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**Article**

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## **Tobacco Control Policies and Smoking Cessation: A Cross-Country Analysis of Men\***

By Donald Kenkel, Dean R. Lillard and Alan Mathios

### **Abstract**

We adopt a life course perspective to study smoking behavior in Great Britain, Germany, Russia, and the United States. Given their different mixes of policies, it is intriguing that the cross-sectional prevalence of smoking in Great Britain and the U.S. is similar, while in Germany rates are higher and in Russia men's smoking rates are very high. Our results suggest that the similarity between British and U.S. smoking prevalence masks large differences in smoking cessation. The very high smoking prevalence among some cohorts of Russian men reflects both high smoking initiation and an almost total lack of smoking cessation.

*JEL Classification: I1*

### **1. Introduction**

The World Health Organization [WHO] (1999) predicts that worldwide mortality from tobacco is likely to rise from about four million deaths a year in 1998 to about 10 million deaths a year by 2030. Although much of this increase will occur in low income countries (Murray/Lopez 1996), the large stock of current smokers in both the formerly socialist economies and the established market economies makes smoking cessation a continuing and critical public health issue worldwide. For example, smoking still contributes to more than 400,000 deaths annually in the U.S. While recent policy debates have tended to focus on how to prevent youth from starting, Mendez and Warner (2000) conclude that public health objectives cannot be met without large increases in smoking cessation rates.

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Previous public health research on smoking prevalence and health economics research on cigarette demand has usually relied on cross-sectional data that may be relatively uninformative about the impact of public policies on smoking cessation. The current rate of smoking and current cigarette demand reflect the accumulated history of youth initiation and adult cessation decisions. For example, the current smoking prevalence in a population may be due to a high youth smoking initiation rate combined with a high adult smoking cessation rate or a lower but steadier level of life-course smoking. To complicate the picture, successive birth cohorts appear to follow different life-course smoking patterns of initiation and cessation. From a public policy perspective, it is important to understand whether and how policies have separately influenced smoking initiation and cessation decisions.

In this paper, we depart from the standard cross-sectional approach and instead present evidence to illustrate the power of adopting a life-course perspective to study smoking behavior. We use retrospective measures of life-course smoking from comparable longitudinal data sets from four countries: Germany, Great Britain, the Russian Federation, and the U.S. With these data, we can separate initiation and cessation decisions and investigate life-course smoking behavior under different mixes of tobacco control policies over long periods of time. This long time period is especially valuable because the tobacco control policies differ substantially within and across the four countries we study.

## 2. Tobacco Control Policies

In this section, we broadly review four categories of tobacco control policies in Germany, Great Britain, the Russian Federation and the U.S.: prices and taxation; legal restrictions on advertising and sales; direct restrictions on smoking in public places; and regulation of smoking cessation products. The information is mainly taken from the *Tobacco Control Country Profiles* project (Corrao et al. 2000), supplemented by other sources.

### Prices

Figure 1 shows trends in the relative price of cigarettes in Germany, Great Britain and the U.S. since 1955. In both Great Britain and the U.S. cigarette prices have increased fairly steadily since about 1980. In Germany the real price of cigarettes has varied over time but shows no strong trend. Although we do not have historical price data for the Russian Federation, in 2001 the price of cigarettes was far lower there than in the other three countries. In 2001 the price of cigarettes ranged from a low of \$0.98 in Russia to a high of

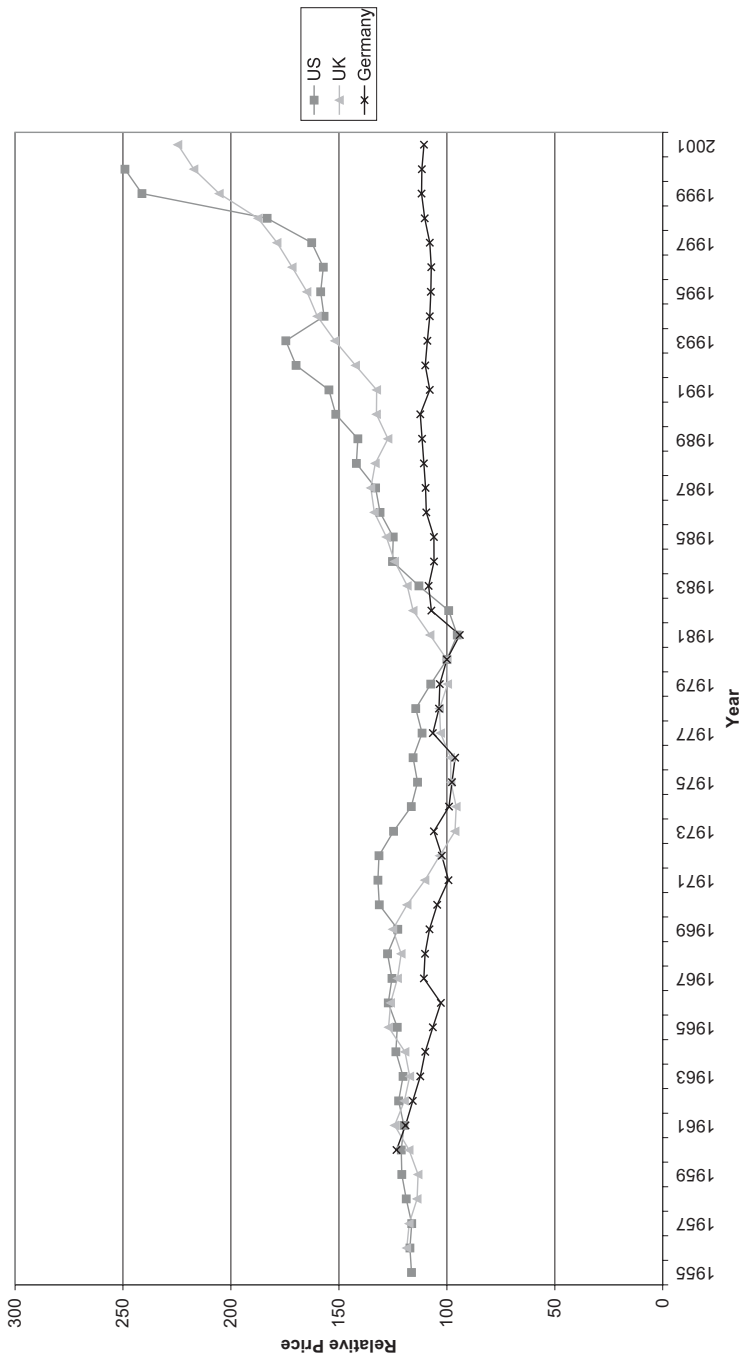


Figure 1: Relative Prices of Cigarettes in the US, UK, and Germany  
1980 = 100

\$6.24 in Great Britain with Germany and the US in between with prices of \$2.81 and \$3.71 respectively (Guindon /Tobin /Yach 2002). Most of the cross-country and inter-temporal differences in the price of cigarettes reflect differences in the excise taxes imposed on cigarettes. The U.S. price also includes a surcharge of about \$0.45 per pack to cover the cost of the 1998 legal settlement between the tobacco industry and the States' Attorneys General.

The relative rank of the Russian Federation reverses when one assesses tobacco affordability by examining how many minutes of labor are required to purchase a pack of cigarettes because average wages there are so much lower. Guindon/Tobin/Yach (2002) estimate that to buy a pack of Marlboros a smoker earning an average wage must work 17 to 18 minutes in Germany, 40 minutes in Great Britain, 71 minutes in the Russian Federation, and 17 to 20 minutes in the U.S.

### **Restrictions on Advertising and Sales**

All four countries restrict when and how cigarettes may be advertised and to whom they may be sold. Germany, Great Britain and the United States completely ban television and radio advertising of cigarettes. Russia prohibits advertising on television from 07:00 to 22:00. In addition, Germany restricts the content of print advertising. For example, advertisements in Germany may not create the impression that cigarettes are harmless to health and may not be targeted to youth. In addition to content, Germany, Russia, and the U.S. require that print advertisements include a health warning. In Germany the warning must cover 10 percent of the advertisement's surface, while in Russia the warning must cover at least five percent.

All four countries also require health warnings directly on tobacco packaging. Germany and Great Britain have adopted the European Union directive on labeling, which includes a requirement that the health warnings on cigarette packs to cover a minimum of four percent of the surface on which they were printed. Recently Great Britain increased this requirement to six percent. Russia requires domestically produced cigarettes to carry a health warning label, but labels are not required on imported cigarettes. The U.S. requires that cigarette packages display one of four rotating health warning labels.

Although all four countries prohibit the sale or distribution of cigarettes to minors, the effectiveness of these bans has been questioned. For example, WHO (1997, 373) notes that Russia's ban on sales to minors is reportedly not enforced. Until recently, many observers felt there was lack of enforcement in the U.S. as well, but recent policy initiatives have sought to make the ban more effective. One step to increase the effectiveness of bans on sales to minors is to regulate or ban cigarette vending machines. In Great Britain, owners of vending machines are required to prevent the machine from being used by

persons under the age of 16. In the U.S., 41 States and DC place some restrictions on vending machine sales, and 19 States and DC ban vending machines in areas available to minors (Rigotti 2001, 152).

### **Direct Restrictions on Smoking in Public Places**

The Russian Federation and the U.S. ban smoking in workplaces and many other public places, but Germany and Great Britain do not. The Russian bans were enacted between 1996 and 1999. In the U.S., most States enacted indoor clean air laws in the late 1980s and early 1990s. As of 2000, half of the States restrict smoking in private workplaces, 42 States restrict smoking on public transportation, and 35 States restrict smoking in restaurants (Jacobson/Zapawa 2001, Table 8.1). Although Germany has not banned smoking in public places by national legislation, a 1999 German High Court decision allows employers to ban smoking completely if they offer acceptable smoking facilities outside the building and most employees agree.

### **Regulation of Smoking Cessation Products**

Although smoking cessation products are available in all four countries we study, the availability of these products varies substantially. The U.S. restricts the sale and advertising of smoking cessation products least. For example, in the U.S. nicotine gum and nicotine patches are allowed to be sold over-the-counter. In Germany 2 mg nicotine gum and the nicotine patch are available only from pharmacies (behind the counter), while 4 mg nicotine gum requires a doctor's prescription. In Great Britain 2 mg nicotine gum is available over-the-counter, while 4 mg nicotine gum and the nicotine patch are available only in pharmacies. In Russia nicotine gum and patches are available only in pharmacies or by prescription. Advertising of nicotine gum and nicotine patches is allowed in all four countries. Bupropion, originally marketed as an anti-depressant but later marketed as a smoking cessation therapy, is available only by prescription in Germany, the U.S. and the U.K.; its status in Russia is not reported in Corrao et al. (2000). Only the U.S. allows Bupropion to be advertised as a smoking cessation therapy.

Although smoking cessation products are more easily available in the U.S., they apparently cost more. Novotny et al. (2000, Table 12.4) report that, in 1996, three months of nicotine replacement therapy in the form of nicotine patches cost consumers from \$282 to \$316 in Germany, \$213 to \$235 in Great Britain, and \$400 to \$472 in the U.S. Three months of nicotine gum cost consumers \$345 in Germany, \$163 to \$175 in Great Britain, and \$441 to \$745 in the U.S.

### **Implications for Research on Life-Course Smoking Behavior**

The cross-country and inter-temporal variation documented above creates a rich set of natural or quasi-experiments to study the impact of tobacco control policies on smoking. We suggest that researchers will learn more if they analyze smoking behavior in a life-course framework using longitudinal rather than cross-sectional data because cross-sectional data can not shed light on all of the ways tobacco control policies may affect smoking rates. A standard cross-sectional specification of cigarette demand uses a two part model, where the first part is a model of smoking participation and the second part analyzes consumption conditional upon participation (e.g., Wasserman et al. 1991, Evans /Farrelly/ Montgomery 1999). Moore (2001) points out that this specification lumps never-smokers and former-smokers together into a single, non-smoking group. Moore demonstrates that this mis-specification can lead to serious errors in inference. For example, Evans /Farrelly/ Montgomery (1999) claim to find strong evidence that worksite smoking bans reduce smoking prevalence. Moore's re-analysis of the same data reveals that there is a strong positive relationship between worksite smoking bans and never smoking among older workers, even though they made their smoking decisions long before the bans were introduced. Similar criticisms could be made of cross-sectional research on the impact of prices and other tobacco control policies. A life-course approach is needed to distinguish the impact of policies on smoking initiation from the impact of policies on smoking cessation.

## **3. Data – Smoking Behavior**

### **Overview of the Longitudinal Data Sets**

Our measures of smoking behavior are from generally comparable longitudinal surveys conducted in Germany, Great Britain, the Russian Federation and the U.S. The German Socio-Economic Panel (GSOEP) is a longitudinal survey that began in 1984 with a sample of 6,000 households in the Western States of Germany representing a disproportionate number of non-German migrant-workers. At present the GSOEP has data on about 14,000 individuals living in roughly 7,000 households in Germany. For a fuller discussion see Wagner /Burkhauser/ Behringer (1993). The British Household Panel Survey (BHPS) is an annual survey that began in 1991 with a nationally representative sample of more than 5,000 households in Great Britain. For a more complete discussion of the BHPS data see Taylor et al. (1996). The Russia Longitudinal Monitoring Survey (RLMS) is a series of nationally representative surveys of households and individuals in the Russian Federation, begun in 1992 and running through 2000 (Zohoori et al. 2001). Unlike the other data we use, the RLMS collects information from a physical household instead of from all in-

dividuals living in a household in a given year. Because the RLMS surveys individuals living in the same physical location individuals who move exit the sample. For more details see [www.cpc.unc.edu/projects/rlms](http://www.cpc.unc.edu/projects/rlms). The Panel Study of Income Dynamics (PSID) began in 1968 with a sample of 5,000 U.S. households, representing a disproportionate number of low-income individuals. See Hill (1992) for an overview of the PSID.

### **Data on Life-Course Smoking Behavior**

The GSOEP, BHPS, RLMS, and PSID ask respondents to report whether or not they smoke, the age at which they started smoking regularly and, for ex-smokers, the age when (or time since) they last smoked regularly. The retrospective questions about smoking were added to the GSOEP in 2002, so we have not yet used these data. We use data from Wave 10 of the BHPS, when the retrospective questions provide fairly broad categorical measure of time since an ex-smoker last smoked regularly. In future work we will analyze data from Wave 12 of the BHPS, which will collect the exact age a person last smoked.

Using available data, we construct indicators of contemporaneous and life-course smoking behavior for respondents in each country. The contemporaneous smoking variable equals one if a respondent currently smokes and zero otherwise. To measure life-course smoking, we use each individual's retrospectively reported start and quit ages, calendar age (date of birth), and survey interview date to construct a series of variables that equal one in each calendar year (age) during which an individual smoked. Consider, for example, the life course smoking history we construct for a 30 year old respondent to the 2000 survey of the RLMS. If the respondent reports that she started to smoke at age 10 and quit at age 25 then we know that she began smoking in 1980 and quit in 1995. Although a person may have started and stopped smoking one or more times between these two years, we label respondents as smokers in every intervening year. This assignment obviously masks temporary quits and so is not without its shortcomings. However, our research focuses on a highly significant outcome for public health – permanent smoking cessation (prolonged abstinence). Kenkel/Lillard/Mathios (2002a) analyze in more detail the reliability and validity of retrospective information on smoking, and conclude that it is as useful as other commonly used data sources.



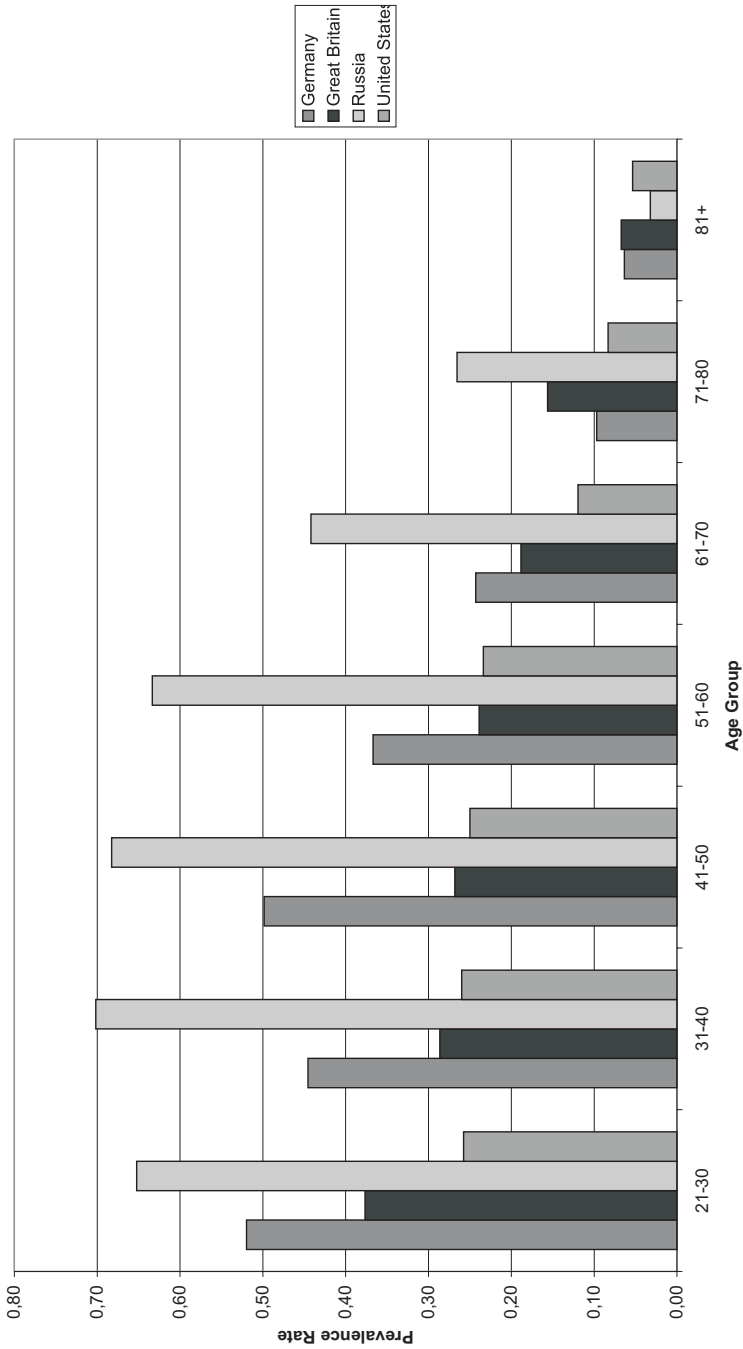


Figure 2: Current Smoking Prevalence Among Men, in Germany, Great Britain, Russia, and the United States

## 4. Patterns in Smoking Behavior

### Cross-Sectional Smoking Prevalence

Before adopting the life-course perspective, we briefly review the sort of information one can glean from the standard cross-sectional views of smoking. Figure 2 shows current smoking prevalence among men in Germany, Great Britain, Russia and the United States. Across almost all age groups, male smoking prevalence is highest in Russia, with lower rates in Germany and much lower rates in Great Britain and the U.S. For example, almost 70 percent of Russian men aged 41–50 currently smoke, compared to 50 percent of German men, and about 25 percent of men in Great Britain and the U.S. In each country fewer people smoke at older ages, reflecting smoking cessation over the life course combined with cohort differences in smoking initiation rates and differential mortality of smokers and nonsmokers. To begin to sort out these factors, we now turn to our analysis of life-course smoking.

### Life-Course Smoking Patterns

In Figure 3 we present evidence on smoking behavior over the life-course of men aged 41–50 in Great Britain, Russia, and the U.S. (Evidence on the life-course smoking behavior for other cohorts of men and women in these three countries are available upon request). The patterns in Figure 3 already point to ways in which a life course perspective sheds new light on smoking behavior. For example, almost all smoking initiation occurs by the time these men are in their early 20s. While this fact has been observed elsewhere, the striking similarity across countries with vastly different tobacco control policies suggests that the *timing* of decisions to start smoking has very little to do with policies. However, smoking initiation rates and hence the prevalence of smoking is much higher in this cohort of Russian men than in their British or U.S. counterparts. This difference, and other differences across cohorts (not reported here) suggest the potential of extending several recent studies of smoking initiation in Germany (Bantle/Haisken-DeNew 2002) and the U.S. (DeCicca/Kenkel/Mathios 2002).

Figure 3 also reveals fairly striking differences in smoking cessation rates in this cohort of men across the three countries. Because smoking initiation is so infrequent after the mid-20s, from that age on smoking cessation rates drive the trends in smoking prevalence. In Russia there is almost no smoking cessation: smoking prevalence is steady around 70 percent. In this cohort of British men, smoking prevalence drops from a peak around 48 percent at age 28 to a little over 30 percent at age 50. In this cohort of US males, smoking prevalence reaches a peak at 42 percent at age 28, which is almost as high as among the British men. But by age 50 only 16 percent of this age cohort of US males

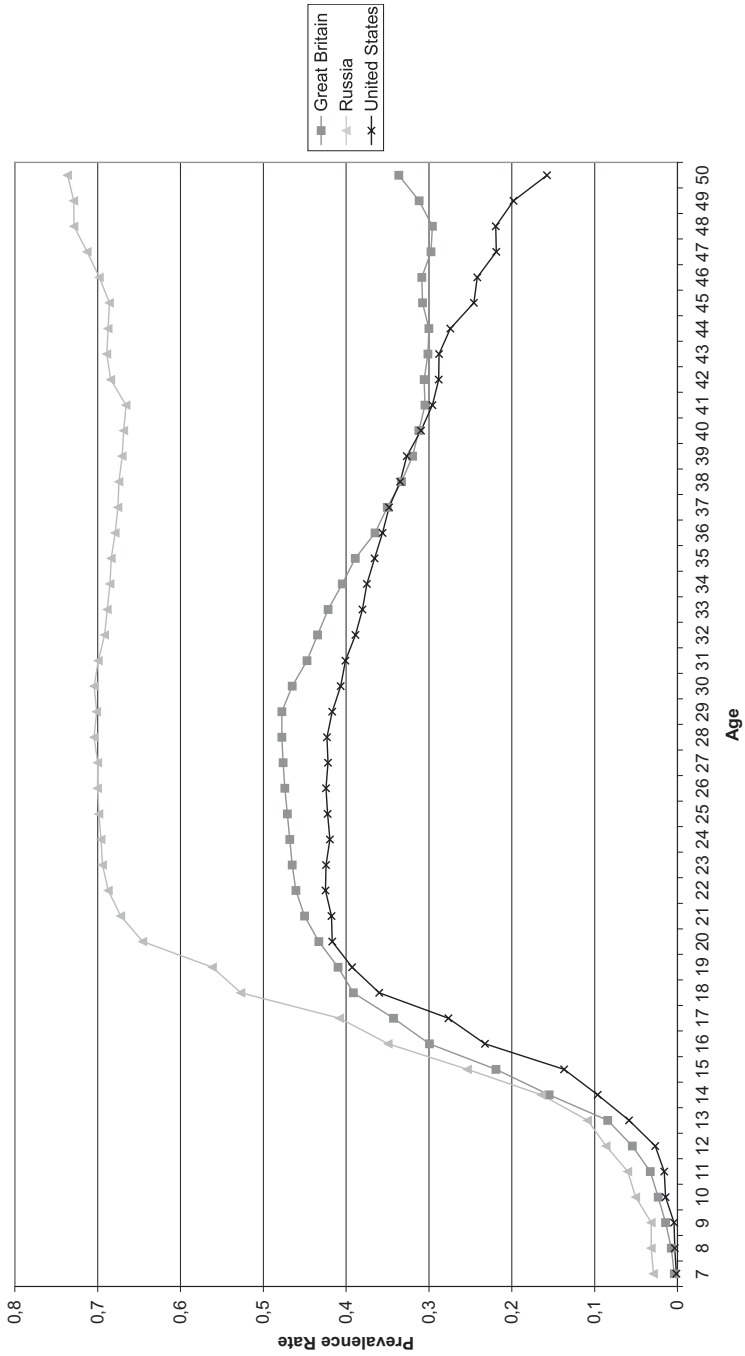


Figure 3: Life-Course Smoking Patterns of Men Age 41 – 50 in Great Britain, Russia, and the United States

are smoking. Put differently, over these ages on average about two percent of British male smokers quit each year, compared to an average of about four percent among U.S. male smokers. A rich avenue for future research is to explore the role differences in policies, such as differences in restrictions on smoking or the regulation of cessation products, might play in explaining the observed differences in smoking cessation behavior in Great Britain, Russia and the U.S.

## 5. Conclusions

In this paper we illustrate the usefulness of a life course approach to study smoking in Germany, Great Britain, the Russian Federation and the U.S. Given the different mixes of tobacco control policies in these countries, it is intriguing to note that the cross-sectional prevalence of smoking in Great Britain and the U.S. is fairly similar, while in Germany rates are somewhat higher and in Russian smoking rates are very high for men but much lower for women (Corrao et al. 2000). Our results suggest however, that the similarity between British and U.S. smoking prevalence can mask large differences in smoking cessation rates. In addition, the very high smoking prevalence among some cohorts of Russian men reflects both high smoking initiation and an almost total lack of smoking cessation.

Future research is needed to address a host of questions about the determinants of life course smoking behavior, including the separate impacts of tobacco control policies on initiation and cessation. Preliminary results from an analysis of data for a cohort of U.S. women suggest that higher cigarette prices, pregnancy, father's death due to a smoking-related illness, and race/ethnicity may be important factors in women's decisions to quit smoking (Kenkel/Lillard/Mathios 2002b). The retrospective smoking information available or becoming available in many long-running panel studies offers a perspective on smoking behavior that has rich possibilities. In the future we will use longitudinal data from Germany, Great Britain, the Russian Federation and the U.S. to construct and analyze lifetime smoking histories for multiple cohorts of men and women.

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