Economic aspects of smoking in South Africa

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Summary
A conservative analysis of some of the costs and benefits of smoking to our society are presented. This preliminary investigation updates and refines the methodology of a previous study. Depending on the underlying economic assumptions, smoking cost South Africa between R212 and R481 million in 1985 as a result of lost productivity due to premature death. Lost productivity while smokers were undergoing treatment cost at least R22 million. Hospitalisation and other health care costs amounted to R128 million in public institutions alone. It is likely that the current level of excise duty does not compensate for the high social costs resulting from smoking. Although many of the costs and benefits of smoking are not quantifiable in monetary units, their available information as presented in this study suggests that the cost of the tobacco industry to South Africa at present, and particularly its potential cost in the future, outweigh any possible economic benefit.

In 1984, the US Surgeon General called for a smoke-free society by the year 2000.1 The economic consequences of this call are far-reaching. In Table I they are enumerated and contrasted to the economic costs of a smoking society.

This article will attempt to quantify the costs and benefits of smoking in South Africa (as listed in Table I). The economic costs of a 'smoking-free' society can alternatively be described as the benefits of smoking, as they are costs which are at presently averted.

A range of estimation techniques have been utilised in earlier publications,2-5 some of which are open to criticism on grounds of methodological over-simplification. In particular this analysis takes into account the proportion of the population which is economically active and utilises economic discounting techniques. Yach2 is the only author to utilise local data.

Methodology

Only a partial analysis of the situation is presented. An attempt has been made to calculate the direct health care costs of smoking-related diseases as well as to estimate concomitant losses of productivity. Loss of productivity as a consequence of smoking can be categorised into three groups: illness (absenteeism), ill-health (decreased output), and premature death. To obtain these estimates, it was necessary to make a number of assumptions which are based on available publications.

The formula used to calculate loss of productivity due to premature death is as follows:

\[
\sum_{t=1}^{n} \frac{Y_t}{(1+i)^t} = Y_1 + \frac{Y_1}{(1+i)} + \frac{Y_1}{(1+i)^2} + \ldots
\]

where \( n \) = the potential years of pre-retirement life lost due to premature death (value dependent on age at death); \( Y_t \) = the estimated average income in year \( t \) \( (Y_t = \text{average salary in } 1985) \) — the estimates of \( Y \) for subsequent years are derived from extrapolations based on average rates of increase in annual incomes for each race group); annual income was assumed to be equal to the marginal productivity of labour in this analysis; and \( i \) = the discount rate.

The number of smoking related deaths6 by age at death, between the ages of 35 and 64 years, was calculated using data from the Department of Statistics. The net present value of expected future earnings was calculated by age at death using
the above formula, and multiplied by the frequency of deaths at each age. These totals were summed to obtain the net present value of incomes lost due to premature, smoking-related death. This result was then corrected for labour force participation and unemployment. A sensitivity analysis was performed to indicate the effects of changes in the discount rate and the rate of increase in annual income. The highest and lowest outcomes are presented.

To determine the loss of productivity due to hospitalisation (1985), the average length of stay was multiplied by average earnings and by all hospital admissions in the RSA for circulatory, respiratory and neoplastic disease due to smoking. This was then corrected for labour force participation and unemployment. Loss of productivity due to absenteeism or indirectly due to diminished work capacity is not included in this formula. The proportion of admissions due to disease attributable to smoking was estimated by assuming that hospital admissions occurred in the same proportions as mortality from disease. We therefore assumed that 25% of all neoplasms and 20% of cases of IHD were caused by smoking. Since the vast majority of patients with chronic obstructive lung disease patients are thought to have smoking as a primary cause, 90% of deaths from this cause have been attributed to smoking. Therefore 32% of all admissions ascribed to neoplasms, circulatory disorders and respiratory disease have been directly attributed to smoking for whites. For coloureds the figure is 27%, Asians 31% and for blacks 15.3%.

Direct cost of hospitalisation/health care costs (1985) was estimated by multiplying the average daily hospital cost (Cape Province) by the total number of hospital days attributed to smoking. The assumption that the number of hospital days mirrors the cause of death for each population group has again been made.

The costs of outpatient department (OPD) care have been estimated by assuming that the proportion of OPD visits attributable to smoking is equal to the proportion of hospital admissions attributed to smoking. Total numbers of OPD visits were obtained from the annual reports (1985) of the Directors of Hospital Services.

Other economic consequences (excise duty, value of tobacco products sold) have been extracted from routinely published reports.

Results

Conservative estimates are that annual lost productivity due to premature deaths was between R212.2 and R246.8 million in 1985 (Table I). In the same period the economy lost at least R21.6 million while smokers were undergoing treatment for disease attributable to smoking. The assumption that the number of hospital days mirrors the cause of death for each population group has again been made.

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Discussion

There have been a number of calls in recent years, both internationally and within South Africa, for the total elimination of smoking. It is therefore important to evaluate the economic costs of smoking and to compare them with the costs which would be incurred in a non-smoking society.

To this end, all the costs listed in Table I must be estimated. We have concentrated on a few items that could be relatively easily and accurately quantified, and the results presented are therefore an estimate of the minimum costs of smoking to South Africa.

Wherever possible the most conservative estimate has been used. Not all smoking-related deaths or diseases have been estimated; only those where the evidence for causality is strongly documented have been utilised.

Similarly, only a small proportion of health care costs are presented. These costs exclude most private sector health care
costs and losses of productivity due to absenteeism and ill-health. Hospital admissions for smoking-related diseases are probably more frequent and longer than the average admission, owing to the chronicity of these diseases.

The costs of smoking for blacks have been given a very low value. However, with increasing urbanisation as well as the adoption of different smoking patterns it can be expected that this figure will rise dramatically in the next decade.

The most conservative estimate is that the costs of smoking to South Africa in terms of health care costs and lost productivity were between R362,3 and R396,9 million in 1985. This exceeds the entire budget of the Natal Hospitals Service in the same year. This estimate takes unemployment and labour force participation rates into account. It thus assumes that only those people who are both available for employment and actually employed will experience a loss in productivity due to smoking-related morbidity and mortality. If it is alternatively assumed that everyone would experience a loss in productivity (e.g. a housewife, although not earning a monthly salary, would also incur productivity losses) the most conservative estimate would be between R584,4 and R652 million.

Although many of the items listed in Table I have not been quantified in monetary terms, some conclusions can be drawn about the economic consequences of smoking and 'smoking-free' societies. International studies have shown that smoking-related health care costs would approximate the increased health care costs in a 'smoking-free' society owing to greater competing cause phenomenon and geriatric care requirements.

It can be argued that excise duty is merely a form of taxation and if smoking were stopped governments would find alternative methods of taxation. This is a simple tax to administer and only the expense of collecting this money elsewhere could be regarded as a cost in a non-smoking society. The contribution of excise duty on tobacco products to total government revenue has decreased from 2.3% in 1970 to 1% in 1985. Pensions would increase but would be counteracted by a concomitant increase in tax revenue.

Studies have shown that money which ex-smokers had spent on cigarettes is devoted to other consumption activities rather than being saved. This would promote demand and consequently employment in other sectors of the economy. In addition, there would be very little change in general sales tax revenue to the government.

The dislocation costs associated with crop substitution and the conversion of existing tobacco production facilities into other forms of light industry need to be quantified. These changes would occur gradually, and thus the dislocation costs in any one year are not likely to be substantial. This assumption is supported by the fact that the tobacco industry has made a steadily decreasing contribution to the overall gross manu-

<table>
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<tr>
<th>TABLE V. DIRECT COSTS OF OUTPATIENT VISITS (PROVINCIAL HOSPITALS)</th>
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<tr>
<td><strong>Total No. of outpatient visits</strong></td>
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<tr>
<td>Whites</td>
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<td>Coloureds and Asians</td>
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<tr>
<td>Blacks*</td>
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<td><strong>Total</strong></td>
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* Includes all visits by ‘non-whites’ for Transvaal, Natal and OFS.
† R26 per visit (3 outpatient department visits = 1 patient day).

* In an attempt to ‘price out’ and thus reduce consumption of a particular product.

The utilisation of production capacity in the tobacco industry has already fallen from 96.9% in 1975 to 87.8% in 1985. The reduction of tobacco consumption would also affect the marketing and related sectors that provide supporting services for the tobacco industry. In 1985, R41.4 million was spent on advertising by the tobacco industry. This constituted 5.1% of the total South African advertising expenditure in 1985. It has been suggested that increased taxation on cigarettes could be used to pay for advertisements advocating non-smoking, which would partially compensate the advertising industry for a loss in tobacco advertising revenue.

Thus the costs of a ‘smoking-free’ society would only outweigh the benefits if the loss of satisfaction to smokers and the costs associated with increased obesity exceeded all the costs to a smoking society (excluding health care costs and the cost of cigarettes). Expressed differently, the following question can be posed: is the satisfaction which smokers derive from smoking incurred would be avoided.

The argument in favour of taxation of tobacco products rests on the divergence between private and social costs. If no taxation existed in South Africa, the private costs of smoking would only extend to the cost of cigarette production and increased insurance premiums. The social costs of smoking would, however, reflect the total opportunity costs to society of the resources used in tobacco production and the related activities resulting from tobacco consumption.

In the absence of a tax, these ‘externalities’ i.e. the social costs not included in the private costs, are imposed on smokers and non-smokers alike. Smoking-related health care costs and disability grants are financed through general tax revenue.

Economic theory suggests that when this particular form of market failure occurs, central authorities are justified in imposing taxes equal to the excess of social costs over private costs to force consumers to take account of these costs.

At present South African smokers incur only a portion of the economic costs of smoking listed in Table I, namely the cost of cigarette production and increased insurance premiums. The current excise duty (R426 million in 1985) will cover some of the other costs (lost productivity and smoking-related health care costs totalled between R362,3 and R652 million depending on the assumption made). There is a need for further research to quantify the other costs of smoking. It is likely, however, that the current level of excise duty does not compensate for the divergence between the private and the social costs of smoking.

Taxes may be increased either: (i) until the tax revenue equals the costs of smoking that are currently not borne by smokers, i.e. the price of cigarettes will reflect all direct and indirect costs of smoking (apart from unquantifiable social costs); or (ii) by an additional amount so that the tax revenue is greater than these costs. This ‘symptuary tax’ is implemented in an attempt to ‘price out’ and thus reduce consumption of a particular product.
This tax revenue could be directed to the health services, where smoking-related health care costs are currently being subsidised by non-smokers through income tax payments. In addition, this revenue may provide the necessary resources for increased anti-smoking publicity campaigns, in a similar way to that recently announced in the Victoria Tobacco Act in Australia. 

Although many of the costs and benefits of smoking have not been quantified in monetary units, the available information, as presented in this study, tends to suggest that the costs of the tobacco industry to society at present, and particularly in the future, outweigh the economic benefits.

The authors thank Dr D. Yach for his help in developing the underlying assumptions and aspects of the methodology. Aspects of this paper were presented at the South African Medical Research Council's seminar, 'Smoking and health in South Africa — the need for action', on 7 April 1988.

REFERENCES

Byssinosis in South Africa
A survey of 2411 textile workers

N. W. WHITE

Summary

The first study of the prevalence of byssinosis in the South African cotton textile industry is described. Questionnaires were administered to 2411 subjects from six textile mills. Height and weight were measured and pulmonary function was tested before and after the first shift of a working week. Dust concentrations were measured using a Lumsden-Lynch vertical elutriator sampler.

The prevalence of byssinosis (all grades) according to work departments was as follows: spinning 11.2%, winding 6.1%, and weaving 6.4%. Subjects with symptoms of byssinosis had a significantly reduced forced expiratory volume in 1 second (FEV₁) and FEV₁/forced vital capacity ratio when compared with controls matched for age, height and weight. Dust concentrations in many areas of the preparation and spinning processes exceeded the World Health Organisation's recommended permissible exposure limit for cotton dust in spinning operations.

The prevalence of byssinosis in this study appears to be lower than that documented elsewhere. The mill design, machinery in use and environmental conditions in the South African cotton textile industry appear to be similar to those in Egypt and the USA before 1978. South Africa differs from these and other countries, including the UK, in having an exceptionally high labour turnover rate, which has reduced exposure periods.

The subjects were found to have a high prevalence of previously treated pulmonary tuberculosis (3.4% for males and 2.2% for females), and in this population this disease appeared to cause more respiratory impairment than byssinosis.

There is no legislation regulating cotton dust exposure in South Africa. When this study was commenced, neither biological nor environmental surveillance was being carried out anywhere in the South African cotton textile industry. This situation has now improved. Legislation is necessary to limit dust exposure and to ensure environmental and biological surveillance.


Byssinosis is an occupational form of chronic obstructive airways disease affecting workers in the cotton, flax and hemp textile industries. It is an entity quite distinct from occupational