

**Section III**  
**Demand for tobacco**

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# 8

## Consumer information and tobacco use

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**This chapter addresses two related questions: first, are consumers well-informed about the consequences of tobacco use?; and, second, can public policies to improve consumer information reduce tobacco use? Although in many countries people are generally aware of the health risks of smoking, there are gaps in their perceptions of those risks. Individuals tend to under-estimate the risk of smoking relative to other causes of death. In addition, many smokers appear not to apply their knowledge of the health risks to themselves personally. Finally, evidence suggests that young people underestimate the addictive properties of tobacco. In some countries significant improvements in consumer information about the links between tobacco use and disease are still possible; while in other countries consumers are probably as fully informed as is realistically possible. In many countries, so-called ‘information shocks’—such as the publication of new reports on the health effects of smoking—have reduced tobacco consumption. If the experience of these countries can be applied elsewhere, consumer information policies appear to be effective instruments for tobacco control. This conclusion is buttressed by the success of specific interventions including mass-media campaigns and warning labels on cigarette packs.**

### 8.1 Overview

This chapter asks whether and how information about the risks of smoking can influence consumers’ use of tobacco and how the answers may affect tobacco-control policy. Smokers are like other consumers in that they face problems in learning about the price and quality of their prospective purchases. However, they are unlike most other consumers in that their purchased goods, tobacco products, are addictive and have serious health consequences. Smokers who are unaware of either the addictive properties or the health consequences of tobacco are not buying the products they think they are. In essence, each purchase of a tobacco product involves two components: the good to be consumed in the present, and the flow of future consequences from that consumption. Poorly informed consumers do not place enough weight on the flow of future consequences. As a result, they make purchases of tobacco products that they later regret or would judge not to be in their best interests if they had had more information (see Chapter 5).

The plan of the chapter is as follows. Sections 8.2 and 8.3 address the first of the chapter’s two questions, on how well-informed consumers are. Section 8.2 discusses how scientific information on the effects of tobacco is discovered and disseminated to

consumers. Section 8.3 reviews the evidence on what consumers know and understand about the risks. Sections 8.4 and 8.5 turn to the second question of whether improving consumer information can reduce tobacco use in countries where important information gaps remain. Section 8.4 reviews econometric studies on the impacts of ‘information shocks’ on tobacco markets over time, and on the extent to which differences in consumer information at a point in time are related to tobacco use. Section 8.5 summarizes the evidence on the effectiveness of specific health information interventions. In general, the message of both Sections 8.4 and 8.5 is positive: the provision of consumer information appears to be an effective tobacco control measure. Section 8.6 concludes the chapter and raises some of the remaining questions for research.

## **8.2 The process of information discovery and dissemination**

### **8.2.1 Information discovery**

This section describes how information about the health consequences of tobacco use has been discovered and disseminated. A simplified view of the process is as follows: scientists discover new facts about tobacco and announce their research findings to the scientific community through conferences and publications in academic journals. Important research findings are then disseminated more broadly to the public, often with the help of various government programs and initiatives.

This description of the process is somewhat misleading in several respects. First, it assumes a naïve view of the scientific process, where facts are simply discovered. Instead, starting from around the 1950s, research on the health consequences of tobacco use has steadily accumulated, leading to a scientific consensus about what the ‘facts’ about tobacco and health probably are. The nature of the consensus changed over time. For example, by the late 1950s there might have been a consensus that smoking is probably dangerous. Currently, there is a consensus that smoking is definitely dangerous. The consensus about the magnitude of the risks involved continues to change over time (see Chapter 1 for a detailed discussion). Whether a process of ‘fact discovery’ or ‘consensus formation’, from the 1950s onwards research established solid evidence linking tobacco use to heart disease, lung cancer, emphysema, and other cancers. More recent research has established additional health effects from smoking during pregnancy and from second-hand smoke. Smokers also appear to face a greater risk of death from tuberculosis than non-smokers.

Another complication is the influence of the tobacco industry on the process of information discovery. The industry has obvious incentives to try to block the formation of a scientific consensus that its products are harmful. In 1954, US tobacco companies formed the Tobacco Industry Research Committee, later re-named the Council for Tobacco Research. The tobacco industry has used several vehicles for publishing the findings of their sponsored research, including symposia proceedings, books, journal articles, and letters-to-the-editor in medical journals. Bero *et al.* (1994) have studied tobacco-industry sponsored symposia on passive smoking in detail. Compared to a random sample of articles on passive smoking from the scientific literature, Bero and colleagues find that symposia articles on passive smoking were more likely to agree

with the tobacco industry's position that passive smoking is not harmful. Recently, however, tobacco companies are moving in the direction of accepting the consensus that smoking is dangerous to health, partly in response to litigation in the United States. For example, Philip Morris's web site states the overwhelming medical and scientific consensus that cigarette smoking causes lung cancer, heart disease, emphysema, and other serious diseases in smokers. It also states that cigarette smoking is addictive, and acknowledges that official government reports have concluded that second-hand smoke is harmful, although it continues to dispute many of their conclusions. So while the tobacco industry tried to influence research on tobacco and health in the past, recent trends suggest it may play less of a role in the future.

### 8.2.2 Information dissemination

Governments in many countries have played active roles in disseminating information about the health consequences of tobacco use. Information policies range from the publication of official reports, to a requirement for warning labels on packages and advertisements, to school health education and mass-media campaigns.<sup>1</sup> Although there are exceptions, the trend has been from inexpensive interventions, such as the publication of official reports, to more direct and expensive efforts to inform the public, such as mass-media campaigns. As the philosopher Robert Goodin (1989) points out, the strategy of providing information about health consequences is usually seen as less intrusive and less paternalistic than many other tobacco control policies.

Publication of official reports by the Royal College of Physicians in Britain in 1962 and by the United States Surgeon General in 1964 (USDHEW 1964) are milestones in tobacco control in high-income countries, and mark the beginning of serious efforts to improve consumer information about smoking and health. Many of the subsequent official Surgeon General reports mainly confirm the main message that smoking is unhealthy, but certain reports have new information. For example, the 1986 report was the first to identify a health risk from second-hand smoke (USDHHS 1986). The 1988 report concluded that tobacco use is an addiction rather than a habit (USDHHS 1988). The function of official government reports is not so much to disseminate the newest research findings, as to have an official statement of current consensus judgements.

Following the official reports of the health consequences of tobacco use, many countries required warning labels on tobacco-product packaging and advertising. The United States required warning labels on all cigarette packages beginning January 1, 1966, with somewhat stronger wording introduced in 1970. In 1972 all print advertisements were required to carry the warnings as well. In 1985, instead of a general warning about health consequences, packages and print advertisements were required to contain one of four rotating texts with statements about specific health hazards. As of 1991, 77 countries required health warnings on tobacco-product packages (Roemer

<sup>1</sup> Saffer (Chapter 9) discusses advertising bans. While banning advertisements can have implications for information, the dissemination of health information to consumers is not the primary goal of this type of tobacco control policy.

1993; WHO 1997). In most of these countries (48), the warnings are relatively inconspicuous and contain little information, such as a general statement that smoking is hazardous. But a growing number of countries (27 in 1991, the most recent date for which figures are available) require rotating or strong warnings, and a few (such as Iceland and Norway) include pictures to enhance the likely effectiveness of warning labels. Many governments have also launched school health education and mass-media public information campaigns about the health consequences of tobacco use. These efforts are difficult to summarize because they have varied considerably over time and continue to vary from country to country.

In describing how research findings on tobacco and health have been disseminated to the public, it is important to recognize that people as consumers are not passive recipients of information. In everyday life people continually learn about the health consequences of consumption choices by evaluating their own experiences and the experiences of their families and friends. Even without hard scientific evidence, tobacco use has long been considered unhealthy (Corti 1931). To explore the media's role in information dissemination, Viscusi (1992) tallies the number of articles on smoking hazards that appeared in *Reader's Digest* from 1950 to 1989. By decade, the number of articles increased over the period: 12 from 1950 to 1959; 17 from 1960 to 1969; 19 from 1970 to 1979; and 23 from 1980 to 1989. Counted differently, out of 71 articles on smoking hazards from 1950 to 1989, 18 appeared before the 1964 Surgeon General's report.

The tally of magazine articles on smoking hazard supports the more general point that in the US the media provided a great deal of information on tobacco and health to the public before the government began its information campaign. Clearly, the media, including the world wide web, continue to be important sources of health information. More generally, it should be stressed that consumers are not passive and the public sector is not the only source of health information. In its history of anti-smoking efforts, the United States Department of Health and Human Services (1989, p. 413) notes that the three major voluntary health organizations, American Cancer Society (ACS), American Lung Association (ALA), and American Heart Association (AHA), have played an important role over the last 25 years in disseminating information about the hazards of smoking. Their role was particularly prominent in the late 1960s after the Federal Communications Commission ruled that under the Fairness Doctrine broadcasters must present anti-smoking public service messages to balance cigarette advertising. Ironically, the frequency of anti-smoking messages fell dramatically in 1971 when broadcast advertising for cigarettes was banned.

To improve profitability, firms in many industries promote their products, so it is not surprising that the tobacco industry has a history of efforts to influence consumer information about the consequences of tobacco use.<sup>2</sup> For much of the past 50 years there has also been a history of public policy efforts in response. Until at least the 1950s, many cigarette advertisements fairly explicitly promoted the advertised brand as healthy, or at least healthier than other brands. The United States Federal Trade Commission (FTC) began to respond to these claims long before the 1964 report of the Surgeon General on smoking and health. At first the public-sector response was in the

<sup>2</sup> The discussion that follows draws heavily on USDHHS (1989).

form of cease-and-desist orders against false and misleading health claims made in advertising. Industry-wide cigarette advertising guidelines were enacted in 1955; additional regulations followed the 1964 Surgeon General's report; and eventually a ban on broadcast-media advertising became effective in 1971. However, many observers see the shift towards low-tar and low-nicotine cigarettes during the 1970s as an example of how tobacco-industry efforts continued to mislead consumers (USDHHS 1989). Although advertisements for these products contained only implicit health claims, surveys in the 1970s found that large proportions of smokers believed low-tar and low-nicotine products posed little or no health risk (FTC 1988). In many countries the tobacco industry's ability to influence consumer information about the health consequences of tobacco use has become more limited by regulations and bans on advertising, although the ability to spread misinformation remains considerable (see Chapter 9 for a discussion on the ineffectiveness of partial advertising bans).

### **8.3 Are consumers informed about the consequences of tobacco use?**

This section provides an overview of the evidence on whether consumers are well-informed about the consequences of tobacco use. To begin, it is useful to define what a potential consumer would have to understand to make well-informed decisions about tobacco use. To be well-informed, the consumer would need to know which diseases are linked to the use of different tobacco products and to second-hand smoke, the morbidity and mortality associated with each disease, and the extent to which tobacco use increases their risks of each disease. In addition, when making the decision to start tobacco use, the well-informed consumer would need to understand addiction and how difficult it will be to quit if he or she decides to attempt this at a future date. Some of these pieces of information may not matter to some consumers. For example, simply knowing that smoking is linked to lung cancer without knowing much about the disease or the magnitude of the risks may itself discourage many from smoking. But to other consumers, the gaps in their information may be critical. For example, they may decide to smoke knowing that the practice carries an increased risk of lung cancer, because they under-estimate the increase in that risk or because they over-estimate the chances of surviving the disease.

This section first addresses whether consumers are informed at the most basic level about the major health consequences of tobacco use. The discussion then turns to other aspects of consumer information that may help explain how people actually respond to the risks. A difficult question is whether consumers accurately assess the quantitative risks of tobacco use, both in general and for themselves personally. A related question is whether consumers accurately judge the risks of tobacco use relative to other risks. If smokers believe their personal risks are low, or believe that the risks of tobacco use are low relative to other threats to health, they may place little importance on changing their own behavior, despite their awareness of the health consequences. The last part of the section discusses consumer information about addiction and the information available to young people—the age group in which the decision to start smoking is most common.

### 8.3.1 Consumer information about the links between tobacco use and disease

Recent research conducted in a number of countries provides a fairly broad international perspective on what consumers know about the health consequences of tobacco use. Most of the studies used similar measures of whether consumers were aware of the health consequences of smoking. However, the specific measures of consumer information vary. As a result, there is considerable heterogeneity in the proportions of the survey respondents who are 'well-informed' depending in large part on what questions are posed.

The 1996 National Prevalence Survey on Smoking, a representative national survey of over 122 000 Chinese, included four questions about their knowledge of the health consequences of tobacco use. At the most general level, 55% of Chinese non-smokers and 69% of Chinese smokers surveyed believed that cigarettes did them 'little or no harm' (Chinese Academy of Preventive Medicine 1997). About the same percentages believed that passive smoking does little or no harm to their health. The specific disease linked to tobacco use most often was bronchitis, with about 70% of both Chinese non-smokers and smokers aware of the link. But only about 40% of both groups said that smoking causes lung cancer and only 4% said that smoking causes heart disease. However, Gong *et al.* (1995) report very different patterns for consumer awareness in one district of China. The results are from a survey of 3423 males and 3593 females in the Minhang District, near Shanghai. In this sample, consumer awareness of the health risks of smoking seems to be widespread, with almost 90% of respondents reporting that they believe that smoking is harmful for both the smoker and those exposed passively to smoke. Current smokers are only somewhat less likely to agree that smoking is a health hazard, with 82% of male smokers so responding. Presumably, the differences between the results reported by the Chinese Academy of Preventive Medicine (1997) and Gong *et al.* (1995) reflect different sampling frames, and the fact that education and income levels are higher in Shanghai than in the rest of China. Gong *et al.* report several additional interesting results. Despite the apparently widespread awareness of the health hazards, smoking is very common among men (67%), but very rare among women (2%). Even more puzzling is that only 14% of current smokers report wanting to quit, and even fewer had ever tried.

Osler and Kirchhoff (1995) report the results of two independent cross-sectional surveys of Danish adults conducted in 1982 (N = 4807) and 1992 (N = 2226). Knowledge is measured by the number of times the respondent agreed with a series of statements about the health consequences of smoking. In 1982, about a quarter of both men and women scored five or more (out of a possible 11) on this knowledge scale. In 1992, the proportions had increased so that about one-third of both men and women scored five or more. More than 90% of the respondents agreed that smoking increases the risks of lung cancer. But knowledge of other consequences of smoking was much less widespread: for example, in 1982, slightly fewer than half of the respondents agreed that smoking increased the risk of cancer of the mouth and throat, although this increased to 57% of the sample by 1992.

According to a 1996 survey of 500 adults from Szekesfehervar, Hungary, about three-

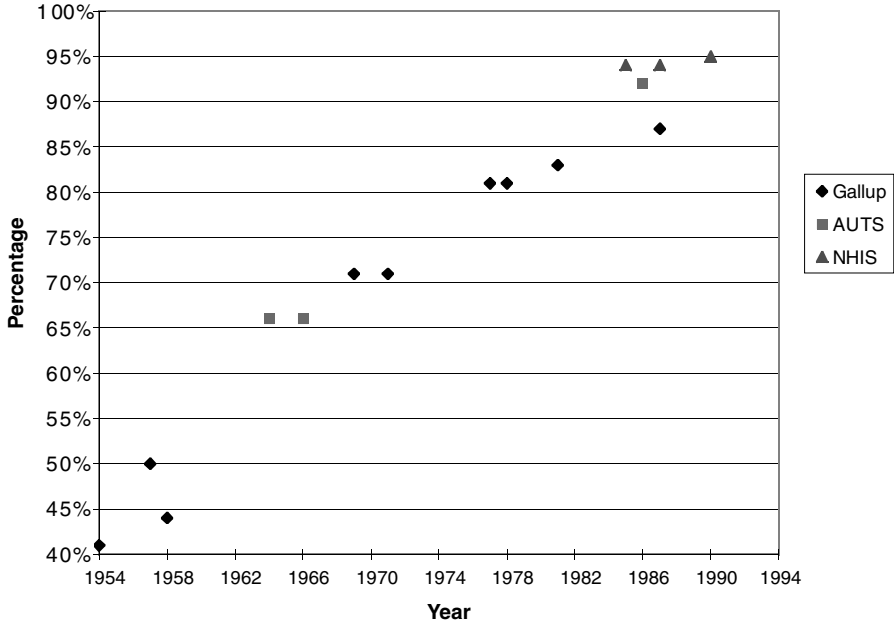
quarters of the respondents think that smoking damages health to a large extent. Another 19% think that it damages health, but only to a small extent. Only 2% think that smoking is absolutely harmless. For current smokers, reported awareness is lower: only 56% responded that smoking damages health to a large extent, while 36% responded that it damages health to a small extent and 6% responded that it does not damage health at all. About 80% of respondents had already heard of passive smoking, and awareness of the health hazards of passive smoking was relatively widespread. Three-quarters of respondents said that breathing others' smoke could certainly or probably increase the risks of asthma; 81% responded that breathing others' smoke could certainly or probably increase the risks of heart disease; and 91% responded that breathing others' smoke could certainly or probably increase the risks of pulmonary cancer.

Two recent studies measuring consumer information about tobacco in South African populations demonstrate the incomplete nature of knowledge about smoking risks. Reddy *et al.* (1996) report the results of a 1995 survey that provides a nationally representative sample of 2238 adults. The vast majority of respondents, 87%, agreed with the general statement that the health effects of smoking are serious. Jones and Kirigia (1999) report a very similar finding from a sample of about 3500 female respondents in South Africa: 86% of the sample knew that smoking has negative health consequences. Reddy *et al.* (1996) find that knowledge of many specific health consequences of smoking was much less widespread in South Africa than was general awareness, however. While 67% and 58% of respondents knew that smoking was associated with lung disease and cancer, respectively, only 31% knew that smoking was associated with heart disease. Knowledge about passive smoking was more widespread but far from complete, with 82% agreeing that babies' health is affected by mothers' smoking and 71% agreeing that the health of non-smokers is affected by smokers in the household.

A study of smoking practices and attitudes in Vietnam finds that consumer awareness about the hazards of smoking is fairly widespread (Jenkins *et al.* 1997). The survey was conducted in 1995, with random samples totaling 2004 adults from Hanoi, Ho Chi Minh City, and two rural communes in Vietnam. Of the respondents, 87% agreed that smoking harms health, and 81% agreed that smokers die at a younger age than non-smokers. Almost 80% agreed that environmental tobacco smoke harms health. With this apparently high level of consumer information, it seems puzzling that 73% of men (but only 4% of women) smoke. Their awareness of the health consequences could be reflected in the fact that 61% of current smokers reported wanting to quit, although only 44% report that they had ever tried to quit.

In the United States, the evidence suggests that consumer information about the health consequences of tobacco use has improved dramatically from the 1950s and 1960s onwards. The improvements parallel the government information campaigns described in Section 8.2.2 and suggest the overall effectiveness of these campaigns. However, the trend analysis below does not attempt to determine the impacts of specific interventions on consumer information.

Figure 8.1 shows estimates from national surveys conducted between 1954 and 1990 on public knowledge about the link between cigarette smoking and lung cancer. Although the surveys are not all identical, they are fairly comparable over



**Fig. 8.1** Trends in public knowledge about smoking and lung cancer—all adults (% believing in a health risk).

Data sources: US Department of Health and Human Services (1989); authors' calculations using National Health Interview Surveys (NIHS).

Note: Actual questions:

1954, 1957, 1958, 1969, 1971, 1977, 1978, and 1981 Gallup surveys: Do you think that cigarette smoking is or is not one of the causes of lung cancer? (Yes, is a cause; no, is not a cause; no opinion.)

1964 and 1966 AUTSs: Would you say that cigarette smoking is definitely, probably, probably not, or definitely not a major cause of lung cancer, or that you have no opinion either way? (Percentages include those who say smoking is 'definitely' or 'probably' a major cause of lung cancer.)

1985 NHIS: Tell me if you think cigarette smoking definitely increases, probably increases, probably does not increase, or definitely does not increase a person's chances of getting lung cancer? (Percentages include those who say smoking 'definitely' or 'probably' increases the risk.)

1986 AUTS: Do you think a person who smokes in any more likely to get lung cancer than a person who doesn't smoke? (Much more likely, somewhat more likely, no, don't know.) (Percentages include those who say smokers are 'much more likely' or 'somewhat more likely' to get lung cancer.)

1987 Gallup survey: Do you think smoking is a cause of lung cancer? (Yes, no, don't know.)

1987 NHIS: People have different beliefs about the relationship between smoking and health. Do you believe cigarette smoking is related to lung cancer? (Yes, no, maybe, unknown.) (Percentages include those who say yes or maybe.)

1990 NHIS: Cigarette smoking definitely increases, probably increases, probably does not increase, or definitely does not increase chance of developing lung cancer? (Percentages include those who say smoking 'definitely' or 'probably' increases the risk.)

time.<sup>3</sup> Gallup surveys conducted in the 1950s found that between 40% and 50% of respondents agreed that smoking is one of the causes of lung cancer. In a 1969 Gallup poll this percentage had increased to above 70%. Other surveys conducted over the period show similar trends, so that by 1990, between 90% and 95% of respondents stated that they are aware of the link between smoking and lung cancer. The trend in public knowledge about smoking and heart disease (Fig. 8.2) is similar. In the early- to mid- 1960s, between 40% and 55% of respondents agreed that the chances of heart disease are higher for cigarette smokers. In the 1985 and 1990 National Health Interview Surveys, about 90% of respondents indicated that smoking either definitely or probably increases the risks of heart disease. Similarly, the percentage of respondents indicating that smoking increases the risk of emphysema/chronic bronchitis increased from 50% to 60% during the 1960s, and reached about 90% by 1990.

There are somewhat fewer data available on trends in consumer information about the other health consequences of tobacco use. By the late 1980s or early 1990s, about 80% of respondents to various surveys indicated awareness that smoking causes cancer of the mouth/throat/larynx/esophagus; by 1992 almost 90% indicated that smoking during pregnancy is hazardous.

A detailed chronology of research findings establishing the links between smoking and each of these health consequences is beyond the scope of this chapter. In broad terms, however, it is clear that the public awareness of the risks follows the publication of research findings.

Public knowledge about passive smoking and health is of special interest, because of the efforts of tobacco industry on this topic. Despite a growing consensus that passive smoking is harmful, a study of newspaper and magazine articles published between 1981 and 1995 found that most of the articles left the impression that there is still a controversy on the issue (Kennedy and Bero 1996). However, as shown in Fig. 8.3, the trend in public knowledge of the link between passive smoke and ill health generally parallels trends in the public understanding of other health consequences of tobacco. In surveys conducted in the 1970s only about half of the respondents agreed that passive smoking was harmful. By the late 1980s the proportion who were aware of the risks had reached more than 80%, and by 1992 it had reached 87%.

Comparing Fig. 8.3 with Figs 8.1 and 8.2 reveals that awareness of the risks of passive smoking is not quite as widespread as is awareness of the risks of active smoking. Although this may be in part due to the tobacco industry's efforts, it is also not unexpected because the scientific evidence about passive smoke accumulated only after the other risks of smoking had already been well established. For example, the 1972 report of the Surgeon General (USDHEW 1972) contained only cautious statements about possible health effects of passive smoke, and the 1986 report (USDHHS 1986) was the first to focus on involuntary or passive smoking. Of course, the formation of the consensus in the scientific community may also have been slowed by the tobacco industry's efforts. But once that consensus was formed and signaled by official publications, the evidence suggests that public awareness of the risks of passive smoking became very widespread.

<sup>3</sup> Details on the survey organizations, texts of the questions, and survey dates are provided in footnotes to the Figure.

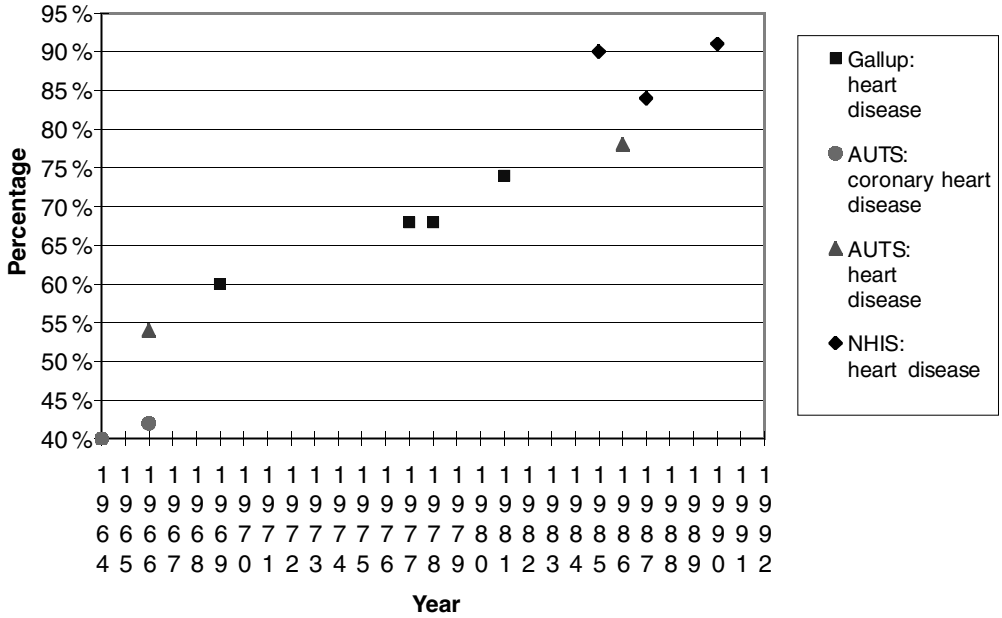


Fig. 8.2 Trends in public knowledge about smoking and heart disease—all adults (% believing in a health risk).

Data sources: US Department of Health and Human Services (1989); authors' calculations using National Health Interview Surveys (NHIS).

Note: Actual questions:

1964 and 1966 AUTS: Do you think the chances of getting coronary heart disease are the same for people who don't smoke cigarettes as they are for people who do smoke cigarettes? Who would be more likely to get it, people who don't smoke cigarettes or people who do smoke cigarettes?

1966 AUTS: Cigarette smokers are more likely to die from heart disease than people who don't smoke cigarettes. (Strongly agree, mildly agree, no opinion, mildly disagree, strongly disagree.) (Percentages include those who 'strongly agree' or 'mildly agree'.)

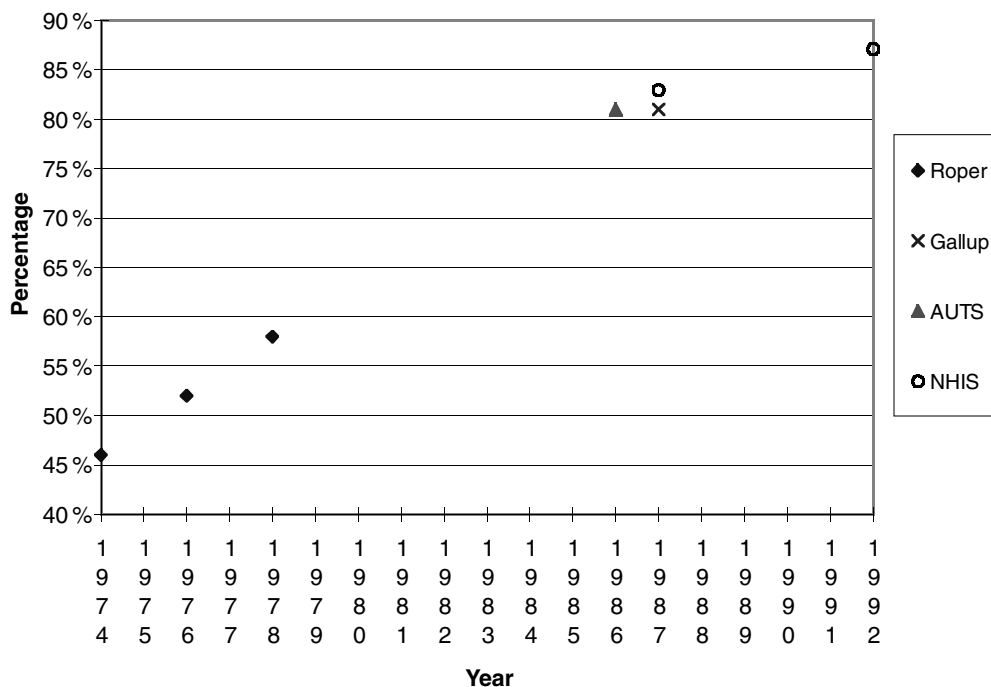
1969, 1977, 1978, and 1981 Gallup surveys: Do you think that cigarette smoking is or is not one of the causes of heart disease?

1985 NHIS: Do you think cigarette smoking definitely increases, probably increases, probably does not increase, or definitely does not increase a person's chances of getting heart disease? (Percentages include those who say smoking 'definitely' or 'probably' increases the risk.)

1986 AUTS: Do you think a person who smokes is any more likely to get heart disease than a person who doesn't smoke? (Much more likely, somewhat more likely, no, don't know.) (Percentages include those who say smokers are 'much more likely' or 'somewhat more likely' to get heart disease.)

1987 NHIS: People have different beliefs about the relationship between smoking and health. Do you believe cigarette smoking is related to heart disease? (Yes, no, maybe, unknown.) (Percentages include those who say yes or maybe.)

1990 NHIS: Cigarette smoking definitely increases, probably increases, probably does not increase, or definitely does not increase chance of developing heart disease? (Percentages include those who say smoking 'definitely' or 'probably' increases the risk.)



**Fig. 8.3** Trends in public knowledge about the health risks of passive smoking—all adults (% believing in a health risk).

Data sources: US Department of Health and Human Services (1989); authors' calculations using National Health Interview Surveys.

Note: Actual questions:

1974, 1976, and 1978 Roper surveys: Is smoking hazardous to nonsmokers' health? (Probably is hazardous, probably doesn't have any real effect, don't know.)

1986 AUTS: Think now for a moment about a nonsmoker who lives or works with smokers . . . do you think that exposure to tobacco smoke is harmful or not harmful to the nonsmoker's health?

1987 NHIS: The smoke from someone else's cigarette is harmful to you. (Strongly agree, agree, disagree, strongly disagree.) (Percentages include those who 'strongly agree' or 'agree'.)

1987 Gallup survey: If people smoke, do you think that it is harmful or is not harmful to people who are near them? (Yes, harmful; no, not harmful; can't say/no opinion.)

1992 NHIS: Other people's smoke is harmful. (Agree/yes, disagree/no, not ascertained or no opinion/don't know.)

### 8.3.2 Consumer information about the magnitude of health risks from tobacco

An additional concern is whether consumers who are aware of the health effects of tobacco use have accurate perceptions of the magnitudes of the risks. This is a difficult research question, but available evidence suggests that some consumers over-estimate the health risks of smoking, while others under-estimate these risks. In a series of studies, Viscusi presents evidence that most people, including most smokers, over-estimate the health risks of cigarette smoking. He reports (1990, 1991, 1992) analyses of

national US survey data collected in 1985, where perceived lung cancer risk is measured based on answers to the question: 'Among 100 cigarette smokers, how many of them do you think will get lung cancer *because* they smoke?'. Viscusi (1998) reports additional analyses of survey data on people's perceptions of the total mortality risk of smoking, based on answers to the question: 'Out of every 100 cigarette smokers, how many of them do you think will die from lung cancer, heart disease, throat cancer, or any other illness *because* they smoke cigarettes?'. Dividing the answers by 100 yields the perceived lung cancer and total mortality risk.

In the 1985 sample, the average perceived lung cancer risk was 0.426, and when the sample was restricted to current smokers the average was 0.368. In the 1997 sample the average perceived total mortality risk was 0.501 for the full sample, and 0.424 for the sample restricted to current smokers. Viscusi (1992) also reports the results of a series of smaller-scale surveys conducted in 1990 and 1991 that explored the sensitivity of the risk responses to several variations in question formulation. For example, he presents evidence that the risk of death from lung cancer due to smoking was perceived to be similar to the perceived risk of the incidence of lung cancer due to smoking. Viscusi (1992, p. 83) concludes that 'the similarity of the responses for [six] different question formulations suggests that the empirical findings are not an artifact tied to some specific question phrasing'.

Part of the difficulty in determining the accuracy of consumers' perceptions of the risks of smoking is that the true risk level is unknown, and the state of scientific knowledge of the risks changes over time. Based on the state of scientific knowledge at the time of the surveys, Viscusi (1992, 1998) argues that reasonable scientific reference ranges are from 0.05 to 0.10 for the lifetime risk of dying of lung cancer, and 0.18 to 0.36 for the lifetime risk of dying from any tobacco-related disease. However, the current consensus is that the risks of smoking are higher, with a consensus estimate of the total mortality risk being around 0.5. Hanson and Logue (1998, pp. 1355–56) criticize Viscusi's reference point as 'probably too low'; in which case fewer people over-estimate the risks of smoking than Viscusi reports. The appropriate reference point depends, of course, on the question being asked. Viscusi uses a different reference point from Hanson and Logue because he is addressing a different question. By focusing on the consensus at the time of the survey, Viscusi's comparisons address whether consumers understood the available scientific information about smoking. Hanson and Logue argue that, in order to address whether those smokers were well-informed by current standards, their perceptions of the risks should be compared with the current range of risks agreed by scientific consensus.

If the distribution of perceived risks in these samples is compared with Viscusi's reference points it may be concluded that most people and most smokers over-estimate the mortality risks of smoking. Moreover, Viscusi's evidence suggests that over-estimation of risks remains an important empirical phenomenon using any plausible estimate of the true risk of death from smoking. For example, a little over 5% of both the full sample and current smokers perceive a smoking mortality risk of 1, and 20.5% of the full sample and 12.8% of smokers perceive a risk of 0.8 or above.

Liu and Hsieh (1995) use Viscusi's approach to measure the risk perceptions of smokers and non-smokers in Taiwan. A survey of a random sample of adults in the metropolitan area of Taipei was undertaken in 1993. Perceptions of the risk of lung

cancer were measured using the same question wording as Viscusi (1990). The average perceived risk of lung cancer in the full sample is 0.363, while the average perceived risk of lung cancer in the sample restricted to current smokers is 0.288. The researchers compare these estimates to one for the 'true risk', which, based on evidence from Taiwan, is judged to be 0.025. Using this scientific reference point, they conclude that only 10.8% of the full sample and 19.2% of the smokers under-estimate risks, while the rest over-estimate risks. The percentages of the Taiwanese sample that perceived extremely high risks are smaller than in Viscusi's US samples; for example, only 1.5% of the full sample reported a risk perception of 1.

A limitation to Viscusi's approach is that the measures he uses are based on asking individuals to assess the risk in a hypothetical population of smokers. People may feel that the risks they face personally are lower. Weinstein (1998) reports an attempt to locate and review all studies that investigated smokers' risk perceptions. Most of the reviewed studies appear to have been conducted in the United States and the United Kingdom. A number of conclusions emerge from Weinstein's review. The review 'shows unequivocally that smokers acknowledge that smokers' risks of various health problems are higher than non-smokers' risks'. At the same time, however, the reviewed studies indicate that non-smokers rate smoking as riskier than do smokers. The evidence on the accuracy of smokers' quantitative risk assessments is decidedly mixed, with two of the reviewed studies finding that smokers over-estimate the risks of smoking, two finding that smokers either over-estimate or under-estimate the risks depending on how the question is asked, one finding that smokers' risks perceptions are accurate or under-estimates, and one finding that smokers under-estimate the risk of smoking. In contrast, the evidence is very consistent that smokers minimize their personal risks. For example, various studies find that, on average, smokers report that their personal risks are lower than the average smoker, and only slightly above the risks of non-smokers.

Given the importance of survey design, it should be noted that Hanson and Logue (1998, appendix) offer a set of specific criticisms of such surveys. The criticisms were made in the specific context of Viscusi's surveys on people's perceptions of the risks of smoking, but are relevant to all such studies. Their overarching concern seems to be that (p. 1361):

... respondents did not operate with precise quantitative risk assessments. Instead, they had only foggy qualitative assessments ... [so] the numeric responses do not mean what they appear to mean.

This implies that this line of research is not likely to yield valid conclusions one way or the other on whether smokers under-estimate or over-estimate the risks of smoking.

More recently, Ayanian and Cleary (1999) find that most current smokers do not believe that their personal risks of heart disease and cancer are higher than the risks faced by other people of the same age and sex. For example, only 29% of current smokers believed they have a higher-than-average risk of myocardial infarction, and this increases to only about 50% among smokers with identified risk factors of hypertension and angina. These findings are consistent with other evidence of unrealistic optimism in survey responses. Weinstein (1980) surveyed college students on how their

estimated chances of experiencing 42 events differed from the chances of their classmates. On average, the surveyed college students estimated that they were more likely than average to live past the age of 80 and to experience other positive events. Conversely, on average, the college students estimated that they were less likely than average to have a heart attack or experience other negative events.

The Health and Retirement Survey (HRS) has been analyzed to provide more evidence on the magnitude of the poor information (or unrealistic optimism) in older smokers' expectations of reaching age 75 (Schoenbaum 1997; Sloan *et al.* 1999). The HRS is a data set used by many health and labor economists, and is based on a national sample of adults aged 50–62. Respondents were asked the following question: 'Using any number from zero to ten, what do you think are the chances that you will live to be 75 or more?', where zero was labeled 'no chance at all' and 10 was labeled 'absolutely certain'. Dividing by ten provides an estimate of the subjective probability of survival to age 75. Although respondents could view this question as an ordinal ranking rather than a probability assessment, Hurd and McGarry (1995) present additional evidence that responses to this question behave like probabilities. Schoenbaum (1997) and Sloan *et al.* (1999) compare the subjective estimates to estimates of the 'true' survival probabilities from life-tables. Using life-table values, the mean probability of survival to age 75 for men who are current heavy smokers is 0.263, while the mean subjective value is 0.501. Similarly, the life-table mean survival probability for women who are current heavy smokers to age 75 is 0.308, while the mean subjective value is 0.601. Among men who were never smokers, former smokers, and current light smokers, subjective survival probabilities correspond quite closely to the relevant life-table values, but for women in these categories, subjective survival probabilities are below the life-table values. The pattern of results suggests that heavy smokers over-estimate their survival probability and hence must under-estimate the risks of smoking; other groups either appear to have accurate perceptions or to over-estimate all risks, including the risks of death unrelated to smoking.

The fact that Viscusi reached opposing conclusions to those of the researchers analyzing the HRS data illustrates the inherent difficulty of research into whether consumer-risk perceptions are accurate. However, it is also important not to overstate the degree of difference between these studies. Some of the difference is to be expected, given differences in the composition of the samples studied. Evidence from the HRS data suggests that older (aged 50–62) heavy smokers under-estimate the risks of smoking. The smokers in Viscusi's studies are much younger, as they are representative of the population aged over 16. If smokers with higher risk perceptions are more likely to quit, it is to be expected that people who remain smokers at older ages will have lower-than-average risk perceptions. In addition, Viscusi (1991) finds evidence that younger people are particularly likely to overestimate the risks of smoking, and suggests that it may result from their greater exposure to the public anti-smoking campaign. However, it has been suggested that young people act as if they feel invulnerable to many risks (see Chapter 7 for a detailed discussion). Young people may, therefore, have a greater divergence than older people between their perceptions of hypothetical risks (measured by Viscusi) and their estimates of personal risks (measured by Schoenbaum). This question could be explored by collecting data on the personal risk perceptions of people of a variety of ages, similar to the data used in the HRS.

It should also be pointed out that in the HRS data, Schoenbaum finds that light smokers on average appear to have accurate risk perceptions, and, by the definition used, light smokers make up the majority of smokers in the sample (59% of male smokers and 77% of female smokers). Given the distribution around the average subjective survival probabilities, there are many light smokers who under-estimate their survival probability in Schoenbaum's sample. Unfortunately, Schoenbaum (1997) does not present much information on the distribution of responses. Because there are also many non-smokers who under-estimate their survival probabilities, it is difficult to determine whether light smokers who under-estimate their survival probability over-estimate the risks of smoking or over-estimate other risks. Of course, they could have private information, in which case their personal estimates may be more accurate than the life-table values. Viscusi's method has some advantages in interpretation over this approach, but its weakness is that it does not take into account the individual's internalization of the risks.

In sum, both Viscusi and Schoenbaum present evidence that some smokers over-estimate the risks of smoking, while others under-estimate them. There is more disagreement about the extent of the information problem and the relative frequencies of the types of mistakes that consumers make.

### 8.3.3 Consumer information about the relative risks from tobacco and other hazards

Another approach to measuring risk perceptions focuses on relative risks rather than absolute magnitudes. Well-known systematic biases in individual risk perceptions suggest that perceptions of the relative risks of smoking are likely to be inaccurate. As Hanson and Logue (1998, pp. 1190–2) point out, consumer information about the relative risks of smoking compared to other threats to their health is an essential part of well-informed consumer decision-making:

If in fact, consumers tend to over-estimate some or all of the other risks to which they are exposed, they may well behave *as if* they under-estimate the risks of smoking.

Evidence shows that people tend to under-estimate the risks of common causes of death, while they tend to over-estimate the risks of rare causes of death (Lichtenstein *et al.* 1978; Slovic *et al.* 1979, 1985; Slovic 1987). In one experiment reported by Lichtenstein *et al.* (1978), participants were told the frequency of deaths in the United States due to motor vehicle accidents, and with this standard were asked to estimate the frequency of 40 other lethal events. On average, the risks of high-frequency lethal events, such as cancer and heart disease, were substantially under-estimated, often by a factor of 10 or more, depending upon the cause of death. The risks of low-frequency lethal events, such as botulism and tornadoes, were over-estimated, again often substantially. In another study, lay people's perceptions of relative risks were compared to the perceptions of a group of experts chosen for their professional involvement with risk assessment (Slovic *et al.* 1979). As an example of how much lay and expert risk assessments diverged, members of the League of Women Voters and a group of college students ranked nuclear power as the

most risky activity or technology, but the experts' ranking placed nuclear power as the twentieth most risky activity or technology. For the cases where technical estimates of the frequency of death were available, the experts' perceived risks were closely related to annual fatalities, but the risk perceptions of lay people showed only a moderate relationship.

As a relatively common cause of death, there is some evidence that people tend to under-estimate the risks of smoking. For example, Lichtenstein *et al.* (1979) found that in two groups of subjects, the geometric mean of their estimated frequencies of death from lung cancer responses implied about 10 000 annual deaths, compared to a true frequency of about 76 000 annual deaths at that time. In the study by Slovic *et al.* (1979), the experts ranked smoking as the second riskiest activity or technology, but the groups of lay people put smoking in third or fourth place. With the widespread publicity given to smoking, these results about people's risk perceptions in the 1970s may no longer be relevant. But a more recent 1993 Harris poll in the United States had similar findings. When asked to rank activities that 'help people in general to live a long and healthy life', avoidance of smoking was ranked tenth, far behind good air quality, good water quality, domestic fire detectors, and other factors with statistically marginal effects on survival. A 1996 survey of 500 adults from Szekesfehervar, Hungary, measured respondents' perceptions of the relative risks of various factors, based on a scale measuring the extent of the perceived broad influence on health of each of those factors.<sup>4</sup> On average, smoking ranked fourth, slightly behind daily stress, alcohol consumption, and environmental damages. Only 33% of respondents ranked smoking first, compared to 50% who ranked stress first.

Benjamin and Dougan (1997) point out a limitation of many of the studies that find systematic biases in individual risk perceptions: the aggregate annual numbers of deaths due to various causes are not very relevant to peoples' decisions about their own health and safety. Benjamin and Dougan argue that people can be well-informed about the risks they face but relatively uninformed about aggregate, population-wide fatality rates. Benjamin and Dougan build a model where people have good information on their age-specific mortality rates. The model further assumes that people use this information on their age-specific mortality rates to estimate population-wide rates. Calculating optimal estimates this way, Benjamin and Dougan re-analyze the data that Lichtenstein used. They find no important differences between actual responses and the optimal estimates, given the assumed information set of the respondents. Hakes and Viscusi (1997) argue that risk perceptions fit a Bayesian learning model. These studies suggest that inaccurate risk perceptions may result more from the inherent difficulties of learning about risks than from systematic departures from rationality. This interpretation, in turn, suggests that appropriate information policies have potential to influence smoking behavior.

#### 8.3.4 Information about addiction

The preceding discussion has shown that people may not fully realize the health consequences of tobacco consumption. Here we turn to discuss the possibility that people

<sup>4</sup> Other results from this survey on Hungarians' general awareness of the risks of smoking are discussed above.

may also be poorly informed about addiction. In 1964, tobacco use was considered habituating. Perhaps surprisingly, it was not until 1988 that the US Surgeon General established nicotine as 'a highly addictive substance, comparable in its physiological and psychological properties to other addictive substances of abuse'. In terms of consumer information, the 1992 National Health Interview Survey Cancer Control Supplement asked respondents if they thought smoking is a habit or an addiction. The most common response was that smoking is both a habit and an addiction, given by 54.4% of the sample. Another 22.4% of the sample identified smoking as an addiction. Only 17.8% of the sample thought smoking was just a habit, and a fairly trivial number (1.2%) responded that it was neither.

Interestingly, the patterns of responses to the 1992 National Health Interview Survey about the addictiveness of smoking are very similar when the sample is broken down by smoking status (current smokers, those who never smoked ('never-smokers'), and former smokers). About 55% of current smokers, never smokers, and former smokers identify smoking as both a habit and an addiction. About 21% of current smokers respond that smoking is a habit, slightly more than the percentages of former smokers, and never-smokers who gave that response (19% and 16%, respectively). In sum, most adults in the United States, and most smokers, identify smoking as an addiction or as an addiction and a habit. However, it should be noted that it is unclear how the distinctions that the lay population makes—between an addiction, a habit, or both—correspond to the concept of addiction used by medical professionals.

Whether teenagers are well-informed about the addictiveness of tobacco when they decide to start smoking is obviously of crucial importance because virtually all smokers in high-income countries, and many smokers in low-income and middle-income countries (see Chapter 2), start their addictions before the age of 20. There are several pieces of evidence suggesting that a lack of information about addiction is a common problem among youth smokers. One comes from the 1989 Teenage Attitudes and Practices Survey in the United States. In this survey of 12–18-year-olds, 39% of smokers—but only 11% of never-smokers—believed that they would be able to quit at any time they wanted (USDHHS 1994, p. 81). Using data from Tobacco Use Supplements to the Consumer Population Survey in 1992 and 1993, Hersch (1998) found that young people aged 15–20, who believe smoking is not an addiction, are much more likely to smoke than those who believe it is an addiction, or both an addiction and a habit. For example, among white males in this age group who believe smoking is an addiction, only 12.3% smoke, while the proportion among those who believe it is neither an addiction or a habit is 39%.

Additional important evidence on youth information about addiction comes from analysis of data from the Monitoring the Future Project surveys (USDHHS 1994, pp. 84–7). Teen smokers are optimistic about their personal chances of quitting smoking: 55% of past-month smokers and 45% of daily smokers predicted that they probably would not, or definitely would not, be smoking in 5 years. Data from longitudinal follow-up surveys of these same students provides direct evidence on whether their predictions were accurate. The typical pattern was for the teen smokers to maintain or increase the amount they smoked. In particular, the expectations about quitting showed very little connection to actual smoking behavior 5 or 6 years later. These patterns are again suggestive that teens under-estimate the addictiveness of smoking.



**Fig. 8.4** Trends in high school seniors' beliefs about the risks of smoking. Source: Monitoring the Future Project, USDHHS (1994).

A study of 191 adolescent girls in the United Kingdom found that 71% of daily smokers and 72% of occasional smokers made at least one attempt to quit, but failed (McNeil *et al.* 1986). Similar British data are reported by Townsend and colleagues (1991).

### 8.3.5 Adolescents' awareness of the health risks of tobacco

While it is clear that young people may consistently under-estimate the risk of becoming addicted to smoking, it is also worthwhile to note that their understanding of the health risks may also be somewhat different from that of older adults. Data from the Monitoring the Future Project (MTFP), a national survey, (USDHHS 1994) show that in 1975 just over 50% of high-school seniors indicated that they believed people are putting themselves at 'great risk' by smoking one or more packs of cigarettes a day. Although progress has not always been steady, the general trend shows higher percentages responding this way over time (Fig. 8. 4). By 1991, almost 70% of high-school seniors in the MTFP data indicated that smokers put themselves at great risk. However, during the 1990s this trend did not continue, and for much of the decade slightly lower percentages of high-school seniors reported believing that smokers put themselves at great risk. In 1995 the percentage perceiving a great risk had dipped to a low of 65.6%. The percentage began to increase again after 1995, so that by 1998, 70.8% of high-school seniors perceived a great risk from smoking.

### 8.3.6 Summary

In sum, then, an optimist would note that high rates of knowledge about the general health risks of smoking have been found in surveys of populations as diverse as those of Denmark, Hungary, South Africa, Vietnam, and Taiwan. Trends in high-income countries, such as the United States, show consumer information increasing steadily over time, in parallel with scientific discoveries of the health consequences of smoking and policy efforts to disseminate this information. By the 1990s, the evidence suggests that over 90% of the US population is aware that smoking increases the risks of lung cancer, heart disease, and emphysema/bronchitis. Nearly 90% agree that passive smoke is harmful, and almost 80% believe that smoking is addictive.

However, a pessimist would point out many remaining gaps in consumer information about tobacco. In some countries, such as China, many people are unaware of many of its health consequences. In the United States, young people seem to underestimate the addictiveness of tobacco. In many countries, even though consumers are aware of general health hazards from smoking, knowledge about many specific health consequences is inadequate. Psychological research finds systematic biases in individual risk perceptions, where people tend to underestimate the riskiness of the most common causes of death, of which prolonged tobacco use is one. Some evidence also suggests that people who appear to be well-informed fail to apply the information to themselves.

It is difficult to compare the extent of consumer information between different countries because of the lack of comparable survey data. Nevertheless, some preliminary comparisons can be suggested. Broadly speaking, where surveys have been done, low-income and middle-income countries do not have the consistently high levels of awareness seen in the United States. However, the pattern is not consistent, and some countries, such as Vietnam, report high awareness of risk, whereas others, notably China, report very low levels of awareness in the general population. Moreover, even if there are apparently similar levels of awareness, smoking behavior is very different in the United States, where smokers are more likely to report intentions to quit, more likely to attempt to quit, and more likely to do so. Much of this could be related to gaps between awareness of risks and the degree to which it is internalized and translated into action. Studying the determinants of quitting behavior in different countries is a promising direction for future research.

When thinking about the future potential for consumer information policies to reduce tobacco use, it is necessary to consider why information gaps remain. In this regard, it seems appropriate to sound a note of cautious optimism. Psychologists and economists are gaining a better understanding of the formation of risk perceptions and how policy interventions can help. Slovic *et al.* (1985, p. 259) argue that while some of the broad results of psychological research on the difficulties people have in comprehending and estimating risks seem pessimistic, the details give some cause for optimism: people understand some things quite well, although their path to knowledge may be quite different from that of the technical experts. In situations where misunderstanding appears to be rampant, errors can often be traced to inadequate information and biased experiences, which education may be able to counter. Taking an economic approach, Taylor *et al.* (1999) provide evidence that survey respondents'

expectations of survival to a given age are strongly related to the actual observed mortality subsequent to the survey. This result suggests that respondents were rational in anticipating their own deaths, and that the relationships are consistent with Bayesian updating models of risk perceptions. In a related study, Smith *et al.* (1999) use new information from their own health experiences to update their expectations of survival to a particular age. These results are consistent with the argument by Slovic and his colleagues that people do learn about risks, and give cause for more optimism about the potential of information campaigns.

## **8.4 Econometric studies of the link between consumer information and tobacco use**

This section begins by reviewing the common conceptual framework underlying economic analyses of consumer information and tobacco use, then reviews two strands of econometric research on the empirical relationships between these variables. The first approach estimates the impact of so-called 'information shocks', such as the 1964 report of the US Surgeon General, on tobacco markets over time. The second approach examines the relationship between consumer information and smoking behavior in a cross-section of the population at a point in time.

### **8.4.1 Conceptual framework**

The effects of health information on tobacco use can be analyzed in an extended version of the standard economic model of consumer behavior. Each consumer is assumed to compare the monetary price of tobacco products to the utility (pleasure or satisfaction) received in the present, taking into account the effects of addiction and smoking-related health problems on future utility. The individual demand curve summarizes consumer behavior by showing that, holding other factors constant, the quantity demanded declines as the price of tobacco products increases. The impact of changes in consumer information about the addiction and health consequences of tobacco use are examples of what happens when other factors are not held constant. Each individual consumer demand curve will shift down and to the left, meaning that because of the new information for any given price, the quantity demanded is lower. Market demand is the aggregate of individual demand and shifts in the same way in response to new information.

The use of this framework of consumer demand to analyze tobacco use raises some special practical and conceptual issues. On the practical side, it is important to note that the quantity of tobacco products sold depends on the number of users and the quantity demanded by each user. Considering the addictive properties of tobacco, the number of users can be thought of as being determined by consumer decisions to start and to quit. So health information can decrease aggregate tobacco demand in four ways:

- (1) it discourages non-users from starting;
- (2) it encourages current users to cut down;
- (3) it encourages current users to quit; and
- (4) it discourages relapse (re-starting) among former smokers.

The different types of consumer response to information influence aggregate tobacco sales with different time lags. The short-run response is dominated by the reactions of current smokers who either cut down or stop their use of tobacco products in response to new health information. The extent to which new information discourages non-users from starting is less of a factor in the short-run because the flow of potential new smokers is small compared to the stock of existing smokers. For example, the Congressional Budget Office (1998) estimates that in the United States, established adult smokers (defined as those age 18 and over) account for 98% of cigarette sales. However, the degree to which starting behavior is responsive to health information determines the long-run market demand. For example, information will have less of an impact on tobacco markets if young people continue to start smoking at rates that can replace the lost demand from older users who cut down, quit, or die. The empirical studies reviewed below mainly provide evidence on the broad impact of information on total tobacco use.

It is important to note that consumer information is only one of many influences on tobacco use. Tobacco use is also influenced by policy-manipulable factors, such as price and regulations on public smoking, other economic factors, such as income and labor-market conditions, and demographic factors, such as schooling and age. The challenge for the empirical studies reviewed below is to disentangle these effects. It is difficult to make estimates of the extent to which tobacco use would fall if health information changed but all other factors were held constant. In reality other factors are not held constant.

The difficulty is compounded because information about the health consequences of tobacco use may actually cause other important factors to change. Warner (1977, 1981, 1989) argues that scientific evidence establishing tobacco as a major public health problem helped change the context of the political debate about tobacco control in the United States. In this way, the anti-smoking information campaign induced other policy changes. For example, Warner (1977, p. 648) points out that in 1965, just after the 1964 Surgeon General's report, there were 23 state and local cigarette tax increases, compared to no more than a dozen in any of the preceding 14 years. Although there was a period of tax inactivity during the 1970s in the United States, for the past two decades tax increases and other tobacco control measures have continued to be associated with increased anti-smoking sentiment in many state and federal legislatures (Warner 1989). The full impact of information campaigns on tobacco use reflects the direct effect of health information on consumer demand, plus any indirect effects when information changes public anti-smoking sentiment and thus facilitates tobacco control policies. An important topic for research in political science or political economy will be to estimate the extent to which tobacco control measures have resulted from campaigns in this way: the conclusions will be important considerations for policy-makers. The discussion here, however, is more narrow and reviews studies that use the economic framework of consumer demand to estimate the direct effect of health information on tobacco use.

A further complication is that the impact of new health information can depend on, and interact with, other factors that determine tobacco use. For example, the effectiveness of mass-media information campaigns may depend on the general levels of literacy and schooling in the population. Factors such as prices and income may play less obvious but also important roles in interaction with consumer information. Section 8.6 of this chapter discusses these issues in more depth to help judge what developing

countries can learn from other countries about health information as tobacco control policy.

A final conceptual issue to be noted concerns the relevance of the economic approach to understanding tobacco use. In Becker's (1976) famous definition, rational maximizing behavior is one of the assumptions that, when 'used relentlessly and unflinchingly, form the heart of the economic approach . . .'. In contrast, the economic approach does *not* assume that individuals are perfectly informed. Analysis of tobacco use by poorly-informed consumers fits into a rich tradition of theoretical and empirical economics research into markets with information problems.. Becker and Murphy (1988) develop a model of so-called 'rational addiction' that demonstrates how many of the phenomena of addiction can be analysed in an economic model (see Chapter 5 for a detailed discussion).

The correct policy response depends on whether tobacco use results from a lack of information or from a lack of rationality. Orphanides and Zervos (1995) show how policies to improve information, such as prohibitions of misleading advertisements by the tobacco industry, can improve social welfare in the Paretian sense. If information about addiction were not an issue, advertising bans would increase the information search costs for smokers and decrease their welfare. However, in the framework developed by Orphanides and Zervos, advertisements can lead more people to mistakenly begin addictive behaviors. In this situation, advertising bans are desirable policies whenever the potential of advertising 'to mislead produces more harm than its potential to inform' (Orphanides and Zervos 1995, p. 753). The economic approach and the rational model do not imply that tobacco control policies necessarily make consumers worse off.

In a world with imperfect information and scarce resources, the role of economic policy analysis is to help evaluate whether the benefits of additional information are worth the costs of providing it. But as a final note on the economic approach, it also should be recognized that economic models allow for the possibility that some rational, well-informed people may decide to begin and continue an addiction to a substance with serious health consequences. As mentioned elsewhere in Chapter 7, it appears that most countries do not have in place policies that would address the specific market failures from smoking, but which would still leave such room for optimal consumption by informed smokers.

#### 8.4.2 The impact of 'information shocks'

Studies to explore the impact of anti-smoking publicity started in the early 1970s. Table 8.1 summarizes the results of selected studies from a number of countries. Because it is hard to quantify the volume of tobacco-related health information, the studies generally explore whether events such as the publication of the 1964 US Surgeon General's report shifted cigarette consumption away from its time-trend. Many of the studies also explore and control for the role of cigarette advertising, discussed in more detail by Saffer (Chapter 9).

In an influential study, Hamilton (1972) studied the impact of what he terms the 'health scare' on the per capita demand for cigarettes of the US population aged 14 and older, from 1926 to 1970. He estimates several specifications for the periods

**Table 8.1** The effect of anti-smoking publicity and health information on demand for cigarettes

| Country            | Time    | Event regarding anti-smoking publicity and health information  | Effect   |
|--------------------|---------|--|--|
| The United States  | 1954–55 | The release of the Hammond and Horn Study in 1954, and a book by Koskowski in 1955.  | A decrease in per capita consumption by 6.9% to 8.8% cigarettes in each of the two years, fading away. |
|                    | 1964    | The publication of the 1964 Surgeon General's Report about Smoking.  | Reducing per capita consumption by 1% to 1.3% cigarettes in that year.                                 |
|                    | 1971    | Ban on television and radio advertising of cigarettes.   | Reducing per capita consumption by 2.2% to 2.9% cigarettes in that year.                               |
| The United Kingdom | 1962    | The first report of the Royal College of Physicians.   | A sudden 4.6% reduction, recovering 1% a year.   |
|                    | 1965    | Ban on television advertising of cigarettes, and considerable public discussion of the issue.  | A sudden 4.9% reduction, recovering 1% a year.   |
|                    | 1971    | The second report of the Royal College of Physicians.  | A sudden 4.9% reduction, returning back later.   |
| Switzerland        | 1964    | The publication of the US Surgeon General's Report.  | An immediate 15% reduction, 4% of which had faded away by 1972.  |
|                    | 1966    | Anti-smoking publicity in the mass media and various anti-smoking activities following the largest single increase in the tobacco tax in January 1966. | An immediate but temporary 11% reduction.  |
|                    | 1978–79 | The mass debates regarding a public vote on a complete advertising ban for tobacco products before this vote, which took place in 1979.                | An immediate but temporary 9% reduction.   |
| Finland            | 1964    | The publication of a short report on the health risks of smoking by the National Board of Health, and the publication of the Terry report.             | An immediate but temporary 6% reduction.   |
|                    | 1971    | Ban on television tobacco advertising.   | No effect.   |
|                    | 1976–77 | The 1976 <i>Tobacco Act</i> , the total advertising ban in 1977, and an  | A permanent 7% reduction.  |

**Table 8.1** (cont.)

| Country      | Time | Event regarding anti-smoking publicity and health information  | Effect   |
|--------------|------|--|--|
|              |      | extensive public debate about the health risks of smoking in 1977.   |  |
| Greece       | 1979 | A systematic anti-smoking campaign including health education, non-smoking in public offices, and non-advertising of cigarettes on television. | A 7.3% reduction in the short-run.             |
| Turkey       | 1982 | Starting to put health warnings on cigarette packages.   | A reduction of about 8% in the short-run.      |
|              | 1986 | An anti-smoking campaign by a national newspaper.  | Additional reduction.                          |
|              | 1988 | An anti-smoking campaign by the government.  | Additional reduction.                          |
| South Africa | 1991 | Starting to have anti-smoking advertising and health warnings on cigarette packages.   | Some effect on reducing demand for cigarettes. |

Sources: For the United Kingdom, Atkinson and Skegg (1973); for Switzerland, Leu (1984); for Greece, Stavrinou (1987); for Finland, Pekurinen (1989); for Turkey, Tansel (1993); for the United States, Blaine and Reed (1994); for South Africa, Abedian (1996).

1926–70 and 1953–70. He assumes that once a message regarding the health consequences of smoking had been sent to the public, its impact on cigarette consumption stayed stable from year to year in his observation period. His results show that the 1964 Surgeon General's report decreased per capita cigarette consumption by between 146 and 253 cigarettes per year on average during 1964–70. Expressed differently, these decreases are from 3.7% to 6.5% of the average per capita consumption from 1968 to 1970. He also estimates a significant impact due to the advent of large-volume broadcast anti-smoking messages required by the Federal Communication Commission's Fairness Doctrine (to counterbalance cigarette broadcast advertising) from 1968 to 1970. His results indicate that this publicity reduced per capita cigarette consumption by between 9.9% and 13.7% per year on average over the period 1968–70. In addition, he estimates that the Fairness Doctrine anti-smoking messages had a larger impact on cigarette consumption than broadcast advertising by the tobacco industry. When the United States banned the industry's broadcast advertisements, an unintended consequence was that the Fairness Doctrine no longer required broadcast media to air anti-smoking messages. Based on his results, Hamilton (1972) predicted that the ban on broadcast advertising would therefore not reduce cigarette consumption.

In additional analysis of US time-series data from 1930 to 1978, Schneider *et al.* (1981) estimate that consumers responded to three information shocks: a 1953 publi-

cation by the American Cancer Society; the 1964 Surgeon General's report; and the anti-smoking messages broadcast during the Fairness Doctrine era (1968–70). They estimate that the cumulative effect of these shocks was a 30% relative decrease in cigarette consumption.

Blaine and Reed (1994) have updated earlier studies to estimate the impacts of health-related information about smoking in the United States after World War II by using data on cigarette consumption per US adult aged 18 or over, from 1946 to 1992. They have estimated the effects of health publicity 'events' in three periods:

- (1) the release of the Hammond and Horn paper in 1954, and a book by Koskowski in 1955, which reported the relationship between smoking and mortality;
- (2) the publication of the 1964 Surgeon General's Report about the health consequences of smoking and subsequent efforts by the government to reduce tobacco consumption from 1965 to 1970; and
- (3) a ban on television and radio advertising of cigarettes in 1971 and anti-smoking activities since 1971 to the end of the study period (i.e. 1992).

The researchers imposed some assumptions in their specifications. First, they allowed the 'information shock' effect related to the 1954–55 health publicity event to decay gradually after these two years. Second, they allowed the health-scare effect related to the 1964 event and subsequent warnings to increase from year to year during 1964–70 and then fade away. Third, they allowed the health-scare effect related to the 1971 event, and those that followed, to increase from year to year until the end of the observation period. They found that repeated health warnings about smoking have considerably reduced consumption. The 1954–55 health scare reduced per capita consumption by between 6.9% and 8.8% in each of the two years, and the effect gradually faded away. The 1964 publicity decreased per capita consumption by between 1% and 1.3% in that year, and the annual effect from this publicity and anti-smoking efforts during 1965–70 increased from year to year until 1970 and then died away. The 1971 event reduced per capita consumption by between 2.2% and 2.9% in that year, and the annual effect from this event and following anti-smoking activities increased until the end of the study period.

Chen (1998) takes a somewhat different approach and extends this earlier line of research to explore a new information shock that is expected to have a disproportionate impact on smoking in a particular segment of the population: parents with children at home. To the extent that parents understand the consequences of second-hand smoke for their children's health, they can invest in their children's health by cutting down or quitting. Chen uses several approaches to explore whether the dissemination of information on the health consequences of second-hand smoke in the United States changed parents' demand for cigarettes. Her first approach is to calculate ratios of expenditures on tobacco per adult in households consisting of husband, wife, and children to expenditures on tobacco in households with single adults. This ratio falls fairly steadily over time, from 1.45 in 1960 to 0.83 in 1994, suggesting that parents' demand for cigarettes is falling much faster than that of single persons. Additional analysis of repeated cross-sections of the American population from several years of the National Health Interview Survey provides further support for this interpretation (Kenkel and Chen 1999). For example, over time, the impact of having young children

in the household further reduces the prevalence of smoking in parents. This is important evidence that information released after the early findings reported in the 1964 Surgeon General's report continued to influence smoking patterns in the United States for some years.

In the United Kingdom, Atkinson and Skegg (1973) use aggregate data on tobacco consumption from 1951 to 1972 to examine the effects of anti-smoking publicity. They investigate three events related to anti-smoking publicity:

- (1) the publication of the first report of the Royal College of Physicians in 1962;
- (2) the ban on television advertising of cigarettes and considerable public discussion of the issue in 1965; and
- (3) the publication of the second report of the Royal College of Physicians in 1971.

Based on their results from models using data on the numbers of cigarettes consumed, they maintain that the 1962 event caused a sudden reduction of 4.6% in consumption, which recovered at a rate of about 1% a year; the 1965 event caused a sudden reduction of 4.9% in consumption, which also died away at a rate of about 1% a year; and the 1971 event again resulted in a fall of 4.9% in consumption in that year and the effect again faded away. These effects appeared to be for men rather than women.

Leu (1984) analyzes the impact of anti-smoking publicity in the mass media in Switzerland by using data of annual per capita cigarette consumption of adults aged over 15, between 1954 and 1981. He examines the effects of three events:

- (1) the publication of the US Surgeon General's Report, which had an important impact in Switzerland;
- (2) anti-smoking publicity in the mass media and various anti-smoking activities following the largest single increase in the tobacco tax in January 1966; and
- (3) mass debates that took place in the run-up to a public vote on a complete advertising ban for tobacco products in 1979.

Leu argues that anti-smoking publicity in the mass media had an important effect on decreasing cigarette consumption and had permanently reduced consumption by 11% in 1984.

Stavrinos (1987) employs aggregate data of the number of cigarettes consumed per adult in Greece from 1960 to 1982 to examine the effect of a systematic anti-smoking campaign in 1979, including health education, non-smoking in public offices, and non-advertising of cigarettes on television. The empirical model adopts a partial adjustment specification, which considers the habit-forming nature of cigarettes and time-lags in reaching the desired consumption level. The results suggest that the anti-smoking campaign reduced consumption of cigarettes by 7.3% initially and by 13.5% in the long run.

Pekurinen (1989) applies Finnish aggregate data of the number of cigarettes consumed per capita for the population aged over 15 from 1960 to 1987 to estimate the effect of anti-smoking publicity. He considers four publicity events:

- (1) the Terry report and the report about the health consequences of smoking by the National Board of Health in 1964;
- (2) the ban on television tobacco advertising in 1971;

- (3) the 1976 Tobacco Act; and
- (4) the total advertising ban in 1977.

He concludes that the 1964 publicity event decreased consumption immediately, but temporarily, by 6%; that the 1971 ban on television tobacco advertising did not have any significant effect; and that the events in 1976 and 1977 permanently reduced consumption by 7%.

Tansel (1993) uses Turkish annual time-series data of the weight of cigarettes consumed per person aged over 15, between 1960 and 1988, to estimate the effects of three events:

- (1) health warnings after 1981;
- (2) a 1986 anti-smoking campaign by a national newspaper; and
- (3) a short-lived anti-smoking campaign mounted by the government in 1988.

The results suggest that the health warnings, on average, decreased cigarette consumption by about 8% for the period 1982–88. The 1986 and the 1988 publicity events appeared to induce additional reduction in consumption in the 1986–88 period. In addition, the author argues that health warnings can produce an effect larger than the opposing effect of advertising, and maintains that public education about the health consequences of smoking may be a more effective way to reduce cigarette consumption than increasing the price of cigarettes.

Abedian (1996) explores the effect of anti-smoking advertising in South Africa by using data on the real per capita numbers of cigarettes consumed domestically from 1970 to 1993. He examines the decline in per capita consumption and assesses whether the decline can be explained by changes in price, income, advertising, and anti-smoking campaigns. Because the decline can not be explained by the first three factors alone, he argues that anti-smoking publicity has contributed to the decline.

#### 8.4.3 Studies of the link between consumer information and smoking in cross-section

Instead of focusing on information shocks and tobacco use over time, another approach examines the relationship between consumer information and smoking behavior in a cross-section of the population at a point in time. Given different costs in acquiring information, it is reasonable to expect variation in the degree to which different members of society are informed about tobacco, even long after information shocks. Taking this approach, Kenkel (1991) finds that more knowledgeable consumers, as measured by knowledge of the links between smoking and specific diseases, smoke less. Unlike studies using aggregate data, Kenkel's are based on microdata on individuals from the 1985 National Health Interview Survey. The author is able to estimate the effect of information on two outcomes: first, the decision to smoke, or smoking participation; and, second, on how many cigarettes current smokers consume.<sup>5</sup> It should be stressed that the estimated relationship between information and smoking

<sup>5</sup> However, the tobit model used in his analysis imposes a restriction on the relationship between the effects of an explanatory variable on the participation decision and its effects on the quantity consumed given participation.

statistically controls for possible differences in observable characteristics such as the person's income and schooling. However, Kenkel suggests that a person who is particularly 'health-minded' might smoke less for any given level of information but also might seek out more health information. This raises the possibility that part of the estimated relationship between information and smoking is spurious and reflects unobservable differences in attitudes towards health. Kenkel adopts a two-stage econometric approach to explore this problem. He concludes that while the pattern of results from this approach is somewhat weaker, it is reasonable to conclude that the relationship between information and smoking is not spurious.

Also using cross-sectional data from surveys of individuals, Viscusi (1990, 1991, 1992) finds that consumers who perceive higher risks are less likely to smoke. As described above in Section 8.3, Viscusi uses quantitative measures of risk perceptions, for example, based on respondents' estimates of the frequency of lung cancer due to a smoking in a group of 100 smokers. Viscusi (1990, 1992) estimates a logit model of the probability that individuals smoke as a function of their perceptions of the risks to their health and a set of socio-economic control variables. He finds that individuals who perceive the risks of lung cancer from smoking to be relatively high are significantly less likely to smoke than individuals who perceive those risks to be relatively low. As one illustration of the magnitude of the estimated effect of information on smoking, Viscusi uses the logit results to simulate the impact of improving the accuracy of people's risk perceptions. The simulation predicts that the societal smoking rate would rise by 6.5% if people believed that the lung cancer risk were 0.1, instead of their own under- and over-estimates. The direction of this result is logical, given Viscusi's somewhat controversial finding that most people in his sample over-estimated the risks of smoking. In other analyses, Viscusi finds that people's smoking decisions are consistent with other risk-taking activities, such as their willingness to accept riskier jobs in return for higher wages.

Viscusi (1991, 1992) also explores the relationship between risk perceptions and smoking for adolescents and young adults. This is central to research, given the important concern that young people in particular fail to internalize and react to hazards to their health. Viscusi finds that the risk assessments of respondents aged between 16 and 21 are higher than those of older respondents. However, risk perceptions appear to influence the smoking behavior of the young in the same way as risk perceptions influence smoking by older adults. The pattern of results leads Viscusi (1992, p. 128) to conclude that: 'There is certainly no evidence of greater neglect of smoking risks by the very young. Indeed, the opposite is the case . . .'. Viscusi suggests that risk perceptions are higher among younger non-smokers and smokers because public anti-smoking campaigns mean that they have been exposed to a very different informational environment than older cohorts.

Liu and Hsieh (1995) estimate the relationship between individual risk perceptions and smoking behavior, using survey data from Taiwan. The risk perception measures and empirical approach are similar to Viscusi (1992). They find that higher risk perceptions reduce the probability of smoking. As Viscusi (1992) finds, the results are robust across several specifications, including one that treats risk perceptions as an endogenous variable.

Jones and Kirigia (1999) have studied the relationship between health knowledge and smoking among South African women. In their sample of about 3500 female

respondents, 26% were smokers. Health knowledge was measured by a simple indicator of whether the respondent was aware that smoking has negative health consequences, which was true for 86% of the sample. Jones and Kirigia estimate a bivariate probit model of the determinants of smoking status and health knowledge. Their results yield a negative correlation between the unobserved determinants of smoking and health knowledge. This suggests that unobserved factors that make smoking more likely also make poor health knowledge more likely. Their approach does not provide estimates of the impact of improving health knowledge on smoking, or the impact of specific anti-smoking interventions. However, it provides policy-relevant information. For example, it identifies those women who may be the most likely to respond to health education because they currently smoke but are unaware of the health consequences. Some 7.1% of the total study population of women were unaware of the health consequences; but, among them, smokers were 'over-represented', accounting for 27% of the study population). Furthermore, Jones and Kirigia are able to make these comparisons at a finer level of detail. For example, they find that the proportion of uninformed smokers relative to informed smokers is much greater among Black women.

## 8.5 The effectiveness of specific health information interventions

This section briefly reviews the evidence for the impact of different types of intervention on smoking prevalence and tobacco consumption.

### 8.5.1 Mass-media counter-advertising campaigns<sup>6</sup>

Counter-advertising campaigns are another example of public interventions that may improve consumer information about the health and addiction consequences of tobacco. Saffer (Chapter 9) discusses advertising and counter-advertising in more detail. In this section, a few studies of counter-advertising campaigns are highlighted to explore their potential as informational interventions.

Using microdata on teen smoking in the United States from 1966 to 1970, Lewit *et al.* (1981) explored the impact of the country's first major anti-smoking advertising campaign, during the late 1960s. As explained above, as a result of the Federal Communications Commission's ruling that the Fairness Doctrine applied to cigarette advertising, there was an unprecedented barrage of anti-smoking messages on the US broadcast media from mid-1967 until cigarette broadcast advertisements were banned in 1971 (USDHHS 1989, p.415). The value of the implicit subsidy of donated radio and television time at its peak in 1970 has been estimated at about \$200 million in 1985 US dollars (USDHHS 1989) or over \$300 million in current dollars. Lewit *et al.* (1981) estimate that the anti-smoking messages required by the Fairness Doctrine had a significant impact on teen smoking participation rates. Their regression results suggest that the 'Fairness Doctrine effect' accounts for about two-thirds of the reduction of 3% to 3.4% in teen smoking participation rates that is predicted by simple trend equations.

More recently, in 1988, the state of California passed Proposition 99, the *California Tobacco Tax and Health Promotion Act*, increasing the tax on each package of cigarettes from 10 cents to 35 cents beginning from January 1989. In addition, the act

<sup>6</sup> Teh Hu contributed to this sub-section of the chapter.

earmarked 20% of the revenue raised by this new tax for health education programs designed to reduce tobacco use. The most visible component of these four programs was the statewide anti-smoking media campaign. According to the California Department of Health Services, between April 1990 and June 1993, the state spent about \$26 million on this campaign. Two studies (Hu *et al.* 1995a, 1995b) have empirically examined the effect of California's anti-smoking campaign on cigarette sales. The researchers estimate that every 10% increase in media campaign expenditures has reduced cigarette sales by 0.5%. In absolute terms, the media campaign reduced sales by 7.7 packs per capita during the third-quarter of 1990 through the fourth-quarter of 1992. The reduction of 7.7 packs per capita is about 10% of the average sales (in packs per capita) at the beginning of the campaign in 1990.

A separate analysis was used to examine the effect of the California anti-smoking media campaign on print advertising by the cigarette industry. It was shown that the state media campaign reduced cigarette consumption, while industry advertising increased, as measured in monthly total pages of cigarette advertisement per issue in *Life* magazine. In other words, the industry advertising slightly reduced the absolute magnitude of the effect of state media campaign.

It is notable that the media campaign reduced cigarette consumption in California where, as in the rest of the United States, consumer information about the health and addiction consequences of tobacco use is widespread. Survey evidence suggests that America's young people are less well-informed than older adults, making them a more likely target for the media campaign. However, because cigarette sales are dominated by the choices of adult smokers, it is highly unlikely that the estimated reductions in sales could have come about solely through changing youth smoking behavior. Instead, it seems likely that the California media campaign changed adult smoking behavior. The specific informational content of the campaign for adults could be considered relatively low. In fact, as reviewed by Saffer (Chapter 9), some analysts of the campaign argue that advertisements that emphasized the unhealthiness of cigarettes were the least effective form of counter-advertising.

Mass-media counter-advertising campaigns specifically directed at youth are becoming more prevalent, and preliminary results from several state programs suggest these may be effective in reducing youth smoking. Massachusetts raised its cigarette tax by 25 cents per pack in 1993 and spent about \$40 million annually on the Massachusetts Tobacco Control Program (Connolly and Robbins 1998). Connolly and Robbins state that youth smoking rates in Massachusetts were nearly the same in 1996 (31%) as in 1993 (30%), a time when national rates of youth smoking increased, suggesting that Massachusetts' efforts 'worked' to some extent. However, because the tax increase and the anti-smoking media campaign occurred at the same time, it is hard to identify their separate effects. The Florida Youth Tobacco Survey (FYTS) conducted in February 1998 and February 1999, provides data to monitor the impact of the Florida Pilot Program on Tobacco Control (Centers for Disease Control and Prevention 1999). Data from the FYTS suggest that smoking prevalence among Florida high-school students fell from 27.4% in 1998 to 25.2% in 1999, while smoking prevalence in Florida's middle-school students fell from 18.5% to 15%. Florida did not increase its cigarette taxes over this period, but did spend \$93 million from its settlement with the tobacco industry on the Pilot Program that included a youth-oriented counter-marketing media

campaign. Data to compare Florida's decline in youth smoking to the national experience for 1998–99 are not yet available. It is also important to note that the most recent media campaigns have not moved past simply providing information about the health and addiction risks of smoking. Content analysis of these campaigns could shed additional light on the extent to which they should be considered to be interventions to change health information or interventions to change attitudes and perceptions about smoking more broadly.

### 8.5.2 School health-education programs

Bruvold (1993) reports the results of a meta-analysis of 84 studies published during the 1970s and 1980s that dealt with the prevention of smoking in a school setting. Different programs were classified according to their orientations into four groups:

- (1) a 'rational' orientation that focuses on providing factual information about drug use;
- (2) a 'developmental' orientation that focuses on affective education (e.g. increasing self-esteem, self-reliance and other skills) and which usually includes minimal or no focus on drug use *per se*;
- (3) a 'social norms' orientation that focuses on alternatives (e.g. reducing alienation) and usually includes minimal or no focus on drug use *per se*; and
- (4) a 'social reinforcement' orientation that focuses on developing abilities to recognize and resist social pressures to use drugs.

The results of the meta-analysis suggest that interventions in all four orientation classifications had a significant impact on knowledge or health-information outcomes. However, the results also suggested a clear general pattern: for programs oriented towards social reinforcement and social norms, the impact was positive and significant in encouraging non-smoking behavior; those for programs with developmental orientations were mixed in sign but generally positive and significant; and those for programs with rational orientations were mixed in sign and usually not significant.

Bruvold's (1993) meta-analysis confirms other suggestions that school-based programs with rational information-providing orientations were not as successful as programs with newer orientations, such as social reinforcement and social norms. At least for adolescent smoking decisions, the model that assumes that factual information will shift down consumer demand for tobacco products may be over-simplified, suggesting the need to embed an economic model of adolescent smoking decisions within a broader psychosocial framework. Reid (1996) reviews evidence that even programs with initially favorable behavioral results can delay recruitment to smoking for several years, but not indefinitely. These results suggest that the role of information provision in reducing adolescent smoking may be quite limited.

### 8.5.3 Warning labels

As noted above in Section 8.2, many countries require health warning labels on tobacco product packages and advertisements. The USDHHS (1987) reviews research on health-warning labels in general. The review concludes that warning labels *can* have

an impact on consumers if they are designed to take into account factors that influence consumer response, such as consumers' previous knowledge of the risks and their level of education and reading ability. To be effective, labels should stand out and have a visual impact; have a visible format; and contain specific, rather than general, information. However, the USDHHS (1987) noted that the evidence of the real-world effectiveness of warning labels in some situations cannot be regarded as conclusive evidence that health-warning labels are necessarily effective in all situations. These considerations suggest that, until recently, the warning labels required in many countries were unlikely to be effective, and have prompted some countries to change their policies (Roemer 1993). Past experiences with warning labels may understate the potential for better-designed warning labels to help reduce tobacco consumption.

Nevertheless, past experience with warning labels may give some idea of their potential, as well as for how that potential might be enhanced. For example, the USDHHS (1989) reviews empirical evidence that people did not pay much attention to the warning labels required in US print advertisements before 1984. However, other evidence is somewhat more promising. For example, in a survey conducted 9 months after US policy required rotation of four specific health warnings, 64% of all adult respondents and 77% of cigarette smokers said they recalled seeing one or more of the new warnings. Whether warning labels have met the policy objectives of increasing consumers' knowledge and reducing cigarette consumption is also very difficult to judge and presents a challenge for research. Reviewing US time trends the USDHHS (1989, p. 485) concludes that:

In sum, there are insufficient data to determine either the independent contribution of cigarette warning labels to changes in knowledge or smoking behavior or the precise role played by warning labels as part of a comprehensive antismoking effort.

More recently, the Public Citizen's Health Research Group (1998) provides encouraging evidence on the effect of cigarette-warning labels on reducing cigarette consumption. According to this report, tobacco consumption decreased by 15% in South Africa in 3 years after 1994, when the new warning labels were implemented. Surveys show that 58% of smokers were motivated by the cigarette-warning labels to reduce their tobacco consumption or quit smoking. In Australia, according to a survey conducted in 1997, the strengthened warning labels introduced in 1995 appeared to have a larger effect on inducing smokers to consider quitting than the old labels. Similarly, half of Canadian smokers in 1996 said that cigarette-package warnings had contributed to making them want to quit or cut down their tobacco consumption.

In the preceding section and this one, evidence has been presented that suggests that dissemination of information about the health risks of smoking has decreased demand for tobacco products in many countries and over various time periods. Based on these fairly consistent findings, it seems safe to conclude that new information policies have the potential to decrease tobacco demand in many middle-income and low-income countries. However, predicting the magnitude of the demand response is much more difficult, and will depend upon many factors. The obvious differences between high-income and low-income countries, such as per capita income and varying levels of education and literacy, present challenges for the design of health-information policies. For

example, many of the most dramatic decreases in smoking in the United States followed the dissemination of information at a time when when smoking prevalence was high and consumer information was low. Further reductions in smoking in countries where information about the health consequences of smoking is widespread will be more difficult. Two important test cases for information will be China and India. Male smoking prevalence in these countries is about 67% and 40%, respectively. If the patterns seen in the industrialized high-income countries can be generalized, then the recently published and widely disseminated research findings on smoking hazards in China (Liu *et al.* 1998; Niu *et al.* 1998) should start to affect either smoking prevalence or tobacco consumption in the next few years. Similarly, forthcoming research findings on India (see Chapter 2) should also influence behavior in India over the next few years. Monitoring these trends will be crucial to judging the effectiveness of new information.

## 8.6 Concluding comments

This chapter has discussed two questions: Are consumers well-informed about the consequences of tobacco use? And, can public policies to improve consumer information reduce tobacco use? As is apparent, both questions defy simple answers. Clearly, some consumers are poorly informed about the consequences of tobacco use. This is more likely to be true for consumers in middle-income and low-income countries, and for young people in general, than for adult consumers in the high-income countries. An extrapolation from the experience of countries where information shocks have reduced tobacco consumption suggests that health information is an effective instrument for tobacco control. Moreover, given the continuing accumulation of evidence on the health consequences of tobacco, and the lags in consumers' responses to this information, there is still a role for governments to play in disseminating information, even in high-income countries, as well as in low- and middle-income countries. These conclusions are buttressed by the success of specific interventions to provide consumer information, including mass-media campaigns and warning labels. Disappointingly, however, the evidence suggests that school health-education programs may have less potential.

While there are, therefore, many consumers who are inadequately informed about tobacco and its health risks, it is probably also true that many consumers in high-income countries have been well informed. However, there appear to be gaps in the extent to which these risks are internalized by individuals, in the way that relative risks are understood, and in the way that young people assess the risks of addiction and disease. One of the more controversial issues is whether, on average, consumers over-estimate the risks of smoking. However, this controversy is somewhat irrelevant to the middle-income and low-income countries where most smokers live, and where many still perceive little or no risk from tobacco use. Even where the controversy is relevant, it should be stressed that the arguments refer to what consumers believe 'on average'. In reality, there is great heterogeneity in consumers' risk perceptions, and future research should investigate how to design public

information with this heterogeneity in mind. Although in many countries there is still considerable potential for consumer information policies to reduce tobacco use, eventually the law of diminishing returns will come into play and further gains will be much harder. Commenting on the US experience, the USDHHS (1989, p. 221) observes that:

The fact that in 1985 10% of smokers did not indicate that smoking is harmful to health, despite all efforts designed to impart such information, suggests that this group of smokers may resist accepting any information on the health effects of smoking. This finding . . . implies that other techniques besides providing information (e.g. policy incentives) are necessary to persuade some smokers to quit.

The USDHHS goes on to emphasize the importance of getting smokers to move past simply recognizing a general risk to understanding a personal risk from tobacco use. Weinstein's (1998) more recent review comes to the same conclusion, suggesting that personalizing risks is a critical objective for consumer information campaigns.

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