Population estimates of occasional smoking among self-described smokers and non-smokers in Victoria, Australia

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Abstract

Objective **– To determine the prevalence of occasional smoking among self-described smokers and non-smokers in Victoria, Australia.**

Design **– Household survey.**

Participants **– A broadly representative sample of 2357 Victorians ⩾ 16 years old**

Main outcome measures **– Cigarette consumption estimates for individuals who admitted to any cigarette smoking in the previous year.**

Results **– 11% of smokers do not smoke daily and about 5% of smokers smoke on average less than one cigarette a day. Also 5% of never-smokers, and 17% of ex-smokers of at least a year's duration had smoked in the past year (11% of all non-smokers). Only 0.4% of non-smokers reported consumption levels likely to exceed an average of one cigarette a day.**

Conclusion **– Occasional cigarette use is common among self-described non-smokers, and there is a small overlap in the consumption distribution of reported smokers and non-smokers. In general respondents described themselves as smokers when they consumed on average one or more cigarettes a day.**

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Introduction

The focus of most research on smoking has been on daily users because most smoking-related mortality and morbidity occurs in this group. More recently there has been some interest in smokers who do not smoke at addictive levels. Shiffman[1] has found that daily smokers of less than five cigarettes a day do not possess most of the characteristics of addicted smokers. Non-daily smokers are also likely to be even more different from addicted smokers.

There is little in the literature concerning the prevalence of non-daily smoking but what there is suggests that there may be considerable numbers in at least some populations. For example, Goldstein[2] noted that 7% of a broadly representative sample of a Canadian city were occasional (non-daily) smokers. Evans and associates[3] found that 15.4% of Californians who had smoked in the previous year were non-daily smokers. They found this pattern to be most prevalent in Hispanics, and argue that it might be related to family income. They also found that over half of the occasional smokers reported being occasional users one year previously (retrospective recall), suggesting that for many it is a stable pattern of consumption.

That occasional smokers exist is of some theoretical and practical significance. It is common to think about smoking as an all-or-none phenomenon (either one is a smoker or one is not a smoker) and that those who do smoke have little control over the numbers they smoke. Such a model assumes that occasional smokers are transitional cases in between the two stable states of regular smoking and not smoking. The existence of considerable numbers of occasional smokers, particularly in age groups where uptake of regular smoking is rare, would be evidence that at least some individuals can engage in stable occasional use. Further, if there is long-term occasional use among "former smokers", it would suggest that occasional or sporadic use of cigarettes might be accepted as a positive outcome of cessation programmes.

This paper is concerned with determining the prevalence of non-daily tobacco smoking in a representative sample in Victoria, Australia. It considers non-daily smoking both among individuals who describe themselves as "smokers" (occasional smokers) and among those who describe themselves as "non-smokers" (sporadic users).

Methods

Subjects were 2357 Victorians aged 16 and above interviewed in their homes in September and October, 1990. The survey was conducted by Roy Morgan Research Centre, a reputable market research company, as part of an omnibus survey which contained questions for a number of clients. It uses a method identical to that used in the series of studies on smoking prevalence in Australia conducted by Hill and associates.[4,5]

The sample consisted of 48% males and 52% females. Twenty-eight per cent were aged 16–29 years, 40% aged 30–49, and 32% aged 50 or over. Compared with official government population estimates for the time,[6] the sample slightly over-represents females aged 30–49 and under-represents males aged

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16–29, but all sample percentages are within 2 percentage points of population estimates.

Interviewing was always conducted at weekends. Sample selection was based on Commonwealth of Australia electoral subdivisions. Each week, one or two names and addresses of electors were randomly selected from the electoral role for each subdivision in Victoria. Sampling began at the house adjoining the identified elector and further adjoining dwellings were approached, excluding the identified electors until a quota of eight interviews were filled. At least two attempts were made to contact residents of the first eight households. The final sample consisted of approximately 60% from the first eight households and 40% from replacement households. Replacements resulted from approximately equal levels of refusals and unattended households. Only one respondent from each household was interviewed, selection being according to a predetermined sequence based on age and sex.

THE QUESTIONS

All respondents were handed a card with 10 description categories and asked which one best described them: there were two cigarette smoker categories ("I smoke only cigarettes" and "I smoke cigarettes and also cigars or a pipe"), four smoker categories for current non-cigarette smokers ("I smoke [cigars/a pipe] regularly, and [have never smoked/used to smoke] cigarettes"); three ex-smoker categories ("I used to smoke regularly, but only cigarettes", "I used to smoke cigarettes regularly and also cigars or a pipe", and "I used to smoke only cigars or a pipe regularly, but not cigarettes"); and a never-smoker category ("I have never smoked at all"). This is the measure of smoking status used in the series by Hill and colleagues.[4,5] Subsequent questions answered by a given individual depended on how they were categorised on the first question. All current cigarette smokers were asked whether they smoked cigarettes every day. Those who did smoke every day were asked about normal consumption on both normal workdays and normal leisure days. Those respondents who reported that they did not smoke every day were asked on what kind of day they smoke, how often they smoke, and on days that they do, about how many cigarettes they smoke on average.

All ex-smokers were asked how long ago they finally gave up smoking cigarettes. Ex-smokers who had given up within the last 12 months were asked if, since they quit, they had smoked or had a puff of any cigarette, cigar, or pipe. All other ex-smokers were asked "In the last year have you smoked or had a puff of any cigarette, cigar or pipe". To make this question plausible, it was prefaced by the sentence, "we are interested in occasional smoking by ex-smokers and non-smokers". Those who indicated "yes" to either question were asked about how many times they would have smoked; whether they smoked cigarettes, cigars, or pipes; and for each they smoked, about how many were smoked on a typical occasion. Only data on cigarette consumption are reported here. Responses to all these questions were analysed as a function of respondents' age, sex, and educational attainment.

Table 1 Estimated average daily cigarette consumption among cigarette smokers

Cigarettes per day	Smoker type (%)		Total smokers (n = 635)
	Daily (n = 566)	Non-daily (n = 69)	
25+	27	0	24
15 to less than 25	35	0	31
5 to less than 15	33	6	30
1 to less than 5	5	30	8
Less than 1	0	49	5
Can't say	0	15	2

Results

Among respondents, 45.1% classified themselves as never-smokers, 26.6% as ex-smokers (including 3.5% who had been ex-smokers for less than one year), 26.9% as cigarette smokers (including 1.7% who also smoked pipes and/or cigars), 1.0% who smoked only pipes and/or cigars, and 0.4% who were unable to classify themselves. This compares with a finding of 27.1% of Victorians 18 years of age and older as being current cigarette smokers in a large government survey in 1989–1990.[7] For the cigarette smokers, 89% reported daily smoking and 11% non-daily smoking. As can be seen from table 1, non-daily smokers had low average daily consumption with 49% smoking on average less than one cigarette a day and a further 15% being unable to estimate consumption. Only 6% smoked an average of five or more cigarettes a day.

For daily smokers, there were relationships between amount smoked and sex, age, and education of respondents. Men ($\chi^2 = 21.8$, df = 5, $p = 0.001$), those over 30 ($\chi^2 = 24.6$, df = 10, $p = 0.01$) and those with less education ($\chi^2 = 41.8$, df = 15, $p = 0.0002$) were all more likely to report higher consumption. The less educated were also more likely to be daily smokers than those with more education ($\chi^2 = 26.9$, df = 3, $p < 0.0001$), but there were no differences by sex or age on this variable. There were no differences in consumption among non-daily smokers as a function of these three demographic variables.

Of the self-defined non-smokers (never- and ex-smokers), 10.8% admitted to having smoked in the past year and a further 3.8% were unable to say whether they had smoked or not (see table 2). Among never-smokers, 5.0% reported smoking; among ex-smokers abstinent for one year or more, 16.8% smoked; and among recent (< 1 year) ex-smokers, 43.4% admitted smoking after they quit. Among the non-smokers who reported smoking, daily consumption was estimated where possible. Most of this group reported very low consumption, with 21% reporting one to three cigarettes in the year and a further 37% reported episodes which suggest that they smoked less than a tenth of a cigarette a day on average (4–36 cigarettes a year) and 16%

Table 2 Estimated average daily cigarette consumption in the past 12 months among self-defined non-smokers (never-smokers and ex-smokers)*

Cigarette consumption	Smoking status (%)				Total non-smokers (%) (n = 1699)
	Never smokers (n = 1064)	Ex-smokers ⩾ 1 year (n = 543)	Ex-smokers < 1 year* (n = 83)	Can't say (n = 9)	
Did not smoke**	92.5	76.8	56.6	33.3	85.4
Total smoked	5.0	16.8	43.4	33.3	10.8
1–3 per year	2.1	2.6	2.4	11.1	2.3
4–36 per year	1.4	7.9	10.8	11.1	4.0
0.1–1 per day	0.3	2.6	15.7	0	1.8
> 1 per day	0.1	0.2	4.8	0	0.4
Can't say how much	1.1	3.5	9.6	11.1	2.4
Can't say whether smoked	2.5	6.4	0	33.3	3.8

* For those abstinent for less than 1 year, consumption is estimated since quitting.
** Includes five never-smokers and three ex-smokers of more than 1 year's duration who reported smoking cigars and/or pipes but not cigarettes.

Table 3 Reported tobacco use in the previous year among non-smokers, by age and sex

	Total (%)	Sex (%)		Age in years (%)		
		Male	Female	16–29	30–49	⩾ 50
Not used	85.4	82.7	87.7	79.0	85.6	89.9
Not sure	3.8	4.4	3.3	2.2	3.7	5.1
Used	10.9	12.9	9.0	18.8	10.7	5.0

smoked 0.1–1 cigarette a day. In addition, 22% were unable to estimate consumption and are likely to have predominantly very low levels of consumption. Only 3% reported episodes suggesting that they smoked more than one cigarette a day on average. This represents 0.4% of all non-smokers.

Among the non-smokers, men ($\chi^2 = 7.6$, df = 2, $p < 0.05$) and younger people ($\chi^2 = 54.3$, df = 4, $p = 0.0001$) were more likely to report some tobacco use (see table 3), but among those reporting some tobacco use there were no clear patterns between extent of consumption and these variables.

To summarise, based on these estimates, 5% of self-ascribed smokers (1.4% of all respondents) smoked less than one cigarette a day and 0.4% of non-smokers (0.3% of all respondents) smoked one or more cigarettes a day on average.

Discussion

The results of this study show that the self-ascription measure used in this study converged reasonably well with a definition of smoking as consuming one or more cigarettes a day. From a public health viewpoint, this is probably an acceptable cut-off level, as the health consequences of lower levels of consumption are likely to be small and difficult to distinguish from those due to exposures to environmental tobacco smoke (ETS).

However, the results of this study show that a small minority of "non-smokers" do indeed use cigarettes on a sporadic basis, this being more common among "ex-smokers" than "never-smokers", although it needs to be stressed that 85% of non-smokers reported zero tobacco consumption in the past year. It seems that some users of cigarettes see their use as so infrequent, atypical of their normal behaviour, or so different to the behaviour of self-ascribed smokers, that they consider themselves to be more similar to people who do not smoke at all.

There was a small overlap in the distribution of rates of consumption between self-ascribed smokers and non-smokers. Care should be taken in interpreting the magnitude of the overlap because the questions asked of smokers and non-smokers were necessarily somewhat different and did not allow precise estimates of consumption (particularly for non-daily users), and because several users did not provide consumption details.

The finding that between 11% and 15% of non-smokers smoke sporadically and that 11% of smokers smoke only on a non-daily basis may be of some significance in relation to interpretation of biochemical tests, estimates of relative risk of disease based on simple self-report measures, and because of its implications for models of smoking behaviour.

Where biochemical validation has been attempted in studies of smoking, it has generally been shown that there is a high degree of concordance with self-reported smoking, although there are some individuals in whom self-report and biochemical measures do not agree.[8] If a significant proportion of genuine non-smokers smoke on a sporadic basis and if some self-ascribed smokers smoke irregularly, this would explain some of the discrepancies, especially those with biochemical measures just above or below the threshold of classification. This explanation does not extend to very high assay levels in professed non-smokers; these cases would still need to be treated as non-concordant.

How dangerous to the smoker is occasional use? Conventional wisdom regarding the role of consumption in the aetiology of disease is that the number of years smoked is a more important factor than the amount smoked.[9] However, it is not clear whether this would apply to occasional smokers. Given the risks associated with exposure to ETS, it is likely that even low levels of consumption will be associated with some health risk. Moreover, it seems likely that exposure to carcinogenic agents in tobacco smoke through active smoking of less than a cigarette a day is likely to be accompanied by exposure to ETS. The effect would be aggravated by the likelihood that

both occasional smokers and sporadic users fraternise with regular smokers more than do absolute non-smokers. For some of these individuals, therefore, their passive exposure could be greater than their active exposure, which would be an unlikely occurrence for most daily smokers.

The finding that nearly half of the recent ex-smokers reported having smoked since they quit was surprising. It is probable that most of these instances represent slip-ups rather than planned sporadic use, especially in those who had quit more recently. On the basis of these data, we cannot determine whether those who have smoked will be more likely to relapse in the future. However, it is apparent that recovery from slip-ups is common, a finding consistent with studies of quitters.[10]

Among the non-smokers, it is unlikely that the majority of sporadic users will return to (or take up) regular smoking. While sporadic use is most prevalent in younger people where the uptake of smoking is more common, the high prevalence of sporadic smoking and the evidence of sporadic use in long-term ex-smokers suggests that this pattern of use does not inevitably lead to regular use. Further, the US data of Evans and associates[3] suggests that prolonged occasional use can occur, although it is overall a less stable state than complete abstinence. The evidence of declining sporadic use with age, coupled with the decline in regular smoking prevalence with age[5] suggests that sporadic users may be more likely to become abstainers than regular smokers. However, longitudinal studies would be needed to confirm this speculation, and to identify what proportion of sporadic users sustain this pattern or move towards complete abstinence.

While it is possible that sporadic users and occasional smokers are not necessarily going to become (or revert to being) regular smokers, sporadic or occasional use is not an optimal outcome given the remaining health risks and the possibility of greater risks of relapse. Sporadic use should not be a goal of cessation programmes. The proportion of all tobacco users engaging in relatively unproblematic levels of use is less than for other drugs,[11] so it is possible that controlled use of cigarettes is more problematic than controlled use of other drugs. Further, no groups of smokers have been identified for which sporadic use is plausibly either a more attractive or attainable outcome than complete abstinence. However, it does seem sensible to accept those who have moved from regular smoking to sporadic use as having successfully quit, or at the very least to differentiate them from failures.

That some non-smokers may smoke sporadically and not become smokers suggests that for those individuals smoking status is not a simple dichotomy. Controlled use over long periods is possible, at least at very low levels of consumption. The relatively high prevalence of sporadic use among people who gave up smoking long ago is evidence that minimal levels of cigarette consumption do not necessarily lead to a return to regular smoking. These data are more consistent with models of addiction based on self-control[12] than on models in which slip-ups are considered catastrophes, because hard-won abstinence is "violated".[13] Historically, both occasional and sporadic use could be a relatively new form of behaviour adopted to try to minimise the widely publicised risks associated with tobacco use. Consistent with this interpretation, studies of adolescents[14] show that many more adolescents try tobacco than ever take up regular use.

People involved in tobacco control research should be aware of classification errors arising from simple self-report measures of smoking status but should also take heart from these data, which suggest that the degree of misclassification is not large. They should also note the possibility that, when biochemical tests do not agree with self-report, it may sometimes be due to misunderstanding rather than outright deception. These findings, taken together with other findings,[3] suggest that sporadic use of cigarettes can occur without it leading to regular use, both by people who used to smoke regularly and by those who have not. These phenomena are not entirely accounted for by some of the addiction models of tobacco use and may be due to anti-smoking social trends that stimulate and enable greater degrees of control by individuals over their smoking behaviour.

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