

CHAPTER III

SMOKING: REVIEW OF RESEARCH AND IDENTIFICATION OF FUTURE RESEARCH PRIORITIES

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INTRODUCTION

Over the last decade increased attention has been given to a diverse range of tobacco control-related research in South Africa. In this article selected high points will be identified; gaps in existing knowledge necessary for future decision making are highlighted and, on that basis, priorities for future research are indicated.

Studies on the prevalence of smoking and its determinants provide crucial information on the likely future extent of the impact of the tobacco epidemic and on how best to target interventions. The lag phase between a population increasing its smoking rate to evidence of tobacco-related health and economic effects can extend from between one-and-a-half to two-and-a-half decades. Early surveillance of tobacco-related effects; the attributable risk of tobacco use for a range of health-related conditions, and models of likely future trends are important to assist public health policy-makers with the prioritisation of tobacco-control strategies. Agricultural and environmental effects of tobacco cultivation indicate that the impact of tobacco extends beyond the health sector.

Research on a range of interventions including the price (and role of excise tax); bans on tobacco advertising and promotion; bans on sales to children; education of children and communities; effectiveness of the mass media and of various quitting programmes; individually and together, provide information necessary to assess the effectiveness of current and planned educational, legislative and fiscal strategies of government. The final broad area relates to research with regard to policy development. Research aims to identify where tobacco control appears on the list of priorities of politicians and government officials from various sectors. The role of media advocacy for tobacco control as a means of influencing the policy agenda is also relevant.

To update information on tobacco control-related research carried out in South Africa, a Medline search of all published articles since 1984 was carried out; this was supplemented by the author's knowledge of research in the field. Importantly, research activities and priorities for the future are contrasted with views carried in a 1989 article.¹

PREVALENCE AND DETERMINANTS OF TOBACCO USE

National estimates

Several recent national studies have identified major trends in tobacco consumption.²⁻⁴ By 1990, the highest smoking rates were reported among coloureds (48,7%), followed by whites (33,7%), Africans (28,4%) and Asians (27,6%).³

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Comparison of trends in smoking prevalence from 1976 to 1990 indicated that there had been an increase of 320 000 new African smokers, 80 000 coloured smokers and 40 000 Asian smokers. There are 270 000 fewer white smokers than would have been expected if trends from 1976 had continued. This decline in smoking among whites occurred in men and women with evidence of a decline among Asian men. In sharp contrast, smoking rates over the period increased sharply among coloured men and women and more slowly among African men. Smoking rates among African women remain below 10%.³

The latest MRC/HSRC survey (unpublished, February 1995) of 2 200 adults indicated that 34% of adult South Africans or a total of 7 million smoke. Importantly, 52% of men (5.3 million) and 17% of women (1.7 million) smoke. The provinces with the highest smoking rates being the Northern Cape (55%), Western Cape (48%) and the North West (46%). The coloured population recorded the highest overall smoking rate (59%); followed by Asians (36%); whites (35%) and blacks (31%). Gender differences in smoking rates are greatest for Asians (48% for men, 6% for women) and Africans (53% for men and 10% for women); and least for coloureds (58% for men, 59% for women). In the survey, sixty percent of smokers indicated they have tried to quit at least once.

Most regionally based studies have been carried out in the Western Cape among Africans,^{5,6} coloureds^{7,8} and whites⁹ with additional studies being carried out in the Free State among adults¹⁰ and Natal among Asians.¹¹ Most studies have relied upon tobacco and advertising industry estimates with only a 1992 MRC-sponsored HSRC survey providing national estimates from a science council research point of view.⁴

Smoking in children

Studies of schoolchildren in the Western Cape^{5,12,13} have, in recent years, indicated that smoking is common particularly among boys over the age of 15 years. In a study that was carried out in an African township in Cape Town, of 673 school pupils, 0,8% of girls and 23,7% of boys were current smokers.⁵ This study included a wide age range and is not directly comparable to Flisher's studies which yielded age-specific smoking rates. For example, Flisher showed that in under 14-year-old schoolchildren, smoking rates were similar (10%) for boys and girls whose home language was English, Afrikaans and Xhosa, the only exception being Xhosa-speaking girls where the percentage was 5%.¹³

Additional prevalence studies have been reported from selected community groups such as hostel dwellers in the Western Cape¹⁴ and among health professionals.^{15,16} The latest study being among Environmental Health Officers (EHOs). The smoking rates among male EHOs was 27% and among female EHOs 17%.¹⁶ An earlier study among Durban anaesthetists, yielded evidence of a decline in smoking from 58% to 19% by 1986.¹⁵ No national or recent studies of smoking prevalence among doctors or nurses have been completed.

Determinants

Of particular importance to the design of interventions, is a need to identify determinants of tobacco use that are amenable to intervention. Recent South African studies among adults have indicated that urbanisation^{5,10} (spending greater than 6 years in an urban area); increasing income among Africans; and unemployment among coloureds⁷ are all associated with increased smoking rates. In the Free State study, the percentage of African men who smoked > 10 cigarettes per day in Mangaung (peri-urban) was double the QwaQwa (rural) figure at all ages.¹⁰

Biological factors that correlate with smoking, have also been identified and include increased total cholesterol, decreased body mass index, presence of a coronary type-A personality and increased alcohol consumption.⁹

A multivariate analysis carried out by Steenekamp indicated that among men, sports participation;

knowledge of the links between lung cancer and ill health effects and the smoking behaviour of siblings were all strong determinants of an individual's likelihood of smoking.¹⁷ In contrast, the smoking behaviour of mothers, boyfriends and/or husbands was a strong determinant of women's smoking status.¹⁷

Few studies of determinants have been carried out among children. A study of African schoolchildren in the Western Cape showed that boys were more likely to smoke than girls and that smoking rates increased rapidly with age.¹² Peer pressure and poor health knowledge were the only identifiable factors associated with an increased likelihood of smoking. Among university students academic stress, peer pressure and the desire for social conformity appear to be important factors.¹⁸

Research/surveillance needs

There is currently no routine surveillance of tobacco use among adults or children by the Department of Health. This information is crucial in order to monitor the success of currently planned and likely future interventions to reduce the impact of tobacco.

Studies of smoking prevalence and attitudes towards tobacco-control measures (as measured in EHOs) in all health professionals are crucial because of the special role they play in directly and indirectly influencing the smoking behaviour of patients and the community at large.¹⁹ Qualitative determinants of smoking and of maintaining non-smoking behaviour (particularly among African women) are required. Val Hooper (UCT Graduate School of Business) is currently involved in such a study that hopes to identify factors that influence African women's smoking behaviour. Preliminary results were recently presented at the 9th World Conference on Tobacco or Health in Paris (October 1994). Further, more detailed information with regard to the age of initiation; the intention to and success of quitting and the relationship between brand use and predominant advertising/promotional trends, particularly among children are needed to focus and target future tobacco-control initiatives.

The relationship between income, education, urbanisation and tobacco use is complex and needs assessment if we are to predict the impact of future excise tax increases on consumption patterns. (In the 1994/5 financial year, excise tax increased by 25%; a further 25% is expected for 1995/6). Fig. 1 indicates a much simplified relationship that exists between tobacco consumption, social class and race in South Africa.²⁰ At the lowest level of social class, consumption remains low; increasing rapidly with increases in indicators of social class until a level is reached beyond which further increases in social class are associated with declines in consumption. Because of a close association between social class and race, the bulk of the African population shows a direct relationship between social class and tobacco consumption while the opposite is true with regard to white and Asian populations. The challenge of tobacco control strategies is to prevent increases (see economic impacts below).

IMPACT OF TOBACCO

Health impacts

Over thirty years ago, Oettlé commented in the South African Medical Journal with regard to tobacco control that "there is no need for more research."²¹ The association (between tobacco use and health effects) has been proved over thirty years ago and in so many separate investigations"! South African studies since then have quantified the proportion of all deaths due to smoking-related causes.³ By 1988, about one third of all deaths among whites; 20% among Asians; 15% among coloureds and 5% of African deaths were due to smoking-related causes. These causes include mainly lung cancer, ischaemic heart disease, chronic obstructive airways disease, lung cancer and aortic aneurysm. Overall, it was estimated that approximately 25 000 deaths in 1988 were related to tobacco use.³

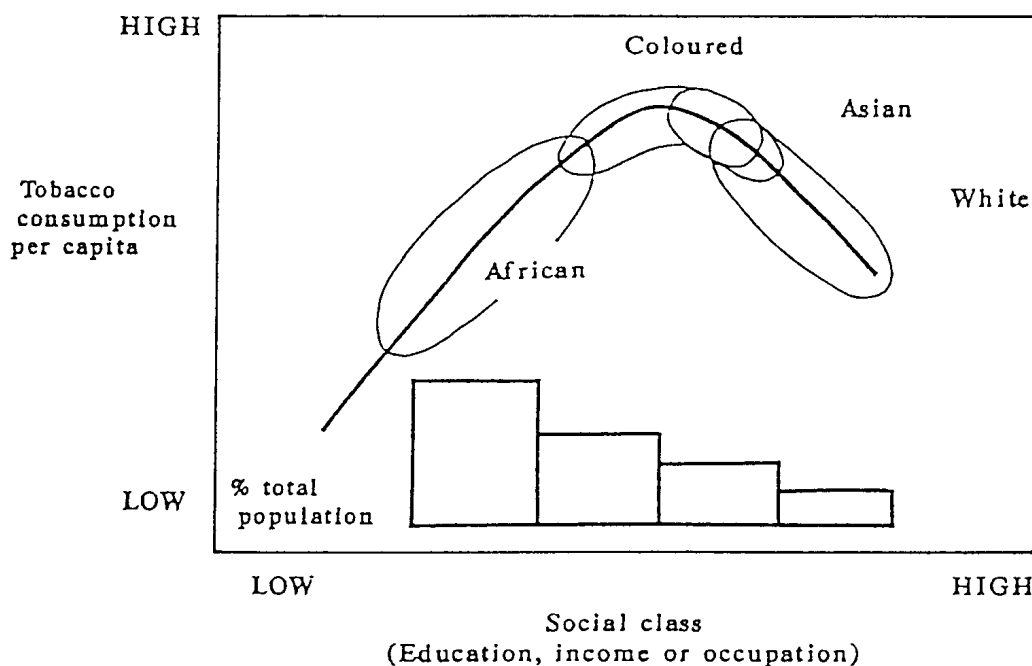


Figure 1. Relationship between tobacco consumption, race and social class

Recent studies by Ehrlich and Bourne have indicated how lung cancer and chronic obstructive airways disease death rates have increased sharply among the coloured population of the Western Cape.²² For example, between 1968 and 1988 there has been an almost 300% increase in the age-adjusted lung cancer death rates among coloured women; with a 100% increase being reported among coloured men and white women.²² Trend data for the African population is not available. However, it appears that lung cancer death rates have started to increase in urban areas, with already over 1000 lung cancer deaths being reported among Africans by 1988.³

Research/surveillance needs

Given the magnitude of the problem and the preventability of the bulk of this burden of disease, there is a crucial need for a routine surveillance system to be put in place to monitor the health effects of tobacco in terms of major causes (such an initiative could start by strengthening the SAIMR's Cancer registry). Considerable effort is given to surveillance for a range of infectious diseases which now have less of an impact on the total burden of disease in South Africa than tobacco.

It should be noted that there is a 20 - 25-year lag phase between an increase in smoking and an increase in tobacco-related deaths. Thus, smoking rates among African men in the late 1980s can be expected to translate into lung cancer and smoking-related causes of death early in the next century. Already among coloured men and women, both smoking rates and smoking-related death rates, are extremely high. The implications of this are that future changes in smoking are unlikely to significantly influence the cause of death profiles that could be predicted now for early in the next century. Large declines in consumption among current smokers and a slowdown in the rate of new smoking, would have an impact beyond 2010.

Analytic studies

Many analytic studies, particularly based in the mining industry, have quantified the association between tobacco use and ill-health. For example, Hnizdo showed that the effect of smoking one packet of cigarettes a day for thirty years, was associated with an estimated loss of 552ml of FEV₁ and 335ml of FEC; among white South African gold miners.²³ It is clear that tobacco consumption would have a significant impact on improving lung function and reducing premature deaths in miners.²³⁻²⁶ Further, several studies showed that tobacco smoking was found to potentiate the effect of dust on respiratory impairment, particularly in relation to chronic obstructive lung disease. Overall, among the studies that have investigated the relationship between silica dust exposure and tobacco smoking on respiratory impairments, heart disease,²⁷ lung cancer²⁸ and total mortality,²⁷ it is clear that tobacco use currently constitutes one of the greatest individual preventable cause of ill-health in South African miners. It is somewhat surprising that this information has not been used as a basis for comprehensive tobacco control programmes within the mining industry. Doing so would, in all likelihood, have resulted in significant savings in terms of premature mortality. The Epidemiological Research Unit (of the Medical Bureau for Occupational Diseases) is currently integrating the evidence of tobacco's overall impact on the health of miners. This information will be applicable to other worker groups in South Africa (B. Williams, personal communication, 1995).

Few analytic studies have been completed outside of the mining industry. However, a case control study of lung cancer determinants is under way at Medunsa (Dr O. Mzeleni, personal communication, 1994) and a study is being considered at Baragwanath Hospital (Dr F. Sitas, personal communication, 1994).

Effects of passive smoking

Internationally, there is growing recognition of the need to focus on the effects of passive smoking and environmental tobacco smoke. Rothberg showed that pregnant Johannesburg mothers who smoked had babies with birthweight deficits of 150 - 250g.²⁹ This finding has been confirmed in Eldorado Park babies enrolled in the Birth-to-Ten Study;³⁰ and in studies of determinants of low birthweight among Bishop Lavis (Cape Town coloured population) carried out by the MRC's Nutrition Intervention Research Programme (Dr S. Benadé, personal communication, 1994). Cotinine levels in pregnant African women in the Western Cape were recently used to validate their smoking status.^{31,32} Exposure to tobacco smoke by children has now been shown in South African studies to be an important determinant of respiratory disease. Terblanche, *et al.* in the Vaal Triangle Study indicated that symptoms of acute respiratory infections were associated with parental smoking status;³³ and Ehrlich, *et al.* showed that childhood asthma in Mitchell's Plain was related to parental smoking and the number of smokers in the home.³⁴ These studies are coherent with international findings and indicate the need to consider parental smoking and smoking in pregnancy as high priority child health targets for intervention.

The Department of Health needs to seriously give attention to implementing a surveillance system for the health impact of tobacco.

Economic impact

The economic impact of tobacco use was estimated in 1980,³⁵ 1984³⁵ and 1988³. Lost productivity due to premature smoking-attributable death; lost productivity due to hospitalisation for diseases attributable to smoking; and direct costs of hospitalisation and outpatient visits for diseases attributable to smoking were all summed and compared to the 'benefits'. The studies clearly indicated that the cost-to-benefit ratio was in excess of 4:1. All economists do not agree about the best method of calculating the economic impact of tobacco and some of these results have been subject to considerable debate in the economic literature. For example, Reekie and Wang concluded that it is difficult to unambiguously decide that smoking imposes nett costs on society.³⁷ The authors question the assumption that diseases are caused by smoking (*sic*) and that the cost

of diseases are borne by society at large. Abedian and Dorrington, in criticising Reekie and Wang's work, call into question the validity of their results and found them inadequate as a foundation for policy-making.³⁸ In particular, Abedian and Dorrington were concerned that the results of Reekie and Wang's studies have provided the South African Tobacco Institute with "useful support for its cause".³⁸ This economic discourse is important, since it indicates that there are few economists carrying out research in the health sector, yet many of the future decisions with regard to tobacco control require considerable insight into the determinants of demand; the impact of price on consumption and the potential perverse effect that excise increases in price may have in driving smokers of branded cigarettes towards 'roll-your-own' brands. In the macro economic debate about financing health care, greater attention should be given to economic issues that relate to key determinants of health like tobacco.³⁹

Animal and laboratory evidence of impact

Several recent laboratory-based studies have provided *in vitro* support for evidence of the negative impact of smoking. For example, Van Jaarsveld showed that exposure of rats to limited periods of cigarette smoke resulted in more severe myocardial damage when their hearts were subjected to myocardial ischaemia/reperfusion.⁴⁰ Of interest from a potential interventional point of view was that supplementation with anti-oxidant vitamins had a beneficial effect on the excessive myocardial ischaemic/reperfusion injury of smoke-exposed rats. The implications of this finding for human health, however, are still unclear.

Schwalb showed that cigarette smoking primes phagocytes to generate increased amounts of carcinogenic compounds. Thus, animal and laboratory-based studies provide some insights into the mechanism by which tobacco use results in myocardial ischaemia and in carcinogenesis.⁴¹ This complements earlier South African research by Albrecht.⁴²

Agricultural and environmental impact

In the mid-1980s researchers⁴³ became concerned about the agricultural and environmental effects of tobacco growing. These effects have recently been extensively documented in Uganda, Tanzania and Kenya.⁴⁴⁻⁴⁶ Similar studies have yet to be carried out in South Africa. These recent African studies indicate that environmental effects include deforestation (because of the flue-curing of several forms of tobacco); increased pesticide use that constitutes both an environmental threat and a threat to tobacco workers; and potentially negative impacts on food security in countries particularly vulnerable to drought. Further research is required by the agricultural sector to investigate these issues. Instead, however, the Agricultural Research Council continues to use government funds to focus on finding higher yield for tobacco plants.¹ This policy is not coherent with government policy which supports efforts aimed at reducing tobacco consumption.

INTERVENTION RESEARCH

Community-based research studies

Researchers in South Africa have started to carry out interventional research that could form the basis for future policy development. The most extensive community-based intervention study for coronary risk factors was carried out in a rural area of the South Western Cape.⁴⁷ The intervention programme among white men in the high intensity intervention area resulted in a reduction of 8,4% in smoking rates and 13% in the amount smoked per day. Among white women there was a reduction of 30,6% in smoking rates and 20,5% in the amount smoked.⁴⁷ The study proved that a community-based intervention programme can effectively reduce smoking. Importantly, after the initial four-year period, smoking rates continue to slowly decline with the control community rates starting to approach that of the high intensity intervention community. This indicated a strong secular effect that could be regarded as a successful policy outcome of the project. Adaptation of such community-based approaches to other communities should be undertaken as a matter of

urgency.

School programmes

School-based intervention programmes have been tested in African schools. In a feasibility study, dedicated to the enhancement of children's health through the use of promoting children's beliefs in themselves regarding their ability to perform health-enhancing actions particularly related to tobacco control, the evaluation of the programme led to a recommendation that the Department of Education consider incorporating the programme into the formal school curricula.⁴⁸ This recommendation has yet to be implemented. Further research is urgently required to identify the best components required for a broad healthy lifestyle school curriculum; the timing of the various components of the curriculum; the need to adapt the curriculum to a particular cultural/language/social class setting and the implications for training teachers in health promotion.

Research to strengthen fiscal and legislative approaches

Recent research publications have identified the need for further work on excise tax as a critical component of health promotion.⁴⁹ Further, the impact of the new legislation aimed at reducing tobacco consumption is currently the subject of research (Tobacco Products Control Act).⁵⁰ Yach warned against voluntary agreements with the tobacco industry with respect to advertising - they were also violated.⁵¹

The impact of warnings to be placed on tobacco adverts will be investigated; the success and problems of implementing a ban on sales of cigarettes to children under the age of 16 are under way in Gauteng. In that study, Environmental Health Officers evaluated the extent to which shop owners are aware of the ban.

The 1995 MRC/Johannesburg survey found, in a survey of 200 retail outlets in the greater Johannesburg metropolitan area, that 9 out of 10 children between the ages of 10 and 12 years were able to buy cigarettes (either singles or in packs). Importantly, suburbs sampled included the diversity of suburbs in the metropole; and retail outlets included cafés, supermarkets, spazas and hawkers. There was little variation in the ability of children to buy cigarettes by suburb or by the type of retail outlet. Model approaches to prevent sales to children are being developed in the Greater Johannesburg area and will include messages in the mass media, backed by Environmental Health Officers retailer education programmes.

Research has already shown the current level of dependency on tobacco advertising experienced by selected media.^{52,53} Further research is under way to determine how the new legislation affects the proportion of above-the-line marketing for tobacco products. Early indications are that the tobacco industry is moving sharply towards investing in sports,⁵⁴ cultural and arts promotions as well as support for science and technology as alternative means of marketing their products. This certainly requires research-based information to ensure that the planned warnings on tobacco adverts do not have less of an impact than expected. Further, the possibility that health warnings would unleash extensive difficulty to control forms of tobacco promotion is already evident.⁵⁴

Quitting programmes

Despite the overall impact that the medical and nursing professions could play in contributing to reducing tobacco consumption by smokers, few research projects have addressed the need to design and implement quitting programmes that work in specific settings in South Africa. The need for such programmes was identified some years ago by the then *South African Medical Journal* editor, Dr S.S.B. Gilder.⁵⁵ Researchers in the Western Cape (K. Steyn, personal communication, 1994) and in the Eastern Cape (F. Maleka, personal communication, 1994) however, are trying to ensure that quitting and assistance with tobacco control become incorporated into the work of general practitioners and, most importantly, into the public health clinics, run at district and

community level. There is an urgent need for research to determine the most effective format and timing of interventions to be run within the health service environment of busy, turbulent urban, peri-urban and rural clinics.

POLICY DEVELOPMENT

The relationship between research-based data relating to smoking prevalence and determinants; the health impacts of tobacco and the success of pilot/community-based interventions; and ultimate policy development at national, provincial or local level has not to date been the subject of substantive research. Further, with the exception of one study,⁴ attitudes of adults on a national basis towards tobacco-control measures have been inadequately studied. In the 1992 study of a representative sample of adult South Africans, it became clear that the public supports the introduction of measures finally promulgated in the Tobacco Products Control Act and would even support more extensive legislation to control tobacco consumption.⁴ Such information was used in Parliament to justify and motivate for the legislation to be promulgated.⁵⁶ In early 1995, components of the 1992 study were reported by the MRC/HSRC. The survey indicated that 61% of adults support a total ban on tobacco advertising on radio (69% of non-smokers and 46% of smokers); 78% of adults support local health departments/ authorities regulating smoking in public places (83% of non-smokers and 70% of smokers); over half of all adults (53%) believe government should support farmers to replace tobacco with other crops; and finally, while 19% of adults supported increases in general sales tax and 30% increases in excise tax on tobacco; half (50%) would support an increase in tobacco excise tax if the money was used for health. With the government looking for extra revenue to finance health promotion and primary health care, information that earmarked use of excise tobacco tax has public support should be seen as an opportunity to act.

Work by an HSRC team with MRC support, will draw upon political science research in an attempt to identify who the real gatekeepers are to policy development and to the implementation of a comprehensive approach to tobacco control. This research takes an intersectoral approach at national and provincial level to obtain the opinions and beliefs of key decision makers particularly in the ministries of education, agricultural, finance, sport and broadcasting, in addition to health. This research will inform the process of implementation by helping to identify how tobacco industry counter-attempts are succeeding. The research is by definition action-orientated and fraught with methodological and ethical dilemmas.

This policy research is being supported by legal research which extends previous work on applying international legislation to South Africa.⁵⁷ The current work focuses on the implications of several clauses in the constitution and the Bill of Rights for tobacco control. Public health law is poorly developed in South Africa. Research in this area is therefore virtually unknown. Legal research under way also aims to ensure that national and provincial health acts include several aspects of tobacco control (S. Harrison, personal communication, 1995).

Further, researchers need to engage, to a far greater, extent the multiplicity of non-governmental organisations active in the health area who may be willing to carry out pilot projects at community level and to lobby for healthy public policy in the arena of tobacco control.

Finally, insufficient research has involved the media. There is growing recognition that media play a key role in determining the public's agenda which in turn can impact on the broad policy agenda at various levels of government.⁵⁸ Researchers with mass communication and media knowledge are crucially needed to facilitate greater effective use of the media for tobacco control.

CONCLUSIONS

In 1989, we identified a number of research priorities for tobacco control.¹ Since then, the political environment has significantly changed in favour of broad-based approaches to tobacco control. For example, both the original RDP document and the ANC Health Plan gave strong support to the need for tobacco control. This has resulted in fairly large increases in tobacco excise tax; promulgation of legislation that bans sales to children under 16 years; requires warnings on cigarette packets and on tobacco advertisements; and, creates enabling legislation for local authorities to ban smoking in public places. The pronouncements by the President and the Minister of Health on the harmful effects of tobacco have given further political support to tobacco control.

Gaps in research still remain but many identified in the 1989 article have been filled. Substantial progress has been made in carrying out prevalence studies; studies on the health (direct and passive) effects; on the economic impact of tobacco; and on toxicological aspects of tobacco. Limited progress has been made on the determinants of smoking and on policy issues of relevance to tobacco control. Surveillance for tobacco use and its effects still needs to be implemented by the Department of Health. Qualitative research on determinants of smoking (particularly in children and women) and of quitting; and a range of interventive research topics (including political science research) also need priority attention.

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