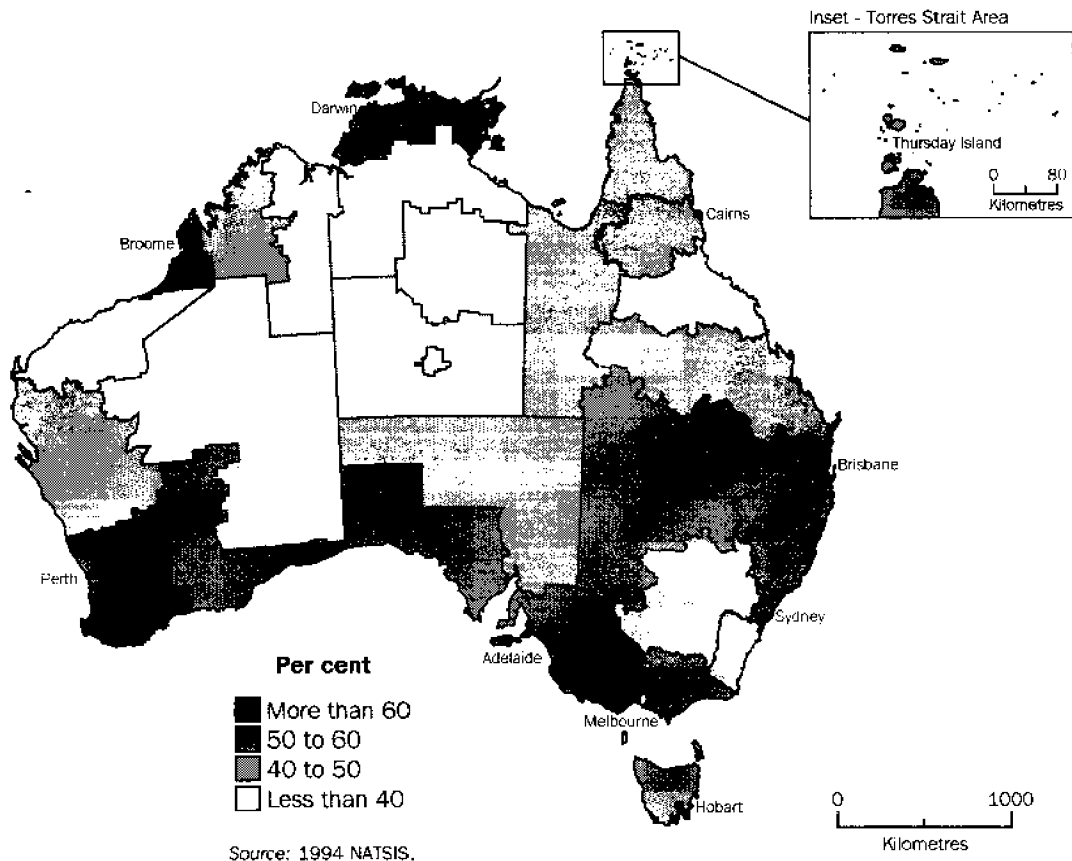
Among males, the proportion of smokers was similar in capital cities and other urban areas (table 3.7). Males in rural areas were slightly more likely to report smoking. Among females, there was a more pronounced trend in the opposite direction, with the proportion of current smokers lowest in the rural areas and highest in the capital cities.

There were large differences in reported smoking from region to region. Among males, the proportion of current smokers ranged from a low of 39% in the Alice Springs ATSI region to a high of 80% in the Bourke ATSI region (map 3.5). Thus even in the region with the lowest proportion of smokers, the estimate was still considerably higher than the all-Australian figure. Among females, the range was from 17% in the Tennant Creek region and 20% in the Aputula region (the only regions in which reported smoking was lower than or equal to the all-Australian figure) to 69% in the Ballarat region (map 3.6). Only in the Ballarat, Wangaratta and Narrogin regions did the proportion of female smokers noticeably exceed that of male smokers.

3.5 PREVALENCE OF SMOKING, Males



3.6 PREVALENCE OF SMOKING, Females



## 3.7 SMOKING PREVALENCE, Selected Characteristics

Variables	Categories	Males	Females
		%	%
Overall (aged 15 years and over)		56.1	48.3
Age(a)	15–24 years	49.2	45.0
	25–44 years	64.3	57.0
	45 years and older	48.5	34.1
ATSI region(a)(b)	lowest	39.2	16.9
	highest	80.0	69.3
Area of residence(a)	capital city	54.5	53.8
	other urban area	54.5	48.0
	rural (areas with population under 1,000)	59.3	43.5
State or Territory(a)	New South Wales	53.5	52.1
	Victoria	53.4	64.0
	Queensland	55.7	46.6
	South Australia	61.0	53.8
	Western Australia	53.7	47.2
	Tasmania	50.9	44.8
	Northern Territory	63.8	38.3
	Australian Capital Territory	(c)	(c)
Labour force status(a)	employed, CDEP scheme	69.5	47.2
	employed, non-CDEP scheme	48.0	42.0
	unemployed	65.9	60.8
	not in the labour force	49.3	46.9
Highest year of school completed(a)	still attending school	15.2	19.2
	less than year 10	60.7	48.9
	year 10 or year 11	62.0	55.7
	year 12 or more	35.6	41.0
Home owner/purchaser(a)	yes	37.4	36.1
	no	61.1	51.0
Household composition(d)	Indigenous members only	57.2	48.7
	Indigenous and non-Indigenous members	53.0	47.2
Most recent alcohol consumption(a)	within the past week	64.6	70.1
	more than 1 week ago	56.3	48.2
	never	24.9	24.4
Main language is English(a)	yes	54.3	51.0
	no	64.4	35.9
Considers role of elders important(a)	yes	58.4	49.1
	no	43.8	43.4
Recognises homelands(a)	yes	58.6	49.5
	no	48.2	44.5
Taken away from family as a child(a)	yes	70.4	60.3
	no	54.8	47.2

(a) Differences by category are statistically significant at  $p < 0.05$  for both males and females.

(b) See maps 3.5 and 3.6.

(c) Too few people were surveyed in the Australian Capital Territory to allow estimation of the prevalence of smoking in that jurisdiction. Respondents from the Australian Capital Territory have been included in all other analyses, however.

(d) Differences by category are statistically significant at  $p < 0.05$  for males only.



## SOCIO-DEMOGRAPHIC FACTORS

Smoking was most commonly reported for males and females in the 25–44 year age group (table 3.7). Among males, those employed in Community Development Employment Project (CDEP) scheme jobs were the most likely to report smoking, followed closely by unemployed males. Unemployed females were more likely to report smoking than employed females (whether CDEP scheme or non-CDEP scheme) or those not in the labour force. People who lived in dwellings that were owned or being purchased by the occupants were less likely to report smoking than were those who lived in rented or other dwellings.

Both males and females who completed year 12 or beyond were less likely to report smoking than were those who had finished school but who had not completed year 12 (table 3.7). People who were still attending school were far less likely to report smoking than those who were no longer attending.

People who said they had never drunk alcohol were much less likely to report smoking than were those who said they had ever drunk alcohol (table 3.7). Among those who reported any drinking, people who said their last drink was within the week preceding interview were more likely to report smoking than were those who had drunk alcohol less recently, with the difference more marked among females than males. No information was collected in the NATSIS on the quantity of alcohol consumed.

## CULTURAL FACTORS

The proportion of males and females who said they smoked was similar regardless of whether the household contained non-Indigenous members (table 3.7). Females who spoke English as their main language were more likely to report smoking than those who did not, while the opposite was true for males. Smoking was more commonly reported for people who said they considered the role of elders to be important and for those who said they recognised homelands, with the differences in both cases being more pronounced among males. Those who said they were taken away from family as a child were also more likely to say they were current smokers.

## STATISTICAL MODELLING

### Logistic regression

As discussed above, several factors were associated with smoking when examined one at a time. Many of the variables of interest are related to one another, however, and it is possible that the relationship of a particular variable to smoking could be explained by a third variable. For example, the relationship between smoking and employment status might be at least partly explained by differences in age or geography which are related both to smoking and to chances of employment.

A statistical modelling technique known as logistic regression was used to estimate the relationship of the variables of interest with smoking while accounting for the impact of other factors. More information on logistic regression, the variables for which adjustment was made and the results of the modelling are provided in the Technical Notes.

In summary, the logistic regression showed that, for both males and females, several characteristics were significantly associated with the probability of smoking after adjusting for the other factors considered. The largest associations were observed for

level of education and alcohol consumption, followed by employment status, home ownership and age (tables T.1 and T.2). Cultural factors, such as language, recognition of homelands, perceived importance of the role of elders, household composition and being taken away from one's family, were also significantly associated with reported smoking but the differences were not as large as those seen for socioeconomic and demographic factors.

Among females, the associations observed after adjusting for other factors were in the same direction and generally similar to what was observed before any adjustment (tables 3.7 and T.2). Among males, however, there were a few changes after adjusting for other factors. Before adjustment, smoking among males was highest in rural areas, with levels of smoking among capital city and other urban residents lower but similar to one another (table 3.7). After adjustment, males in other urban areas were significantly less likely to smoke than males in capital cities, and rural males were also slightly less likely to smoke but were not significantly different from those capital cities (table T.1), which is closer to the pattern observed among females (tables 3.7 and T.2). Among males, living in a household with both Indigenous and non-Indigenous members was associated with lower levels of smoking before adjustment but significantly higher levels of smoking after adjusting for other factors (tables 3.7 and T.1).

#### Further analyses

Indigenous Australians live in a variety of situations across Australia and form a heterogeneous group. Thus it is possible that the relationships observed between the factors of interest and smoking may vary from place to place, by age group, or for Aboriginal people and Torres Strait Islanders. For example, it may be that level of education is more (or less) important with respect to smoking for younger people than for older people, or that the relationship of employment status and smoking is different in urban ATSI regions such as Sydney compared to rural or remote regions such as Warburton.

Further analyses were conducted to assess the evidence for differences in relationships between smoking and other factors by age and by ATSI region. A comparison was also made for Torres Strait Islanders and Aboriginal people. The results were broadly similar regardless of age group, area of residence or Indigenous group. More detail is presented in the Technical Notes

The results presented here indicate that smoking is much more common among Indigenous people than among non-Indigenous people across Australia. The rates of smoking were higher than the all-Australian rate in every region of the country for Indigenous males and in 34 of 36 regions among Indigenous females.

A number of socioeconomic, demographic and cultural factors were found to be associated with smoking, even after adjustment for other factors of interest. Although several cultural factors were significant after adjusting for socioeconomic and demographic characteristics, the most important factors appeared to be alcohol use, education, employment, home ownership and age.

Similar factors have been found to be associated with smoking among Australians overall. Low education, unemployment, low income, age and living in an area of socioeconomic disadvantage are all associated with higher levels of smoking in Australia (Australian Institute of Health and Welfare 1996). Tobacco use and alcohol use have often been found to go hand in hand (see, for example, US Department of Health and Human Services 1988).

It is important to understand that the results presented here are not meant to imply a causal relationship between any of the factors and smoking. For example, the relationship between alcohol use and smoking should not be taken to mean that drinking *causes* smoking, only that the two tend to occur together more often than not. Regardless of causal links, or lack thereof, identifying the factors which are associated with smoking is important in the planning and implementation of health education and health promotion programs.

Smoking is a major health problem for Indigenous and non-Indigenous people alike. In 1992, it was estimated to account for 15% of all deaths in Australia, and the estimated health care cost of tobacco-related illness in 1989-90 was \$672 million (Australian Institute of Health and Welfare 1996).

The higher rates of smoking among Indigenous people carry a much greater chance of smoking-related illness and death. In Western Australia in 1989-91, for example, the rates of hospitalisation and death from tobacco-related conditions were estimated to be 2-5 times higher for Indigenous people than for non-Indigenous people (Unwin et al. 1994). Similar figures have been observed in the Northern Territory (Plant et al. 1995; Cunningham & Condon 1996).

Despite the well-documented dangers of smoking, there is evidence that Indigenous people underestimate the risks. In a 1994 survey of urban Indigenous people, almost a third of respondents (31%) said they believed that it was safe to smoke a pack or more of cigarettes per day, and 5% said they did not believe that smoking could damage their health (Commonwealth Department of Human Services and Health 1996). When asked to select from a list of substances the cause of the most deaths among Indigenous people, only 3% named tobacco, compared to 66% who said alcohol and 13% who said petrol sniffing. Cocaine and heroin were also named ahead of tobacco in the respondents' nominations of significant causes of death.

The health risks of smoking are not always immediately apparent. There is often a long time delay between the onset of smoking and the manifestation of disease and death. Smoking can be quite pleasurable and is usually not associated with social disruption. This is in sharp contrast to what may occur with excessive consumption of alcohol or the use of illicit drugs, which tend to produce much more immediate and more obvious consequences. It is perhaps understandable then that alcohol and illicit drugs are uppermost in the minds of Indigenous people when asked about health and substance problems (Australian Bureau of Statistics 1995).

Significant progress in reducing the prevalence of smoking has been made in Australia as a whole (Australian Institute of Health and Welfare 1996; Commonwealth Department of Human Services and Health 1994), but there is little available evidence to determine whether there have been similar reductions among Indigenous Australians. Given a relative lack of awareness of the problem, however, it is not likely that much if any progress has been made. Indeed, in the 1994 survey of urban Indigenous people mentioned above, there was a much smaller proportion of Indigenous ex-smokers than in the general population (22% versus 41%), as well as a smaller proportion of Indigenous current smokers who were attempting to reduce their tobacco intake through such means as cutting down on daily cigarette consumption and/or switching to a lower tar/lower nicotine brand (Commonwealth Department of Human Services and Health 1996).

The Australian Health Ministers have endorsed the goal of reducing the prevalence of smoking in Australia, with a target of smoking prevalence of 20% by the year 2000 (Australian Institute of Health and Welfare 1996). While this goal may be achievable for non-Indigenous Australians, it seems well out of reach for Indigenous people. Without large and sustained reductions in tobacco smoking, however, the excess mortality from such causes as heart disease, lung disease, stroke and cancer (Anderson et al. 1996) will continue to shorten the life expectancy of Indigenous Australians relative to their non-Indigenous counterparts. The gap is currently 15–20 years (Anderson et al. 1996) and could increase if improvements in the non-Indigenous community are not matched by reductions in smoking prevalence among Indigenous people.

## TECHNICAL NOTES .....

### THE LOGISTIC REGRESSION MODEL

The dependent variable of interest in this analysis was reported current smoking. Because people without adequate information on smoking were excluded from consideration, all those included in the analysis could be assigned to one of two categories: smoker or non-smoker. In cases such as this, where the probability of falling into one of two categories is of interest, the logistic regression model is commonly used, especially in the area of health research. Logistic regression overcomes the fact that probabilities are limited in range from 0 to 1. By using a logit transformation, the dependent variable has a range from negative infinity to positive infinity, thus facilitating modelling.

In its simplest form, the logistic regression model can be described as follows:

$$\text{Logit } P_i = \log [P_i / (1-P_i)] = \text{alpha} + b_i X_i + e_i$$

where  $P_i$  is the probability of the outcome occurring (e.g. being a smoker), alpha is an intercept term, the  $b_i$ 's are coefficients,  $X_i$ 's the independent variables of interest, and  $e_i$  is the error term.

Logit  $P_i$  is the natural logarithm of the 'odds ratio', which is commonly used in the field of health research as a measure of the magnitude of the relationship between two variables. More information on logistic regression is available elsewhere (e.g., Hosmer & Lemeshow 1989).

Several independent variables were of interest in the analysis. The relationship of any one of these variables to smoking may be affected by other factors. In some cases, relationships may be explained entirely by the action of a third factor. For example, the relationship between use of alcohol and smoking could be affected by differences in alcohol use by age, since age may also be associated with smoking. Therefore, it is important to adjust for other variables when examining the relationship between a factor of interest and smoking. In the current analysis, both unadjusted and adjusted models have been generated and compared.

A number of sets of geographical variables could have been used in the models, including State or Territory, ATSI region, and area of residence (capital city, other urban area or rural area). Only one set should be used at a time however. The final models presented here use area of residence to adjust for geographical differences. The estimated regression coefficients for the other factor of interest were almost identical to those from alternative models using ATSI region.

In tables T.1–T.4 and T.6–T.7 below, odds ratios and 95% confidence intervals are presented. Odds ratios have been estimated relative to the following set of reference characteristics:

- age 25–44 years;
- capital city resident;
- employed in a non-CDEP scheme job;
- highest year of school completed was year 10 or year 11;
- lives in a dwelling that is not owned or being purchased by its occupants (i.e. rented or 'other');
- lives in a household with Indigenous members only;
- has drunk alcohol in the preceding week;
- main language is English;
- considers the role of elders to be important;
- recognises homelands; and
- was not taken away from family as a child.

The reference category is not shown in the tables below for variables with only two levels (e.g. main language is English, recognised homelands). For variables with more than two levels (e.g. age group, labour force status), the reference group is shown in the tables to assist the reader. By definition, the odds ratio for the reference category (whether shown in the table or not) is 1.0, and 95% confidence intervals are not applicable.

#### ADJUSTING FOR OTHER FACTORS

After adjusting for all other factors, Indigenous people aged 45 or more remained significantly less likely to report smoking than were those aged 25–44 years (tables T.1 and T.2). Males and females aged 15–24 were not significantly different in reported smoking to those aged 25–44 after taking into account the other factors of interest, however.

Indigenous people living in capital cities were more likely to report smoking than those who lived in other urban areas (males and females) or in rural areas (females only; table T.2). The adjustment for other factors had a greater effect on males than on females.

Males and females in non-CDEP employment were significantly less likely to report smoking than were those in CDEP employment, the unemployed, and people not in the labour force (tables T.1 and T.2). The difference was more pronounced for males than for females. After adjusting for other factors, the probability of smoking was similar for all groups other than those in non-CDEP employment, which is in contrast to the unadjusted figures reported in table 3.7.

People living in dwellings owned or being purchased by their occupants were significantly less likely to report smoking than were those who were living in rented dwellings (tables T.1 and T.2), especially for males.

Males who completed year 12 or more, or who were still attending school, were significantly less likely to report smoking than were those who completed year 10 or 11 (table T.1). The same was true for females (table T.2), but the differences were greater for males. Males and females who had left school having completed less than year 10 were similar in reported smoking to those who completed year 10 or 11 after adjustment for other factors.

Household composition was not significantly associated with adjusted smoking prevalence among females (table T.2), but males who lived in a household with

non-Indigenous members were more likely to report smoking than were those whose household included Indigenous members only (table T.1).

Perhaps the most striking differences in reported smoking after adjustment for other factors were in relation to the period in which the respondent last drank alcohol (tables T.1 and T.2). For both males and females, those who said they never drink alcohol were much less likely to report smoking than were those who had consumed alcohol within the week before being interviewed. The probability of smoking among ever-drinkers who had not consumed alcohol in the previous week was between that of never drinkers and recent drinkers.

After adjustment for other factors, males who spoke English as their main language were less likely to report smoking compared to those who spoke another language, while the opposite was true for females (tables T.1 and T.2). For both males and females, those who said they considered the role of elders to be important were significantly more likely to report smoking than those who said it was not important. The difference was more pronounced among males. People who said they recognised homelands were more likely to report smoking after adjustment, but the difference was only significant for females. After taking into account the other factors of interest, males and females who said they were taken from family as children remained significantly more likely to report smoking than were those who had not been taken away. The difference was larger among males than among females.

In summary, several characteristics were significantly associated with the probability of smoking after adjusting for the other factors of interest. The largest associations were observed for highest level of education and alcohol consumption, followed by employment status, home ownership and age. Cultural factors, such as language, recognition of homelands, perceived importance of the role of elders, household composition and being taken away from one's family, were also significantly associated with reported smoking but the differences were not as large as those seen for socioeconomic and demographic factors.

**T.1 RELATIVE ODDS OF SMOKING, Males**

Variables	CRUDE(a)	ADJUSTED(b)	
	Odds ratio	Odds ratio	95% confidence interval
Age 15-24 years	***0.54	0.86	0.72-1.02
Age 25-44 years(c)	1.00	1.00	..
Age 45 years or more	***0.52	***0.56	0.46-0.69
Capital city(c)	1.00	1.00	..
Other urban area	1.00	**0.78	0.65-0.94
Rural area	*1.22	0.93	0.75-1.14
Employed, CDEP scheme	***2.47	***1.95	1.51-2.52
Employed, non-CDEP(c)	1.00	1.00	..
Unemployed	***2.10	***1.89	1.56-2.28
Not in the labour force	1.05	***1.74	1.41-2.14
Still attending school	***0.11	***0.19	0.13-0.29
Completed less than year 10	0.95	1.04	0.88-1.23
Completed year 10 or year 11(c)	1.00	1.00	..
Completed year 12 or more	***0.34	***0.37	0.28-0.49
Home owner/purchaser	***0.38	***0.40	0.34-0.49
Indigenous and non-Indigenous household members	*0.84	***1.44	1.20-1.72
Last drank within the past week(c)	1.00	1.00	..
Last drank more than 1 week ago	***0.70	***0.63	0.54-0.74
Never drinks alcohol	***0.18	***0.20	0.16-0.26
Main language is not English	***1.52	*1.31	1.05-1.63
The role of elders not important	***0.56	***0.66	0.54-0.81
Does not recognise homelands	***0.66	0.86	0.72-1.04
Taken away from family as a child	***1.96	***1.88	1.43-2.49

(a) Unadjusted for other factors.

(b) Adjusted for all factors listed in the table.

(c) The reference group. Odds ratio is equal to 1.0 by definition.

.. Not applicable.

Statistical significance is indicated as follows:

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .



## T.2 RELATIVE ODDS OF SMOKING, Females

Variables	CRUDE(a)	ADJUSTED(b)	
	Odds ratio	Odds ratio	95% confidence interval
Age 15 to 24 years	***0.62	0.92	0.78-1.09
Age 25 to 44 years(c)	1.00	1.00	..
Age 45 years or more	***0.39	***0.48	0.40-0.58
Capital city(c)	1.00	1.00	..
Other urban area	**0.79	**0.76	0.65-0.90
Rural area	***0.66	**0.76	0.63-0.93
Employed, CDEP scheme	1.23	*1.43	1.04-1.97
Employed, non-CDEP(c)	1.00	1.00	..
Unemployed	***2.14	***1.63	1.32-2.03
Not in the labour force	**1.22	***1.69	1.42-2.01
Still attending school	***0.19	***0.31	0.22-0.43
Completed less than year 10	***0.76	0.96	0.82-1.12
Completed year 10 or year 11(c)	1.00	1.00	..
Completed year 12 or more	**0.55	***0.56	0.44-0.71
Home owner/purchaser	***0.54	***0.55	0.46-0.67
Indigenous and non-Indigenous household members	0.94	0.93	0.79-1.10
Last drank within the past week(c)	1.00	1.00	..
Last drank more than 1 week ago	***0.40	***0.40	0.34-0.47
Never drinks alcohol	***0.14	***0.16	0.13-0.19
Main language is not English	***0.54	**0.74	0.60-0.90
The role of elders not important	**0.79	*0.81	0.66-0.98
Does not recognise homelands	**0.82	***0.76	0.64-0.89
Taken away from family as a child	***1.70	**1.37	1.08-1.75

(a) Unadjusted for other factors.

(b) Adjusted for all factors listed in the table.

(c) The reference group. Odds ratio is equal to 1.0 by definition.

.. Not applicable.

Statistical significance is indicated as follows:

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

## RESULTS BY AGE GROUP

Logistic regression was performed separately for males and females aged 15–24, 25–44 and 45 years and over. The results are presented in tables T.3 and T.4. Because of the reduced sample size in each of the age groups, the results are subject to greater uncertainty and must be interpreted with caution. No formal tests of interaction were conducted.

Among females, the results were broadly consistent in each of the three age groups. There was, however, a suggestion that being taken away from family might be more important among those in the youngest age group than among those aged 25–44 or 45 years and over. Similarly, household composition appeared to be more important in the youngest group than in either of the other age groups.

Results by age group were also largely consistent among males. One possible exception was the association of place of residence with smoking, with older men (aged 45 or more) more likely to smoke if they lived outside of capital cities and younger men (ages 18–24 and 25–44) somewhat less likely.

Although the prevalence of smoking was lower among those in non-CDEP jobs than those in CDEP scheme employment, the unemployed and those not in the labour force, the ranking of these last three groups varied somewhat by age group among both males and females.

**T.3 RELATIVE ODDS OF SMOKING (AGE GROUP), Males**

Variables	15-24 YEARS.....		25-44 YEARS(a).....		45 YEARS AND OVER....	
	Odds ratio(b)	95% confidence interval	Odds ratio(b)	95% confidence interval	Odds ratio(b)	95% confidence interval
Capital city(c)	1.00	..	1.00	..	1.00	..
Other urban area	0.87	0.63-1.22	***0.53	0.40-0.70	1.43	0.97-2.10
Rural area	0.80	0.54-1.19	0.74	0.53-1.02	*1.80	1.15-2.82
Employed, CDEP scheme	1.48	0.94-2.32	***1.98	1.38-2.85	***4.16	2.02-8.55
Employed, non-CDEP(c)	1.00	..	1.00	..	1.00	..
Unemployed	1.17	0.83-1.66	***2.54	1.93-3.34	*1.79	1.07-3.00
Not in the labour force	**1.85	1.17-2.93	***2.28	1.63-3.19	1.42	1.00-2.03
Still attending school	***0.13	0.07-0.22	(d)	..	(d)	..
Completed less than year 10	1.05	0.76-1.44	0.96	0.77-1.21	1.54	0.95-2.51
Completed year 10 or year 11(c)	1.00	..	1.00	..	1.00	..
Completed year 12 or more	***0.29	0.19-0.43	**0.50	0.31-0.81	1.52	0.48-4.83
Home owner/purchaser	***0.48	0.33-0.68	***0.32	0.24-0.42	**0.60	0.41-0.87
Indigenous and non-Indigenous household members	1.26	0.92-1.74	*1.40	1.06-1.84	*1.56	1.04-2.34
Last drank alcohol within the past week(c)	1.00	..	1.00	..	1.00	..
Last drank more than 1 week ago	***0.48	0.35-0.65	***0.61	0.48-0.77	0.94	0.68-1.30
Never drinks alcohol	***0.21	0.14-0.31	***0.17	0.12-0.26	***0.18	0.11-0.29
Main language is not English	*1.65	1.07-2.53	1.09	0.79-1.50	1.20	0.79-1.82
The role of elders not important	0.84	0.57-1.23	**0.63	0.46-0.87	**0.56	0.38-0.83
Does not recognise homelands	0.88	0.64-1.22	*0.74	0.56-0.97	1.02	0.69-1.50
Taken away from family as a child	**2.88	1.37-6.06	1.39	0.94-2.04	**2.08	1.26-3.41

(a) Excludes four respondents who said they were still attending school, so that convergence could be achieved.

(b) Adjusted for all factors listed in the table.

(c) The reference group. Odds ratio is equal to 1.0 by definition.

(d) No one attending school in this age group.

.. Not applicable.

Statistical significance is indicated as follows:

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

T.4 RELATIVE ODDS OF SMOKING (AGE GROUP), Females

Variables	15-24 YEARS.....		25-44 YEARS.....		45 YEARS AND OVER...	
	Odds ratio(a)	95% confidence interval	Odds ratio(a)	95% confidence interval	Odds ratio(a)	95% confidence interval
Capital city(b)	1.00	..	1.00	..	1.00	..
Other urban area	**0.62	0.46-0.84	0.83	0.66-1.05	0.87	0.61-1.25
Rural area	*0.68	0.47-0.99	0.77	0.58-1.01	0.89	0.59-1.35
Employed, CDEP scheme	1.84	0.98-3.43	1.43	0.92-2.24	1.17	0.54-2.53
Employed, non-CDEP(b)	1.00	..	1.00	..	1.00	..
Unemployed	1.50	1.00-2.25	***2.06	1.53-2.77	2.11	0.94-4.71
Not in the labour force	***2.62	1.79-3.85	***1.74	1.38-2.19	1.14	0.77-1.69
Still attending school	***0.26	0.18-0.39	(c)	..	(c)	..
Completed less than year 10	0.95	0.69-1.30	1.14	0.94-1.39	***0.37	0.23-0.62
Completed year 10 or year 11(b)	1.00	..	1.00	..	1.00	..
Completed year 12 or more	***0.37	0.25-0.53	0.90	0.64-1.29	0.60	0.14-2.64
Home owner/purchaser	0.69	0.48-1.01	***0.57	0.44-0.75	***0.43	0.29-0.64
Indigenous and non-Indigenous household members	*0.69	0.50-0.96	1.09	0.87-1.36	1.02	0.70-1.48
Last drank alcohol within the past week(b)	1.00	..	1.00	..	1.00	..
Last drank more than 1 week ago	***0.33	0.24-0.44	***0.39	0.32-0.49	**0.55	0.38-0.79
Never drinks alcohol	***0.09	0.06-0.13	***0.18	0.14-0.24	***0.25	0.17-0.36
Main language is not English	0.88	0.59-1.31	0.78	0.58-1.04	**0.54	0.36-0.82
The role of elders not important	1.09	0.77-1.55	***0.58	0.44-0.77	0.87	0.57-1.34
Does not recognise homelands	0.81	0.60-1.09	0.84	0.66-1.06	*0.64	0.42-0.98
Taken away from family as a child	***3.49	1.82-6.71	*1.40	1.01-1.93	0.84	0.52-1.34

(a) Adjusted for all factors listed in the table.

(b) The reference group. Odds ratio is equal to 1.0 by definition.

(c) No one attending school in this age group.

.. Not applicable.

Statistical significance is indicated as follows:

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

TORRES STRAIT ISLANDERS VERSUS ABORIGINAL PEOPLE

It is possible that the factors which are associated with smoking may differ for Torres Strait Islanders and Aboriginal people, but the small number of Torres Strait Islander respondents makes comparisons difficult, and the results must be interpreted cautiously.

The relationships between the variables of interest and smoking were examined separately for people identifying only as Torres Strait Islander (255 males and 298 females) and those identifying only as Aboriginal (3,729 males and 4,427 females). People who identified as both Aboriginal and Torres Strait Islander ( $n = 74$ ) were excluded from this analysis, although they are included in table T.5. The majority of people (about 75%) who identified solely as Torres Strait Islanders lived in either the Torres Strait Area or the Townsville or Cairns ATSI regions.

Torres Strait Islanders were significantly less likely to report smoking than were Aboriginal people (table T.5;  $p < 0.05$  for both males and females).

T.5 ABORIGINALS VERSUS TORRES STRAIT ISLANDERS

Identification	PROPORTION OF THE INDIGENOUS POPULATION...		CURRENT SMOKERS.....	
	Males	Females	Males	Females
	%	%	%	%
Aboriginal only	94.2	93.9	56.5	48.7
Torres Strait Islander only	4.8	5.3	47.8	41.7
Both Aboriginal and Torres Strait Islander	1.0	0.8	54.7	42.2
<b>All Indigenous</b>	<b>100.0</b>	<b>100.0</b>	<b>56.1</b>	<b>48.3</b>

The results of the logistic regression modelling are presented in tables T.6 and T.7. The results were largely similar for Aboriginal people and Torres Strait Islanders for both males and females.

**T.6 RELATIVE ODDS OF SMOKING, Torres Strait Islander versus Aboriginal Males(a)**

Variables	TORRES STRAIT ISLANDER.....			ABORIGINAL.....		
	Crude(b)	Adjusted(c)	95% confidence interval	Crude(b)	Adjusted(c)	95% confidence interval
	Odds ratio	Odds ratio		Odds ratio	Odds ratio	
Age 15-24 years	0.64	2.00	0.70-5.68	***0.53	*0.82	0.69-0.98
Age 25-44 years(d)	1.00	1.00	..	1.00	1.00	..
Age 45 years or more	**0.36	*0.34	0.13-0.88	***0.53	***0.58	0.46-0.72
Capital city(d)	1.00	1.00	..	1.00	1.00	..
Other urban area	0.56	0.46	0.10-2.18	1.03	*0.80	0.66-0.96
Rural area	0.82	0.49	0.10-2.40	**1.27	0.96	0.77-1.19
Employed, CDEP scheme	2.01	1.88	0.57-6.18	***2.59	***2.03	1.55-2.65
Employed, non-CDEP(d)	1.00	1.00	..	1.00	1.00	..
Unemployed	1.25	1.13	0.43-2.98	***2.16	***1.93	1.59-2.35
Not in the labour force	0.61	1.95	0.67-5.72	1.10	***1.77	1.42-2.20
Still attending school	**0.10	0.22	0.03-1.63	**0.11	***0.20	0.13-0.30
Completed less than year 10	1.03	1.77	0.73-4.27	0.94	1.00	0.84-1.19
Completed year 10 or year 11(d)	1.00	1.00	..	1.00	1.00	..
Completed year 12 or more	0.89	0.89	0.30-2.67	***0.31	***0.34	0.26-0.46
Home owner/purchaser	*0.48	*0.34	0.13-0.84	***0.37	***0.40	0.33-0.49
Indigenous and non-Indigenous household members	**2.70	1.01	0.35-2.93	**0.80	***1.46	1.22-1.76
Last drank within the past week(d)	1.00	1.00	..	1.00	1.00	..
Last drank more than 1 week ago	***0.26	**0.32	0.15-0.67	***0.74	***0.65	0.55-0.77
Never drinks alcohol	***0.02	***0.03	0.00-0.16	***0.19	***0.21	0.16-0.27
Main language is not English	1.41	1.66	0.70-3.95	***1.64	**1.42	1.12-1.80
The role of elders not important	0.54	*0.30	0.10-0.96	***0.56	***0.68	0.55-0.84
Does not recognise homelands	1.46	1.59	0.47-5.41	***0.64	0.87	0.72-1.04
Taken away from family as a child	2.62	1.20	0.15-9.82	***1.91	***1.80	1.35-2.40

(a) Excludes people who identified as both Aboriginal and Torres Strait Islander.

(b) Unadjusted for other factors.

(c) Adjusted for all factors listed in the table.

(d) The reference group. Odds ratio is equal to 1.0 by definition.

.. Not applicable.

Statistical significance is indicated as follows:

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

**T.7 RELATIVE ODDS OF SMOKING, Torres Strait Islander versus Aboriginal Females(a)**

Variables	TORRES STRAIT ISLANDER.....			ABORIGINAL.....		
	Crude(b)	Adjusted(c).....	95% confidence interval	Crude(b)	Adjusted(c).....	95% confidence interval
	Odds ratio	Odds ratio		Odds ratio	Odds ratio	
Age 15-24 years	0.82	1.83	0.72-4.62	***0.61	0.91	0.77-1.07
Age 25-44 years(d)	1.00	1.00	..	1.00	1.00	..
Age 45 years or more	0.71	0.96	0.39-2.36	***0.38	***0.46	0.38-0.56
Capital city(d)	1.00	1.00	..	1.00	1.00	..
Other urban area	0.67	*0.20	0.05-0.81	**0.82	*0.81	0.69-0.96
Rural area	1.51	0.96	0.23-3.94	***0.64	**0.75	0.62-0.92
Employed, CDEP scheme	**6.15	5.05	0.88-28.95	1.10	1.33	0.96-1.86
Employed, non-CDEP(d)	1.00	1.00	..	1.00	1.00	..
Unemployed	1.44	1.13	0.32-4.04	***2.12	***1.61	1.29-2.02
Not in the labour force	1.45	1.59	0.64-3.96	*1.19	***1.70	1.42-2.03
Still attending school	0.32	0.92	0.16-5.20	***0.18	***0.29	0.20-0.40
Completed less than year 10	0.81	1.18	0.46-2.98	***0.76	0.96	0.82-1.13
Completed year 10 or year 11(d)	1.00	1.00	..	1.00	1.00	..
Completed year 12 or more	0.52	0.36	0.11-1.17	***0.60	***0.58	0.45-0.75
Home owner/purchaser	0.76	0.53	0.21-1.32	***0.53	***0.56	0.46-0.68
Indigenous and non-Indigenous household members	*1.82	0.61	0.26-1.45	0.91	0.92	0.78-1.09
Last drank within the past week(d)	1.00	1.00	..	1.00	1.00	..
Last drank more than 1 week ago	***0.26	**0.30	0.13-0.72	***0.41	***0.41	0.35-0.48
Never drinks alcohol	***0.09	***0.04	0.02-0.12	***0.14	***0.17	0.14-0.21
Main language is not English	0.95	1.08	0.49-2.40	***0.50	***0.69	0.55-0.86
The role of elders not important	1.57	1.56	0.64-3.82	**0.76	*0.78	0.64-0.95
Does not recognise homelands	1.29	0.83	0.34-2.04	**0.80	***0.75	0.63-0.88
Taken away from family as a child	*5.02	5.58	0.52-59.98	***1.64	*1.33	1.04-1.70

(a) Excludes people who identified as both Aboriginal and Torres Strait Islander.

(b) Unadjusted for other factors.

(c) Adjusted for all factors listed in the table.

(d) The reference group. Odds ratio is equal to 1.0 by definition.

.. Not applicable.

Statistical significance is indicated as follows:

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

## RESULTS BY ATSI REGION

The 35 ATSI regions and the Torres Strait Area represent a broad range of climates, lifestyles, economies, and peoples. It is quite possible that the relationships of many of the factors of interest to smoking could differ from region to region.

In the analyses by age group and by ATSI region, there were difficulties in using logistic regression because of sparse data in some strata, and some models failed to converge. This was observed when there were only a few people in an area (or in an age group) with a certain characteristic (e.g. attending school or working in CDEP scheme employment) and all of them had the same response to the smoking question. So, for example, in some ATSI regions, all those still attending school reported that they were non-smokers. In other cases, everyone in the region (or age group) shared the characteristic of interest. For example, in several ATSI regions, all respondents reported that they used English as their main language. Because of these difficulties, it was not possible to estimate odds ratios for all variables of interest for all regions or for all age groups.

Although it was not possible to adjust for all the factors of interest within each region due to the much smaller sample size, each factor was examined in turn in each region to assess its relationship to smoking. As noted above, odds ratios could not be calculated for every region for every variable of interest.

As would be expected, there was some variability from region to region in the association between the factors of interest and smoking, but there was broad consistency for several factors.

In most regions, males and females aged 15–24 years and aged 45 years and over were less likely to smoke than were those aged 25–44. The relationship of employment status and smoking was more variable by region, especially among women, but this may be due to differences in the pattern of employment opportunities by region (see, for example, Australian Bureau of Statistics 1996c).

In almost every region, males and females were less likely to smoke if they were still attending school, and in the majority of regions, those who had completed year 12 or more were less likely to report smoking than were those who had completed year 10 or 11. Among males, home ownership was associated with a lower probability of smoking in almost every region, but this was somewhat more variable among females.

Household composition, main language spoken, recognition of homelands, and the perceived importance of the role of elders all varied from region to region in their relationship to smoking. Being taken away from family as a child was generally associated with increased likelihood of smoking, but not in every region.

Perhaps the most dramatic and consistent result was the association of smoking with alcohol use. In all but one region (in which there was no difference), recent drinkers were more likely than non-drinkers to report that they smoked, among both males and females. In the majority of regions, ever-drinkers who had consumed alcohol in the preceding week were also more likely to say they smoked than were drinkers who had last consumed alcohol more than a week ago, especially among females.



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