

REVIEW

Smoking-Related Research in the Asian-Pacific Countries

Malcolm A Moore, Hiroyuki Tsuda

Abstract

In addition to the obvious link between tobacco consumption and cancer of the lung and oral cavity, there is increasing evidence that carcinogens in smoke may also have an impact in many other organ sites. The potential damage of second hand smoke, especially to children, also requires stress. While studies of gene polymorphisms for enzymes involved in carcinogen metabolism have pointed to a genetic background to smoking likelihood and clearly increased risk of cancer development in many organs for smokers with decreased detoxification potential, the question of how to make best use of this information for practical prevention remains largely unexplored. Similarly, the fact of peer group and family influence in determining initiation of adolescent smoking has yet to be translated into a concrete strategy based on psychological understanding. Cessation programs for adult smokers on the other hand could make use of positive results from interventions in hospital settings, possibly married to screening programs for early cancers. Political and socioeconomic questions are clearly very important and putting into action principles of tobacco control efforts with collaboration between all of the interested parties must now be stressed. Government can play a very positive role by control of sales and marketing, heavy taxation and smoking bans, and provision of funding for research and community interventions, while education and awareness are natural targets of NGOs. The academic research community can perhaps best contribute by further clarifying mechanisms underlying tobacco-related disease, possibly with an emphasis on chemoprevention in association with epidemiological assessment of confounding factors, and also very importantly the psychosociology of the tobacco habit.

Key Words: Tobacco-related disease - prevalence - interventions - government action - research themes

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The Link Between Smoking and Cancer

International Correlation with Disease in the Asian Pacific

Comparison of WHO data for smoking in different countries of the Asian Pacific and their incidence rates gives a clear pointer to the importance of smoking, and particularly the numbers of cigarettes consumed, in terms of lung cancer (Mochizuki-Kobayashi and Moore, 2000). Thus a very good correlation is observed with cigarettes/male smoker over 15 ($r=0.56$ $p<0.005$). This has generally been confirmed by studies performed in individual countries in the region, which have also pointed to links with between tobacco consumption and cancer in other organ sites (see Table 1).

Western Asia

Turkey. Both laryngeal and lung cancer show significant associations with smoking (Dosemeci et al., 1997). Among the male patients, squamous cell carcinoma was the most common tumor type seen in the current smoker group (Gursel et al., 1998).

Southern Asia

India. At present lung cancer ranks among the top three killers in men in almost every metropolis. The highest incidence rate has been recorded in Bombay (14.6/100,000) and the lowest in Barshi (2.0/100,000). How much of these can be attributed to smoking cannot be commented on as no case-control or cohort studies have ever been undertaken in India (Pandey et al., 1999). However, smoking (cigarettes or bidis) was found to be the principle risk factor for causation of lung cancer among men in Chandigarh, several other risk factors besides smoking being active in women (Gupta et al., 2001). Gajalakshmi and Peto (2000) found significant increase in risk of mortality from all cancers, especially lung and larynx, and pulmonary tuberculosis in Tamil Nadu/Bhopal data provide strong evidence that smoking bidis is even more hazardous than cigarette smoking for the development of lung and oropharyngeal cancer (Dikshit and Kanhere 2000). Exposure to ETS during childhood is strongly associated with lung cancer in Chandigarh, India (Rapiti et al., 1999).

Table 1. Non-lung Organ Targets of Tobacco

Organ	Reference (Country)
Mouth/Pharynx	Bhurgri et al., 2000 (Pakistan)
Oesophagus	Gao et al., 1994 (China)
	Evstifeeva and Zaridze, 1992 (Uzbekistan)
Stomach	Ji et al., 1996 (China)
	Kikuchi et al., 2002 (Japan)
Rectum	Ji et al., 2002 (China)
Liver	Mizoue et al., 2000 (Japan)
Pancreas	Ji et al., 1995 (China)
Ovary	Green et al., 2001 (Australia)
Urinary Bladder	Hashmi et al., 1995 (India)
	Gumus et al., 1999 (Turkey)

Among men, 35% of oral cancer is attributable to the combination of smoking and alcohol drinking and 49% to pan-tobacco chewing, while in women, chewing and poor oral hygiene can explain 95% of cases. (Balaram et al., 2002). In Assam, of the different combinations of ingredients that were chewed the adjusted odds ratios were highest for those who had been using fermented betel nut with any form of tobacco (Phukan et al., 2001). There is much scope for targeting dietary factors in preventing oral cancer, coupled with aggressive anti-tobacco use efforts. (Hebert et al., 2002). High values of estimates of attributable risk percent (ARP) and population attributable risk percent (PARP) confirmed the positive impact of reduction or elimination of the tobacco consumption practices on reducing the risk of oro-pharyngeal cancer in the population of Central India. (Wasnik et al., 1998). Nasopharyngeal carcinoma appears to be a special case, not associated with exposure to a smoky atmosphere, betel-nut chewing, use of smokeless tobacco products, smoking or drinking habits, but rather to consumption of smoked meat (Chelleng et al., 2000).

Pakistan. Tobacco smoking is estimated to be responsible for 40% of cancers in males and tobacco chewing for a further substantial proportion of head and neck cancers. (Bhurgri et al., 2000).

Central Asia

Uzbekistan. Nass use and cigarette smoking are independent risk factors for oral leukoplakia, and esophageal lesions (Evstifeeva and Zaridze, 1992).

Northern Asia

China. In a retrospective proportional mortality study of both sexes, the lung cancer rates at ages 35-69 were about three times as great in smokers as in non-smokers. Among the study subjects of Yuan et al. (1996), 36% of all cases of cancer and 21% of all deaths could be attributed to cigarette smoking. Tobacco caused about 0.6 million Chinese deaths in 1990 (0.5 million men) (Liu et al., 1998), essentially in line with an earlier report (Lam et al., 1997). Findings were published for Taiwan by Liaw and Chen (1998), who documented increased risk for many cancers as well as

cerebrovascular disease. Peto and Lopez (2000) presented very graphic data, especially for the alarming extent of increase in cigarette smoking in China and the impact that this will eventually have on the male population in this country. They estimated that fully 50% of persistent cigarette smokers will eventually die because of the habit, a quarter in middle age. Smoking is a major cause of death in older Chinese and quitting can save lives. Early recognition of the significance of chronic obstructive pulmonary disease symptoms followed by prompt quitting (excess risk reduction of 56%) should be emphasized in the control of the growing tobacco epidemic (Lam et al., 2002).

In non-smoking mothers, paternal preconception smoking was related to a significantly elevated risk of childhood cancers, particularly acute leukemia and lymphoma (Ji et al., 1997). Environmental tobacco smoke (ETS) findings of tone study in Shanghai showed that long-term occupational exposure, both alone or in combination with exposures at home, conferred an increased risk of lung cancer among women who never smoked (Zhong et al., 1999).

In the esophagus, the studies of Ji et al (1994) and Gao et al (1994) confirmed that smoking and drinking are important risk factors for esophageal cancer in China, thereby paralleling findings from developed countries.

Korea. Smoking was found to be a major independent risk factor for lung cancer, increasing with an increased amount, longer duration, and younger starting age (Kim et al., 2001). The incidence of lung cancer is also elevated among non-smoking women whose husbands smoke, and a dose-response relationship seems to exist, with a positive association with breast cancer (Jee et al., 1999).

Japan. Twenty-two percent of mortality from all causes, 25% of all cancers, and 17% of all circulatory system disease deaths, could be attributed to cigarette smoking in males, and 5%, 4%, and 11% in females, respectively (Hara et al., 2002). Change over time in the lung cancer death rate of males and females in Japan can be explained fairly well by the increase in cumulative cigarette consumption at the national level (Yamaguchi et al., 2000). Stopping smoking earlier in life appears preferable to keep the individual risk low. The absolute rate, however, was found to substantially decrease after smoking cessation even in those who quit at ages 60 - 69, reflecting the high mortality rate among continuing smokers in the elderly (Wakai et al., 2001). For men and women, respectively, when divided by histologic type, relative risk for squamous cell carcinoma and small cell carcinoma was 12.7 and 17.5, while for adenocarcinoma it was 2.8 and 2.0 for men and women, respectively (Sobue et al., 2002). Lung cancer risk in men rises with increasing cigarette smoking, especially the duration of smoking among current smokers and decreases after the cessation of smoking among former smokers.

Prospective study results indicate that smoking is a risk factor for liver and stomach cancer in a population with a

high background risk for these cancers (Mizoue et al., 2000). Men who smoked more than 40 cigarettes per day also had a substantially higher risk of pancreatic cancer, with a RR of 3.3, a significantly decreasing trend in risk being observed with increasing years after smoking cessation (Lin et al., 2002).

In a prospective study, age-adjusted relative risks (RR) and 95% confidence intervals (CI) of smoking-related cancers and lung cancer for women who had smoking husbands, compared with women whose husbands did not smoke, were 1.7 and 1.9, respectively, although a significant inverse association was observed for breast cancer, the RR being 0.58 (Nishino et al., 2001).

Australasia and the Pacific

Australia. Blizzard and Dwyer (2002) recently reported that the switch to filter-tip cigarettes prior to any reduction in tar yields was associated with reduced incidence of SCCs and of AC in men only, other factors appearing to play a role in women.

Complicating Factors

With regard to the general burden on societies posed by tobacco consumption, however, there seems to be little doubt that tobacco smoke and the included carcinogens are responsible for a large proportion of cancers in very many body sites, as much as one in seven as estimated by Parkin et al (1994). It should be remembered, however, that trends in cigarette consumption cannot fully explain variation in lung cancer rates and there are a number of other related factors which might be of great importance (Lee and Forey, 1998). There appear to be cultural factors and a multiple logistic regression analysis adjusting for pack-years of smoking, occupation, education, and age revealed that Hawaiian, Filipino, and Caucasian male smokers were at 121%, 53%, and 46% greater risk for lung cancer than Japanese male smokers (Le Marchand et al., 1992). It must be taken into account that there is variation between squamous cell carcinomas and adenocarcinomas in terms of smoking as a risk factor (Moore et al., 1999). However, in this context it is important to realise that passive smoking may also be a factor in adenocarcinoma of the lung, which appears to be on the rise, particularly in non-smoking females (Jee et al., 1999; Boffetta et al., 1999), although not all the published data are in line with increased risk (Wang and Zhou, 1997).

Non-carcinogen factors which might be important with smoking include other respiratory disease, itself linked to lung cancer (Nakachi et al., 1999). One study in China also provided evidence that previous pulmonary tuberculosis and chronic bronchitis/emphysema are causally related to lung cancer, with similar tendencies apparent for asthma and pneumonia (Brenner et al., 2001). While smoking appeared more important than occupational exposure in Guangzhou, (Ho et al., 2002). However, other results suggested that risks were increased for all occupations in which there was exposure to dusts, with the highest risks seen among coke

oven workers (OR = 3.5) and fire-resistant brick makers (OR = 2.9). A significant dose-response pattern was found for cumulative total dust, cumulative total B(a)P and lung cancer risk and it was concluded that smoking and environmental pollution combine to account for elevated rates of lung cancer in cities of northeastern China (Xu et al., 1996). In Korea, hypertension is not an independent risk factor in lung cancer-related deaths, but it increases the likelihood of lung cancer death among current smokers (Lee et al., 2002).

The other major influence is clearly the diet and high prediagnostic serum levels of total carotenoids and beta-cryptoxanthin were associated with lower smoking-related lung cancer risk in middle-aged and older men in Shanghai, China (Yuan et al., 2001). Both smoking prevalence and average fat intake, especially saturated fat, may play a role in the cross-cultural variation in lung-cancer mortality, either independently or by effect modification (Mulder et al., 2000). In Japan, vegetables and fruits rich in antioxidative and carcinogenic agents have been found to reduce the risk of lung cancer deaths among male smokers with results for female nonsmokers partially consistent with the hypothesis that high fat consumption increases the risk of lung cancer, especially that of adenocarcinoma (Ozasa et al., 2001). Turkish data also suggest that high cancer risk associated with smoking may be compounded by somewhat lower intake of foods which are thought to be cancer protective (Beser et al., 1995). Thus dietary improvement or supplementation with antioxidants or anti-inflammatory drugs, might be recommended for smokers (see Table 2 for risk factors with smoking and possible countermeasures). Without a deep awareness of the detailed mechanisms whereby tobacco smoke exerts its detrimental effects, however, and an understanding of how exogenous factors may impact there is little hope of chemoprevention for the very high risk smoking population, as evidenced by the failure of the Finnish and US studies of beta-carotene, where enhancement was the initially unexpected outcome (Omenn et al., 1996).

Carcinogen Dose Dependence, Mechanistic Aspects and Genetic Background

Dose Dependence. From a purely toxicological pathology viewpoint it would be expected that dose of carcinogen intaken is an important consideration with the ill effects of smoking so that, while total cessation is clearly the optimal solution, any measures that act to bring about a reduction in the number of cigarettes smoked is to be vigorously welcomed. Cigarette years of exposure, for example, was shown to be important for colon adenomas by Hoshiyama et al (2000). Dose dependence, this time regarding passive smoking and breast cancer risk was also found for Chinese female non-smokers by Liu et al (2000).

Mechanisms. In rat lung tissue, after exposure to smoke the terminal bronchioles become infiltrated with lymphocytes in the peribronchiolar region and a mild to

Table 2. Components of Tobacco Smoke

Factor	Action	Counter-measures?
Carcinogens	DNA Damage Oxidation	Antioxidants
Particles	Irritation	Anti-inflammatory Drugs
Unknown?	Lipid metabolism	Physical Exercise
Nicotene	Dependence	Pharmacological Drugs

moderate degree of emphysema occurs in the alveolar spaces. The terminal bronchioles also show marked lipid peroxidation, dilatation, and peribronchiolar fibrosis, with expression of iNOS, NF-kappa B, MAPKs (MEK1, ERK2), phosphotyrosine protein and c-fos (Chang et al., 2001). This evidence suggests that exposure to cigarette smoke results in oxidant stress which leads to the stimulation of iNOS and c-fos together with the induction of protein tyrosine phosphorylation and MEK1/ERK2 which in turn may promote lung pathogenesis (Chang et al., 2001).

In hamsters, initiation with DEN followed by promotion with tobacco smoke, beta-carotene reduced preneoplastic and neoplastic lesions in a dose-dependent manner (Furukawa et al., 1999). Environmental tobacco smoke (ETS) exposure clearly can increase combined malignant and benign lung tumors in multiple experiments involving male and female A/J mice, and thus provide convincing evidence that ETS is a positive mouse carcinogen ETS does not promote growth of spontaneous neoplastic foci in A/J mice, and that ETS-induced lung-tumor risk in A/J mice occurs predominantly by genotoxic effects that can be suppressed by reduced cell proliferation associated with chronic, high-level ETS exposure. (Bogen and Witschi, 2002). This points to the necessity for further research in animal models to dissect the processes underlying smoking-related disease.

Regarding the physiological effects of smoking, one paper by Birmingham et al (1999) deserves mention, documenting a markedly detrimental effect on lipid risk factors for cardiovascular risk factors in Vietnamese refugees in Australia. Thus a number of pharmaceutical interventions could be considered in order to reduce the detrimental effects of tobacco smoke, dependent on a detailed understanding of the mechanisms involved. This is an area deserving more stress, given the difficulty of persuading people to quit the habit (see Table 2).

Genetic Background. An important aside to the carcinogen dose-dependence is the question of relative risk alteration due to the genetic background. At the individual level the importance of polymorphisms in drug metabolizing enzymes has for example investigated by Kiyohara et al (2000), their findings generally echoing the literature in indicating a role for a decreased ability to detoxify carcinogens in tobacco smoke in enhancing risk. This is usually not the case for carriers of the same polymorphisms in non-smokers,

providing convincing evidence that the degree of carcinogen exposure is of essential significance, a conclusion supported by the findings of a series of investigations reported by Hamajima et al. (2001). Genetic factors also operate with reference to the propensity for both initiation and persistence of smoking at the individual level (Madden et al., 1999). Hamajima et al (2001; 2002) have pointed to an importance for polymorphisms affecting the interleukin and dopamine expression, although the magnitude of the effect may depend on the cultural background (Uno et al., 2002).

The Scope of the Problem

Awareness and Socioeconomic Aspects

Predisposing and Confounding Factors

Clearly many factors may predispose individuals to take up or reject the smoking habit. In many cases, there are also complicating associations with other lifestyle behaviour which could impact on tumour development. The interplay between different factors could be complex and dependent on the organ, as suggested by the differences found by McCredie et al (2000) between Maori and Non-Maori New Zealanders, with very much higher rates for lung and upper digestive tract cancers in the former, but lower values for urinary bladder tumours. However, review of the literature for different countries in the Asian Pacific indicates that many basic similarities may exist across cultures (Table 3).

Western Asia

Turkey In youths, a smoking-related attitude, presence of a stepmother, father's use of alcohol, a sister and/or brother who smoke, own alcohol use, and participation in art activities are all associated with taking up the habit (Ozcan and Ozcan, 2002). Almost 20% of female adolescents smoke cigarettes (Vicdan et al., 1996) and the prevalence of smoking among university students is 42.5% (being highest among the students of the Faculty of Arts and lowest among the students of the Medical Faculty (60.9% vs 33.9%) (Metintas et al., 1998). Only a small minority of smoking physicians appear to be involved in smoking counselling and the necessity for better education through from undergraduate to practising doctor, with reimbursement for cessation programs has been emphasised (Esen et al., 1999).

Israel. Among adolescents, the lowest prevalence of smoking was found among Arab female students and the highest among their Jewish counterparts (9% vs. 41%, P < 0.001). However, the prevalence of smoking among Jewish and Arab males is similar (Meijer et al., 2001). In Israel smoking is associated with other adverse health behaviors, like consuming more meat and high-fat dairy products (Shahar et al., 1999). In the Jewish population, age adjusted incidence rates of squamous cell carcinomas are decreasing while those for adenocarcinomas are on the increase, as found in other western countries, whereas both are on the rise in the Arab population (Baron-Epel et al., 2001). This provides a pointer to important differences in lifestyle.

Table 3. Lifestyle Association and Influences

Factor	
High Fat Diet	Nakamura et al., 1996 (Japan) Shahar et al., 1999 (Israel) Hagoel et al., 2002 (Israel)
Alcohol Consumption	Kitagawa et al., 2000 (Japan) Lee et al., 2001 (Hong Kong)
Missing Meals	Kitagawa et al., 2000 (Japan)
Education Level	Smith et al., 1998 (Cambodia) Jarallah et al., 1999 (Saudi Arabia)
Parent/Brother/Friend Smoking	Smet et al., 1999 (Indonesia) Sen and Basu, 2000 (India) Naing and Ahmad, 2001 (Malaysia) Sperber et al., 2001 (Israel) Ozcan and Ozcan, 2002 (Turkey)
Art School Background	Ozcan and Ozcan, 2002 (Turkey)
Religious Status	Hameed et al., 2002 (Pakistan) Acik et al., 1998 (Turkey)
Psychological factors	Kim, 2001 (Korea)

Syria. The crude prevalence of current smoking among adults in Syria, based on combined information from all studies, is 48% and 9% for males and females, respectively, while rates among high school adolescents is 16% and 7% for boys and girls, respectively, this being strongly associated with parental and sibling smoking (Maziak, 2002). The smoking patterns of schoolteachers are of interest in this regard, 52.1% of males and 12.3% of females being current smokers. Daily smokers buying foreign brands spent 22.0% of their monthly income on cigarettes, while those smoking local brands spent 12.2%. Most teachers who smoke do so openly at school (Maziak et al., 2000).

Saudi Arabia. Education level is clearly a factor in Saudi Arabia, along with certain occupations (Jarallah et al., 1999). The Muslim religious profession may protect against smoking, better rates being reported for never-smoking and current smokers than other personnel (Acik et al., 2001).

United Arab Emirates. Of high school boys aged 15-19 years 19% were found to be current smokers and 28.2% admitted that they had smoked before but had now given up. Nearly two thirds wanted to give up and were generally aware that smoking is a risk factor for lung cancer, respiratory diseases, and ischaemic heart diseases (Bener and al-Ketbi, 1999).

Iran. Of medical students, 17% of males (Ahmadi et al., 2001b) and in the general adult population 26% of the men and 3.6% of women appear to be current smokers (Ahmadi et al., 2001a).

Southern Asia

India. Sen and Basu (2001) have provided data suggesting that most people starting smoking in the period from 14-18 years old, whether friends or close relatives smoke appearing to be the most important determinants of initiation. The adults in coastal Kerala have been found to have a habit

pattern of very high levels of tobacco and alcohol use. Pan-tobacco-chewing may be more prevalent than smoking, the habit pattern correlating negatively with education and positively with number of children per family (George et al., 1994). Among illiterate villagers, it was observed that the smoking rate was high (56%) and 47.7% were ignorant of health effects of smoking. However, the attitude of illiterate smokers was encouraging, as 83.6% were willing to quit smoking (Gavarasana et al., 1992).

Pakistan. Medical students incidence of smoking is greater among male students than females (17% versus 4%), most being in favour of legislative actions to discourage tobacco advertising (Hussain et al., 1995). In the general population the overall incidence of smoking is 21.6% (36% males and 9% females) (Alam, 1998), or in another study, 25% of males and 3.5% of females (Nasir and Rehan, 2001). Smoking is common in urban squatter settlements in Pakistan (Merchant et al., 1998), and also in a mountain community the prevalence of smoking was 40.5% for men and 6.3% for women (Shah et al., 2001). Based on a survey in Karachi, it was concluded that mass health education and enforcement of the ban on smoking in public places would effectively reduce the number of smokers. There is a need to educate physicians and the general public about the cardiac and carcinogenic effects of smoking (Memon and Memon, 1999). In air-conditioned coaches, it was found that 11.7% of passengers smoke during travel, and 59.3% of staff members were smokers, so that the Ministry of Health should disseminate educational messages regarding hazards of passive smoking among commuters of AC coaches and above all proper implementation of legislation for smoking at public places especially in transport (Mal et al., 2001). In Multan, most smokers do not hesitate to smoke in public places, but very few smoke during fasting of Holy Ramadan (Jaleel et al., 2002). The religious status correlates with the smoking habit (Hameed et al., 2002)

South-East Asia

Malaysia. Encouragingly, medical students appear to be under increasing pressure from teachers not to smoke (Frisch et al., 1999). However, regarding the smoking habits of secondary school teachers in Kelantan, Malaysia, current smokers were found to account for as high as 40%, the mean initiation age being 16.5 years, significant association between smoking status of teachers and their fathers' and perception of the hazards of smoking on health, with peer influence the major reason for smoking (Naing and Ahmad, 2001). A cross-sectional survey of the Bajaus in Sabah State demonstrated 74.4% of the men to smoke, compared to 3.3% of the women, whereas 77% of women used smokeless tobacco compared to 4.3% of men. Local handrolled cigarettes called kirais appear popular while smokeless tobacco is an ingredient in the ritual of betel-quid chewing. Tobacco is thought to have medicinal effects, and habits can be easily maintained as they were cheap practices which are socially and culturally accepted (Gan, 1998).

Indonesia. In Semarang, smoking increases dramatically between the ages of 11 and 17, from 8.2% to 38.7%, smoking behaviour of best friends and older brothers being the most powerful determinant of smoking (Smet et al., 1999). The disinclination of women to smoke is commonly attributed to cultural values, which stigmatise women smokers as morally flawed, while at the same time sanctioning smoking by men, but this pressure is weakening now under the onslaught of Western cultural values (Barraclough, 1999).

Cambodia. While 65% of urban respondents and 86% of rural respondents smoke, with an inverse correlation with levels of education/income, the majority of those interviewed indicated they would attend a program in their area to stop smoking if such a program were available (Smith et al., 1998).

Central Asia

Siberia. In one study of youth 33% males smoked in 1999 (Denissova and Zavjalova, 2001) and in another, 21% of girls and 40% of boys aged 14-17 (Alexeeva and Alexeev, 2001).

Northern Asia

China. Chen et al (2001) found a rapid increase in smoking after 10 years of age, with a peak at 14-15 in males. Females generally started after 12 and demonstrated a much lower risk of smoking initiation. Current smoking continues to be prevalent among more men (63%) than women (3.8%), and only a minority of smokers recognize that lung cancer (36%) and heart disease (4%) can be caused by smoking (Yang et al., 1999). Of nonsmokers, 53.5% are exposed to environmental tobacco smoke at least 15 minutes per day on more than 1 day per week. The role of general awareness is highlighted by one large scale survey in China which showed 72% of current smokers to have no intention to quit, and with those that did quit it was usually because of illness (Yang et al., 2001). Participants with university education are more likely to have made an attempt to quit. The extent of the problem can be best realised by the finding of increased rates of smoking and decline of anti-smoking counselling among Chinese physicians in the period from 1987-1996 (Li et al., 1999). Comparison of tobacco use knowledge, attitude and practice among college students in China and the United States, American students scored higher in knowledge but lower on the attitude scale of the questionnaire. American respondents also were more likely to smoke cigarettes and use other tobacco products. Chinese students, on the other hand, had a higher rate of starting smoking at age 13 years or younger and were less likely to have tried to quit (Torabi et al., 2002).

Korea. Smoking was shown to be highly prevalent in men (57.4%) and uncommon in women (0.6%) in a medical insurance survey (Jee et al., 1998). Adolescents show a clear relationship between negative health behavior and psychological factors (Kim, 2001). The adolescent struggle

in choosing value priorities amid the opportunities and limitations of daily life highlights the problem (Kim et al., 1998).

Japan. In a recent survey, the age-adjusted proportion of current and former smokers was 54.8% and 21.8% in males and 8.3% and 2.1% in females, respectively, with mean ages at initiation of smoking of 20.6 and 27.8 years, respectively (Sobue et al., 2001). Attendance at a vocational high school is strongly associated with accumulation of health risk behaviors, cigarette smoking, alcohol use, and sexual intercourse clustered, presenting as a high risk group (Takakura et al., 2001). As shown by Kitagawa et al (2000), taking into account differences in lifestyle is very important for epidemiological research into the effects of smoking on disease incidence and severity. They found smokers to generally be more likely to miss meals and ignore questions of dietary balance, be regular consumers of alcohol, and relatively low intake of fruit and vegetables. Their participation in screening was also found to be lower than in the non-smoking group. Linkage of smoking with an unhealthy diet has been stressed earlier (Nakamura et al., 1996).

Kawakami (2000) conducted an investigation of medical school students and found that about 90% intended to perform smoking intervention in the future, but only one-third were actively interested. More than 70% of the respondents thought that doctors should carry out smoking cessation advice depending on the disease, while the rate of those who thought so irrespective of the disease did not reach 20%. Smokers thought less actively about smoking intervention than current nonsmokers.

Regarding education and preventive measures in schools, it was found to be advisable to show some photographs of cancer as well as talk about how smoking damages teeth, dentists being in the best position to provide this kind of education (Oda et al., 2002).

Australasia and the Pacific

Australia. The rise in the prevalence of smoking among younger secondary students seen in the 1990s now seems to have stopped and smoking prevalence has declined (Hillet et al., 2002). The odds of smoking for single mothers are 2.4 times greater than for married mothers (95% CI 2.0-2.9), requiring interventions that enhance the material conditions and social circumstances for this high risk group (Siahpush et al., 2002). In migrants, it has been found that the longer the Vietnamese immigrants have lived in Australia, the less likely they are to smoke cigarettes but the other side of coin is that there is an increase in fast-food consumption (Brock et al., 2001).

New Zealand. While evidence has emerged to support current smokers being slightly better informed regarding proven strategies for cessation than ex-smokers, few current smokers are aware of efficacious interventions for smoking cessation (de Zwart and Sellman, 2002).

Practical Smoking Non-Initiation/Cessation

General

From the above it is clear that in many societies smoking starts very early and therefore interventions to prevent initiation of the habit need to be conducted. One must bear in mind, however, the fact that messages from adults tend to be rejected or ignored by rebellious youth and therefore care must be given to underlying psychosocial factors. The importance of a smoking parent as a role model should also be stressed (Farkas et al., 1999). The general consensus is that a comprehensive approach using all opportunities to counteract pressures for smoking be adopted (John, 2002; Workshop convened by the Institute for Global Tobacco Control, Johns Hopkins Bloomberg School of Public Health, 2002).

Background and Physician Education

More stress on education of nurses and provision of incentives to undertake cessation activities is to be recommended (Nagle et al., 1999). In one worldwide survey of education on tobacco in medical schools, only a third were found to teach smoking cessation techniques while a specific tobacco module was included in only 11% (Richmond et al., 1998).

School-Based Intervention

There have been only very few studies so far conducted in the Asian Pacific area. In one in New Delhi, India, thirty schools were randomly assigned to 3 conditions: school-based and family-based intervention, school-based intervention only, or the control group. Students were in the seventh grade at pretest ($N = 4,776$) and the smoking intervention included posters, booklets, classroom activities, debates, and a signature campaign. The family intervention involved home activities. The survey measured tobacco knowledge, attitudes, offers, use, and intentions and intervention students were significantly less likely than controls to have been offered, received, experimented with, or have intentions to use tobacco (Reddy et al., 2002).

The Gatehouse Project in Australia is an innovative, comprehensive approach to mental health promotion in secondary schools and the initial results with 26 schools have demonstrated considerable success in reducing smoking rates among year 8 children (Bond et al., 2001). Capacity building in this context may encourage teachers, parents, and students to all view the core business of education differently.

Hospital Based Intervention

Encouraging people to quit in hospital, where most smokers do not expect or experience problems with not smoking, is an obvious high priority. Brief smoking cessation advice tailored to stage-of-change by a health worker in a hospital pre-admission clinic was found to significantly increased the quit rates for females (Rissel et al., 2000). Making use of opportunities to get across the anti-tobacco message in hospitals was the focus of Hamajima and Matsuo

(2000) and Ozasa et al.(2000), respectively, for first visit outpatients at a cancer hospital and patients undergoing the so-called human Dry Dock, or regular comprehensive checkup in Japan. The findings are very encouraging and Ozasa et al estimated that potential increase in smoking cessation could extend to an extra four percent of smoking male participants, or around 70,000 individuals a year. In the outpatient setting, those with cancer given a pen embossed with a message that tobacco is dangerous were found to be more likely to cease smoking and a similar trend was observed for non-cancer cases (Hamajima and Matsuo, 2000).

A self-administered survey was used to determine current rural nursing staff practices in relation to brief intervention for smoking cessation, and to ascertain the perceived level of support, skills, needs and barriers amongst these staff to conducting brief interventions. The major findings include that while the majority of respondents were aware of their patients' smoking status, most were not very confident about assisting smoking patients to quit (Gomm et al., 2002). A prospective audit of patients referred to an outpatient smoking cessation programme by hospital specialists or general practitioners. The programme consisted of fortnightly counselling sessions, with nicotine replacement therapy when clinically indicated. At 3 months the self-reported abstinence rate was 31%, falling to 19% by 12 months. (Wood-Baker, 2002). A comparison of the Stanford Heart Attack Staying Free (SF) programme and a Usual Care (UC) programme, carried out in Queensland, showed the former to be superior, although results were not as good as in the US (Feeley et al., 2001). Again in Queensland, 70 publicly funded hospitals were matched on numbers of births and maternal socioeconomic status and randomly allocated to an awareness-only or behaviorally based intervention groups. Success was defined as the routine offer of an evidence-based smoking cessation program to at least 80% of the pregnant clients who smoked. After 1 year, 43% of the intervention hospitals still provided the material, compared with 9% of the awareness-only hospitals. Thus a brief intervention encouraged antenatal staff to provide smoking cessation materials (Lowe et al., 2002).

Indeed, nurses can be very effective in cancer prevention efforts and may be generally in favour of active intervention, although they were found more likely to support restriction of smoking than a total ban in the workplace in one study (Nagle et al., 1999). In central Sydney, 21% of nursing staff respondents were recently found to smoke, smokers being significantly younger than non-smokers and more likely to speak mainly English at home (Hughes and Rissel, 1999). The difficulty regarding education and smoking habits is highlighted by the finding that female nurses in Japan have a higher smoking rate than the general female adult population (Ohida et al., 1999). Having friends who smoke and living alone are factors in Japanese nursing students, who demonstrated a 3-10% increment in a one year period, nicotine dependence also increasing in the daily smokers between the time points investigated (Ohida et al., 2001).

GP-Based Intervention

In a postal survey of randomly selected general practitioners in New South Wales, only 34% of respondents reported providing cessation advice during every routine consultation with a smoker, in accordance with national guidelines. Respondents appear no more likely to advise quitting completely than the less effective method of nicotine fading. Respondents rated their patients' lack of motivation and uninterest as the most important barriers to smoking cessation advice in general practice and neither uncertainty about effective smoking cessation strategies nor lack of reimbursement for smoking cessation advice were identified as barriers. Thus it was concluded that a multicomponent intervention to address suboptimal behaviour and barriers holds considerable potential to plan effective implementation of smoking cessation guidelines in general practice (Young and Ward, 2001). Distance learning is a promising approach to continuing medical education although caution is needed for recommending this approach to promote smoking cessation advice in family practice (Young and Ward, 2002).

Development of own language 'readiness to stop' smoking questionnaires is very important in this context, as demonstrated for Arabic (Haddad and Hoeman, 2001). Clearly, screening for nicotine dependence is also necessary, for example in smoking related cancer patients (Mikami et al., 1999), and this is a possible area of collaboration with the pharmaceutical industry in preventive measures. A randomized double-blind study compared different doses in nicotine patches in heavy smokers at clinical sites in the USA and Australia, demonstrated higher doses to increase quit rates slightly (Hughes et al., 1999). A study to assess the effectiveness of a new antismoking mouthwash preparation also gave positive results (Zmeili et al., 1999).

Community-Based Intervention

For the general populace, community action intervention needs to be stressed, although the lack of success in rural Australian towns, in terms of both adolescent smoking and adult quit rates (Hancock et al, 2001a; 2001b), points to the need for a greater understanding of psychological factors. The potential for applying psychology to persuade people to reject the habit was the subject of an editorial in the APJCP (Moore, 2000) and the contribution that local centres might make in both education of the public and researching into factors like efficacy of different types of posters or black humour in cartoons (Hansen, 1997) needs further exploration. Presumably the impact of such visual aids will be dependent on cultural factors and this is an obvious area for more emphasis in future research. Since mental health may be worse in female smokers than non-smokers, an active role for psychiatry might also be proposed (Mino et al., 2001).

Worksite intervention is another area worthy of more attention. One randomized controlled study of smoking cessation for all smokers in a worksite regardless of their willingness to quit smoking was carried out in Japan (Kadowaki et al., 2000). Those who signed a smoking

cessation declaration underwent a five-month intervention while the control group received equivalent delayed intervention for four months. The cessation rates after the original intervention were 12.9% and 3.1% in the intervention and control groups, respectively ($p=0.003$) and among those who once succeeded in quitting, 48.6% (18/37) maintained cessation in the long-term.

Newspapers and the media can exert a major influence. Research reports need to be selected for their potential newsworthiness and news reportage of tobacco control and other public health issues can be increased significantly by the strategic use of news releases alerting journalists to research reports that embody recognizable news values, like for example Tobacco Industry behaviour (Dixon et al., 2001). This is an inexpensive strategy with great potential to advance public health objectives (Chapman and Dominello 2001).

Limiting Access

Control of Sales/Marketing. With adolescents in both China and California, access to tobacco is a major factor and action must be taken to control sales (Unger et al., 2002). Clearly vending machines need to be strictly controlled if not totally prohibited, and effective restrictions must be put in place to restrict marketing to minors (John, 2002). Marketing strategies used by the tobacco industry in both the developing and developed world have a major impact (Dagli, 1997) and the ongoing globalisation and liberalisation of markets (Yach and Blettcher, 2000), can bring about a decline in prices and a lowering of restrictions on the availability of cigarettes and advertising, for example in Japan, with a consequent increase in smoking prevalence among Japanese women and adolescents (Honjo and Kawachi, 2000). The only advantage is that it highlights the dangers and therefore may indirectly promote control efforts. The tobacco industry appears to be very successful in getting across its message. For example, college students at 12 universities in China were found to be well acquainted with foreign brands, this correlating with a preference for such cigarettes (Zhu et al., 1998). Even primary school children aged between 7-13 years in Ankara, Turkey, recognize cigarette brand names and logos, a reflection of the impact of tobacco advertising efforts (Emri et al., 1998).

While it has been proposed that at least 80% of the surface of a pack of cigarettes should be devoted to health warnings, low ratings of believability and importance of the "Smoking Kills" warning are a major concern (Duffy and Burton, 2000). The possibility of using cartoon tobacco warnings or other innovative approaches with future tobacco warning labels therefore deserves stress.

Taxation. The level of taxation on cigarettes can also exert a decisive impact and it has been estimated from price elasticities in China that by introducing an additional 10% increase in cigarette tax per pack (from the current 40% to 50% tax rate), the central government tax revenue would twice exceed total losses in industry revenue, tobacco

farmers' income, and local tax revenue, with between 1.44 and 2.16 million lives saved (Hu and Mao, 2002). Similarly it was calculated for Papua New Guinea, that 10 percent increases in cigarette and non-cigarette tobacco excise would be associated with an estimated 7.1 percent fall in demand for cigarettes and a 5 percent decrease in the demand for tobacco (Chapman and Richardson, 1990). Since price would be expected to be particularly important in determining consumer behavior in lower income countries then increasing tobacco and cigarette excise should be considered as an important strategy for the control of smoking in developing countries which, because of their large populations, are huge markets for tobacco products.

Smoking Bans. Banning of smoking in public places can greatly assist in reducing the level of tobacco consumption. In a survey of patrons of restaurants and pubs, one in nine of smokers stated that adoption of smoke-free policies might prompt them to quit smoking entirely without a significant decrease in attendance (Philpot et al., 1999). Smoke-free restaurants do not appear to require "smoking police" to enforce bans, and present few ongoing difficulties for staff (Chapman et al., 2001), attracting many more favourable than unfavourable comments from patrons, and not adversely affecting trade. Regarding restriction on smoking in restaurants, one study in Adelaide, South Australia suggested that whereas only about a quarter of premises had a total smoking ban, even about half those with no restrictions agreed that the government should legislate to this effect (Jones et al., 1999). The extent to which the law defines where smoking is thus permissible is thus another area requiring more investigation in relation to prevalence of the habit and disease. Control of this very important parameter, along with taxation and import policy, all make government policy. Thus political aspects need commensurate stress as Sombat Chantornvong and Duncan McCargo (2001) admirably reviewed for the position in Thailand. In addition, governments are the main providers of funding for academic and practical community research projects and the necessary infrastructure (see Table 4 for a list of the components of a comprehensive approach).

While legislation for control of smoking in the home might present insurmountable difficulties, education could be effective by concentrating on concern for the welfare of children. Parental and household smoking are known to be associated with respiratory morbidity in children aged under 12 years (Maziak et al., 1999) and not all mothers are aware of the health risks (Chan et al., 1999). Interventions targeting infant exposure to environmental tobacco smoke should incorporate quit smoking strategies for both parents and other household members, as well as strategies for changing the pattern of smoking behaviour around infants (Daly et al., 2001). A study in Australia in fact has indicated a strong move towards protecting children from smoke in the home (Borland et al., 1999). Reports of visitors being discouraged from smoking rose from 27% in 1989 to 53% in 1997 and smokers who reported always smoking outside the home

rose from 20% in 1995 to 28% in 1997. Not smoking in the presence of children rose from 14% in 1989 to 33% in 1996. Indoor restrictions on smoking were associated with the presence of children in the household and even more strongly with the presence of non-smoking adults. Importantly, people who worked in places where smoking was totally banned were more likely to ask their visitors not to smoke than those who worked where smoking was allowed. However, an intervention for parents recruited from South Australian pediatric hospital outpatient waiting rooms, featuring written and verbal feedback about childrens urinary cotinine-to-creatinine levels, information booklets, and two telephone calls encouraging a ban on smoking at home, did not change parents' propensity to create or maintain bans on smoking in their homes or otherwise change smoking habits to reduce their children's exposure so that complex social questions need to be addressed (Wakefield et al., 2002).

Strategies for Tobacco Control

In addition to action at the government level regarding legislation and education for physicians/nurses, public health authorities, pharmaceutical firms and NGOs clearly need to coordinate their efforts to provide a comprehensive strategy

Table 4. Components of a Comprehensive Strategy to Counteract the Ills of Tobacco Consumption

Government Action	Raise tobacco taxes Counter smuggling Restrict smoking areas Offices Restaurants and clubs Restrict vending machine sales Enforce minimum age purchase laws Prohibit/counter advertising Regulate product design and naming Educate health professionals Medical students General practitioners Nurses Provide financing/infrastructure General practitioner action Community intervention Academic research
NGOs	Support legal challenges Promote research Support community efforts for education and active intervention
Academic Research	Toxicological pathology Mechanisms Chemopreventive agents Descriptive epidemiology Psychosocial aspects
News Media	Increase awareness Health risk Tobacco industry actions

to reduce smoking initiation, encourage cessation or reduction in consumption, and combat the adverse physiological effects of tobacco smoke. The Global Youth Tobacco Survey Collaborative Group (2002) has pointed the way forward for increased surveillance of young people across the world and attention has been stressed for interventions (Institute for Global Tobacco Control, 2002). In his recent review, John (2002) emphasizes the need for different elements in comprehensive tobacco control. The research fraternity continues to have major roles to play in generating a better understanding of disease processes linked to tobacco and psychological and physical dependence on the habit. Last but not least, more attention to convincing the media of its potential contribution should pay dividends (Flynn et al., 1994; Vateesatokit et al., 2000)..

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