

## **Executive Summary:**

Smoking is the largest single cause of death and disease in the European Union (EU). Effective and equitable control of tobacco in the EU by the use of fiscal policies is both significant for addressing the tobacco disease burden and highly complex. PPACTE aimed to develop evidence-based policy recommendations to improve market regulation of tobacco products, for more effective, equitable control of tobacco in Europe.

The PPACTE consortium undertook several studies to inform the design of tobacco tax policy in the EU. PPACTE convened an international working group to review and critically appraise the international literature on the effectiveness of tobacco tax and price policies for tobacco control. PPACTE built on existing evidence by: surveying over 18,000 citizens in 18 European countries on their attitudes towards and responses to tobacco tax and price policies; analysing time series from 11 EU Member States to estimate the impact of price, income and tobacco control policies on the demand for tobacco products; developing dynamic simulation models to assess independently for each of 15 European countries the present impact of their tobacco tax policies and other tobacco control policies on smoking prevalence and smoking-attributable deaths and to make predictions for the future; examining industry influence on and responses to tobacco taxation in selected countries through interviewing key informants, analysing tobacco industry documents and analysing data on of the British cigarette market; and integrating research findings to distil policy recommendations.

Substantial evidence suggests that tobacco taxation improves public health through preventing initiation among never smokers, promoting cessation among current smokers and reducing consumption among continuing smokers. This is substantiated by robust econometric analysis of time series data from 11 European countries, which confirm convincingly that price is a major determinant of cigarette demand. A 10% increase in cigarette price reduces demand for cigarettes by 3-4%, while a 10% increase in income increases demand by 3-4%; thus, tobacco tax increases must increase price above inflation and income growth to achieve tobacco control aims. SimSmoke simulation modelling indicates that increasing taxes has immediate effects on smoking prevalence and smoking-attributable mortality, with the effects growing over time. The PPACTE survey indicated that the majority of smokers would attempt to quit in response to a substantial increase in price. Furthermore, survey responses demonstrated strong public support for tax increases, particularly where at least some of the tax is earmarked for smoking cessation support and prevention.

Future EU tobacco tax Directives must address the following: the availability of cheap and ultra low price cigarettes; the relatively low taxes on alternative products such as fine cut tobacco used for hand-rolled cigarettes; illicit trade or smuggling; and the pernicious interference and influence of tobacco companies on the development of tobacco tax policy. In this regard, the PPACTE Consortium formulated 15 recommendations for tobacco fiscal policy and supportive legislation, which if implemented has the potential to reduce tobacco use, tobacco-attributable mortality and health inequalities in the EU. The PPACTE Consortium has also delivered tools to support advocacy for policy implementation in EU MS including: 15 country-specific simulation models and users' manuals enabling advocates to demonstrate the

potential impact of stronger policy, documentation exposing industry arguments and strategies to undermine and influence tobacco control policy, and a handbook to support researchers in conducting econometric analysis of demand in their own country.

## **Project Context and Objectives:**

In the European Union, smoking continues to be the largest single cause of death and disease, accounting for over 650 000 premature deaths each year (1). Europe has only 15% of the world population but some 30% of the worldwide burden of tobacco-related diseases (2) and is estimated to cost the economy EUR98–130 billion, or 1.04–1.39% of the European Union's gross domestic product (GDP) for 2000 (2).

Despite increasing awareness of the health consequences of smoking, a third of all citizens in the European Union over the age of 15 currently smoke tobacco products (3). While smoking prevalence trends across the European Union have shown a decline in recent years, the rates remain alarmingly high and continue to rise among females in some Member States. In addition, the average age of initiation has dropped to 11 years of age (2).

In response to the health, economic and social costs of tobacco use, governments have implemented increasingly stringent tobacco control regulations during the past two decades. Action at Member State level has been reinforced and reinvigorated by the WHO FCTC, a widely embraced public health treaty that represents a legally binding agreement between Parties to implement evidence-based tobacco control measures (4). The FCTC calls on Parties to implement measures to reduce the demand for tobacco products, including price and tax measures, protection from exposure to tobacco smoke, product content regulations, packaging and labelling regulations, education and awareness-raising campaigns, smoking cessation support and bans on tobacco advertising, promotion and sponsorship. The European Union and all but one Member State (the Czech Republic, at the time of writing) are Parties to the FCTC.

The degree of implementation of tobacco control policy varies among Member States. Joossens and Raw (5) quantified implementation of tobacco control policies at country level on the tobacco control scale and ranked 30 countries by their total score on the 100-point scale. In 2005, only four countries scored 70 or more (Iceland, Ireland, Norway and the United Kingdom), two countries scored above 60 (Malta and Sweden), seven scored above 50 (Belgium, Cyprus, Finland, France, Italy, the Netherlands and Poland) and the rest scored 49 or below (6). In 2010, while the average score on the scale had increased by 5%, a similar pattern emerged. The new European Union accession states of central and eastern Europe continue to be strongly represented among the countries scoring lowest on this scale (7).

Taxation of tobacco products is an important means of tobacco control under European Union competence. Previously, tobacco tax policies reflected the sole priority of creating a strong single market economy. Early tobacco tax directives issued by the European Union were primarily concerned with harmonization of tax structures and approximation of tax rates to prevent market distortions and create a functioning single market. More recently, with the acceptance of health protection of all European Union citizens as a mandate, the importance of tobacco pricing policies in controlling tobacco has been increasingly emphasized.

Currently, there are large price discrepancies among European Union Member States, despite attempts to harmonize tobacco tax rates. As of March 2011, tobacco prices for 20 cigarettes in the most popular price category ranged from as high as EUR8.50 in

Ireland and EUR6.90 in the United Kingdom to as low as EUR1.87 in Poland, EUR2.03 in Estonia and EUR2.14 in Lithuania. Total tax (inclusive of VAT) as a percentage of total tax-inclusive retail sales price ranged from 71.6% in Sweden to 88.7% in Bulgaria (8).

Increased integration within the European Union and the large price discrepancies in tobacco products among Member States provide incentives for tax avoidance. Tobacco taxation for tobacco control is further complicated and undermined by the presence of an extensive eastern land border with Belarus, the Russian Federation and the Ukraine countries with high prevalences of smoking, very low real prices of tobacco products and relatively weak tobacco control policies. This border complicates the policing of illicit trade and exaggerates grey-market activity, with a particular influence in new European Union Member States such as the Baltic States, Bulgaria and Romania. Tax avoidance and tax evasion have implications for government revenues and the effectiveness of tobacco control policies for public health.

Furthermore, tobacco control is one of the few public health issues that has an active opponent - the tobacco industry - which is making calculated strategic attempts to undermine policy and thereby minimize public health gains, in the interest of protecting profits.

Effective and equitable control of tobacco in the European Union by the use of fiscal policies is both significant for addressing the disease burden caused by tobacco use and highly complex, because of the diversity among Member States in their stage in the tobacco epidemic, their level of tobacco control and their tobacco market structure, as well as their economic, cultural and political environments.

## Objective

The main aim of the PPACTE project is to make evidence-based policy recommendations to improve market regulation of tobacco products, for more effective, equitable control of tobacco in Europe. To achieve this aim, the PPACTE consortium undertook several studies with different methods to provide insight into the challenge of designing a tobacco tax policy within the complex policy environment of the European Union. It was structured into work packages as described below.

## Methods

### Integration and dissemination

PI: Dr Maria Leon-Roux, International Agency for Research on Cancer, France

A working group of international experts was convened to produce a handbook, The effectiveness of tax and price policies for tobacco control (IARC Handbooks of Cancer Prevention, Volume 14), as a deliverable of PPACTE, referred to herein as the Handbook. It consists of a review and critical appraisal of the current international literature on the effectiveness of tobacco tax and price policies for tobacco control.

Topics covered include: tobacco industry pricing, price related marketing and lobbying strategies, the effectiveness of tobacco tax and price policies based on aggregate demand studies, the effectiveness of tax and price policies for youth, adults, and the poor based on individual- or household-level survey data, tax avoidance and tax evasion, and the health and economic impact of tobacco taxation.

European survey on the economic aspects of smoking

PI: Dr Silvano Gallus, Istituto di Ricerche Farmacologiche Mario Negri, Italy

An extensive survey was conducted with over 18,000 respondents in 18 EU Member States to collect recent, comparable, individual-level survey data. The purpose of the survey was to estimate the prevalence, consumption and social acceptability of smoking, purchasing patterns and attitudes towards fiscal policy.

Data were collected during face-to-face interviews between January 2010 and July 2010 in 18 European countries by standardized methods. The 18 056 participants (8653 men and 9403 women) aged 15 years and older were representative of the national general population in terms of age, sex, rural and urban location and socioeconomic characteristics in each country. Surveys were conducted in Albania, Austria, Bulgaria, Croatia, the Czech Republic, England, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Poland, Portugal, Romania, Spain and Sweden. The survey included questions on demographic, socio-economic and anthropometric characteristics; smoking status, number of cigarettes smoked per day, age at starting and age at stopping, smoking dependence, channels of cigarette distribution and weekly expenditure on tobacco products; a “show your pack” section focused on the latest pack of cigarettes purchased by smokers in order to validate direct questions on smuggling; information on perceptions and attitudes towards an increase in cigarette price including the intention to quit and smoking behaviours according to an increase in cigarette prices; and information on smokeless tobacco use.

Econometric analysis of demand for tobacco

PI: Professor Gunnar Rosenqvist, National Institute for Health and Welfare, Finland

Few studies have been conducted on the impact of tobacco price on tobacco product demand with data from European Union Member States. The available published European studies used varying specifications for the included variables, inconsistent data sources and divergent empirical strategies and modelling approaches. The PPACTE project analysed demand for tobacco in similar data sets from different countries over longer periods (30 - 60 years), with a consistent estimation strategy and model-building approach. The aims of these analyses were to: estimate the price elasticity of demand for selected tobacco products in countries with suitable data sets; investigate whether cigarettes, pipe and hand-rolling tobacco and snus are substituted for each other; evaluate the impact of non-price tobacco control policies on consumption; evaluate the extent to which the estimates of price elasticity of demand for tobacco products differ in Europe; and assess the extent to which demand for tobacco products can be controlled by price measures. Analyses were conducted in 11 Member States where suitable national aggregate time series datasets could be obtained for a sufficient duration. The countries were Austria, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

The analyses addressed factors affecting per capita consumption of tobacco products (cigarettes and, where appropriate, pipe and hand-rolling tobacco or snus). Per capita consumption was the dependent variable, while the real price of tobacco products, real disposable income per capita and a tobacco control policy index quantifying implementation of tobacco control policies at country level were the explanatory variables. On the basis of the theory of demand and addiction, conventional, partial adjustment and rational addiction models were applied. In view of the non-stationarity of time series data, error correction models were also considered. Dynamic models were estimated by instrumental variables methods (2SLS) and the Engle-Granger two-step procedure. The estimated models were tested for autocorrelation in residuals, and recursive estimation was used to assess the estimated error correction models.

#### Simulation modelling of tobacco control policies

PI: Professor David Levy, Pacific Institute for Research and Evaluation, United States

SimSmoke, the dynamic simulation model of tobacco control policy, was adapted to assess independently for each of 15 European countries the present impact of their tobacco tax policies and other tobacco control policies on smoking prevalence and smoking-attributable deaths and to make predictions for the future. SimSmoke contains a population model, a smoking model, a smoking-attributable death model and policy modules. It considers the effect of cigarette taxation, smoke-free legislation, advertising bans, health warnings, media and educational campaigns, cessation treatment and restrictions on sales to and by young people both independently and as part of a comprehensive tobacco control strategy. The model begins with a baseline year, before major policy changes, for which a large-scale survey of smoking rates is available. To validate the model, predictions of smoking rates are compared with actual rates from surveys, from the baseline year through 2010 or the most recent date of a national survey. SimSmoke then predicts the effect on smoking prevalence rates and smoking-attributable deaths of stronger policies fully consistent with the WHO FCTC and MPOWER recommendations and compares the effect to the status quo, in which policies are held constant at 2010 levels. Country-specific models were developed for Albania, the Czech Republic, Finland, France, Germany, Great Britain, Ireland, Italy, the Netherlands, Poland, the Russian Federation, Spain, Sweden, Turkey and the Ukraine.

#### Industry and market response

PI: Professor Anna Gilmore, University of Bath, United Kingdom

The work carried out to examine Industry influence on and responses to tobacco taxation can be categorised into four main areas:

- 1) An examination of efforts by tobacco companies to influence tax policy via country case studies in Czech Republic, Bulgaria, Poland, and France. This work was primarily based on analysis of internal tobacco industry documents and key informant interviews.
- 2) An examination of transnational tobacco company strategies to develop and market smokeless tobacco products in the EU. This work was primarily based on analysis of internal tobacco industry documents, key informant interviews, and snus test purchases.

3) An examination of the impact of tobacco control policies on tobacco product and cigarette brand choice to determine the extent of substitution or down-trading, using the UK as a case-study. The work is based on secondary data analysis using UK survey data.

4) An examination of state of the art systems for supply chain tracking and tracing of tobacco products.

Policy analysis and recommendations

PI: Ms Fiona Godfrey, International Union Against Tuberculosis and Lung Disease

This workpackage analysed the development of EU tobacco fiscal policy and the current EU policy context within which emerging policy recommendations from PPACTE would be situated. An expert policy panel was then convened to integrate the research findings and distil recommendations for EU fiscal policy.

## **Project Results:**

### Effectiveness of tobacco taxation for public health

#### Econometric analyses of demand for tobacco in 11 European countries

There is substantial evidence from the vast body of international literature reviewed in the Handbook that tobacco taxation improves public health by preventing initiation of smoking among people who have never smoked, promoting cessation among current smokers and reducing consumption among continuing smokers. The effectiveness of tobacco taxes for tobacco control, as reported in the literature, is substantiated by econometric analysis of time series from 11 European countries, which confirm convincingly that that price is a major determinant of cigarette demand.

The results obtained with the preferred demand models indicate a negative relationship between cigarette consumption and cigarette price, higher prices being associated with lower consumption. This relationship was apparent in both the short and the long term. For cigarettes, short-run price elasticity estimates of demand obtained from our preferred models ranged from -0.30 to -0.40, suggesting that a 10% increase in the real price of cigarettes will reduce cigarette consumption by 3 - 4%. Outside this range are Ireland, with an elasticity estimate of -0.27, Germany, with an elasticity estimate of -0.79 (or -0.67 depending on the model chosen), and Austria, with a price elasticity estimate close to zero and statistically insignificant. In agreement with other studies, these estimates of price elasticity suggest that demand for tobacco is price-inelastic: the reduction in consumption is proportionately less than the increase in price. Therefore, increasing the price by raising taxes will discourage consumption and increase government revenues. These results lend weight to the considerable body of international evidence for using tobacco taxes as a public health measure to dissuade consumption of tobacco in the European context.

Similarly, a negative relationship was found between the price of pipe and hand-rolling tobacco and its consumption in Finland, with a price elasticity of demand of -0.43, and between price and consumption of snus in Sweden, with an elasticity estimate of -0.24. These own-price elasticity estimates lie between -0.2 and -0.4, similar to the estimates for cigarettes. Moreover, pipe tobacco was found to be a substitute for cigarettes in Finland, with a cross-price elasticity of 1.7, implying that a 10% increase in the price of cigarettes would result in a 17% increase in the consumption of pipe and hand-rolling tobacco.

These analyses show a positive relationship between real disposable income and cigarette consumption, suggesting that consumption of cigarettes increases as income increases. While the estimates of income elasticity in this study vary between 0.1 in Italy and 1.2 in Sweden, most fall within a range of 0.1 - 0.6, with the median and typical estimates between 0.3 and 0.4. In other words, a 10% increase in income increases consumption by 3 - 4%. In contrast, a negative relationship was found between income and the consumption of pipe and hand-rolling tobacco in Finland and the consumption of snus in Sweden. This might suggest that users of pipe and hand-rolling tobacco in Finland and users of snus in Sweden with higher income will switch from these products to cigarettes and that users of pipe and hand-rolling tobacco and snus tend to be poorer than cigarette smokers.



These findings suggest that the planning of tobacco price and tax policies must take into account the effect of real income growth on cigarette consumption. The real price of cigarettes must increase above the rate of income growth to prevent increases in the affordability of cigarettes and consequent increases in consumption. Furthermore, these findings suggest that taxation of pipe and hand-rolling tobacco and snus should be kept in line with that of cigarettes to discourage product substitution.

#### Predicting the impact of raising tobacco taxes on smoking prevalence and smoking-attributable deaths in the SimSmoke model of tobacco control policy

While the econometric analyses described above are empirical evaluations of the impact of price, income and tobacco control policies on the consumption of tobacco products, the SimSmoke simulation model of tobacco control policy draws together data from various sources to distinguish the effect of tobacco control policies implemented by European countries from long-term trends, to evaluate the effects of tobacco control policies on smoking prevalence and related mortality, and to consider the potential impact of stronger policy alternatives in these countries.

In the SimSmoke model, when taxes change, an equation translates changes in the tax rate (as a percentage of price) into changes in price, assuming that tax increases are passed on to consumers and not under- or over-shifted. Changes in price are then translated into changes in smoking prevalence by an equation dependent on price elasticity estimates. In the models for Germany, Great Britain, Ireland, the Netherlands and Sweden, a price elasticity of -0.3 was applied to people aged 15–17 years, -0.2 to those aged 18 - 24 years, -0.15 to those aged 25 - 34 and -0.1 to those aged 35 and over. In the models for Finland, France, Italy, Poland, the Russian Federation, Spain, Turkey and the Ukraine, a price elasticity of -0.3 was applied to people aged 15 - 24, -0.2 to those aged 25 - 34 and -0.1 to those aged 35 and over.

Country-specific data on excise duty rates were used for 2010, as the baseline from which future tax changes were measured. Rates of excise (specific and ad valorem, exclusive of VAT) were obtained from the WHO MPOWER report (9) or the European Commission excise duty tables for 2010. For all years before 2010, a cigarette price index of actual prices deflated by the consumer price index was used. The SimSmoke models consider the impact of increasing tobacco taxes (specific and ad valorem, exclusive of VAT) to 70% of the price. The estimate for a particular year represents deaths in that year alone, whereas the cumulative estimate is for the years 2011 - 2040. The variation in the percentage effects on prevalence is due mainly to the difference between the 2010-specific tax rate and the 70% tax rate.

In general, this model showed how the prevalence of smoking among young people declines more than among adults as a result of tax increases. This is the main reason that taxes continue to reduce adult smoking rates over time. The projected number of deaths reflects the effectiveness of a tax policy in reducing smoking. The effects of tobacco taxes on the number of deaths are delayed not only because the effects of cessation on death rates are relatively slow but also because the greatest effects are on the prevalence among young people. Changes in the prevalence among the young do not avert deaths for at least 20 years.

The predictions shown above are based on the assumption that all other policies are held constant at 2010 levels. The model predictions suggest that, in each country, substantial reductions in smoking prevalence and lives lost due to smoking can be realized by increasing tobacco taxes alone. Moreover, when tobacco tax increases form part of a comprehensive tobacco control strategy in which stronger laws on smoke-free air and restrictions on sales to and by young people are implemented, strict tobacco advertising and marketing bans are promulgated, strong tobacco health-warning labels are required, high-publicity media campaigns are coordinated with other policies, strong comprehensive smoking cessation treatment services are provided and all policies are enforced, considerable reductions in smoking prevalence and smoking-attributable mortality can be achieved. Because of the natural progression of tobacco-related illnesses, early reductions in smoking prevalence have a relatively small short-term impact on the number of smoking-attributable deaths but a much larger long-term impact.

In some of the countries considered, such as the Czech Republic and Poland, tobacco product prices are lower than in other countries and in relation to the standard of living. In these countries, excise duties, as a proportion of the tax-inclusive retail-selling price, are relatively high. In other countries, such as Ireland and the United Kingdom, tobacco product prices are relatively high and the excise duties as a proportion of the tax-inclusive retail-selling price are somewhat lower. The divergence among European Union Member States in the rates of tobacco excise as a proportion of price and the absolute value of excise duties highlights the need for a specified monetary minimum specific tax floor to achieve appreciable increases in the tax-inclusive retail selling price and corresponding improvements in health outcomes.

#### European survey on economic aspects of smoking: perceptions and attitudes to increasing tobacco taxes

The PPACTE European survey examined current smokers' declared responses to a hypothetical 20% increase in the price of a pack of cigarettes. Overall, 14.2% of current smokers said they would quit smoking, 30.6% would consume fewer cigarettes, 21.5% would engage in compensatory behaviour (13.7% would switch to cheaper brands and 3.8% to hand-rolling tobacco, 3.5% would switch at least part of their smoking consumption to illegal or smuggled cigarettes, 0.5% would switch to or also use smokeless tobacco including snuff, snus or chewing tobacco, and 33.6% would not change their smoking habit). Participants in Romania and Spain indicated that they would be most responsive to hypothetical price increases, with 80.3% and 75.9% of current smokers reporting that they would change their smoking habit in some way in response to the price increase, respectively, while participants in Finland and France would be least responsive, with 45.8% and 49.3% of respondents claiming they would not change their smoking behaviour in response to a 20% price increase, respectively. The proportion of current smokers who would switch to smokeless tobacco was lower in Portugal (0.0%) and Hungary (0.3%) and was higher in Bulgaria (11.2%) and Latvia (18.6%), while the proportion of current smokers who would switch to smokeless tobacco was higher in Poland (1.4%) and Sweden (2.0%).

Current smokers were asked if they intended to quit smoking within the next 6 months. Overall, 36.0% of current smokers said they intended to quit smoking (34.1% of men and 38.3% of women). Among male current smokers, the proportions of men who said they intended to quit smoking were lowest in Hungary (7.7%) and the Czech Republic (10.9%) and highest in Spain (56.7%) and Romania (61.0%). Among female current smokers, the proportions of women who said they intended to quit smoking were lowest in Hungary (10.0%) and Austria (14.7%) and highest in Poland (54.3%) and Spain (57.6%).

Respondents were then asked what percentage increase in the current cigarette price would encourage them to quit completely. Overall, 20.5% of current smokers reported that they would quit in response to a 20% increase in price, 19.1% reported they would quit in response to a 21 - 40% increase, 18.2% would quit with an increase of 41 - 60%, 6.3% would quit with an increase of 61 - 80%, and 35.7% said that it would take a price increase of more than 80% for them to quit. The proportions of current smokers who reported that they would quit smoking completely in response to an increment of 20% or less were lower in Hungary (6.8%) and Latvia (6.9%) and higher in Ireland (30.0%) and Romania (31.3%). The proportions of current smokers who reported that they would quit smoking completely in response to an increment of five or more times the current price were lower in Hungary (0.5%) and Portugal (4.0%) and higher in Albania (16.3%) and Latvia (16.5%).

Current, ex- and never smokers were asked about their attitudes to an increase in the price of a pack of cigarettes and were asked to assume that the revenue from the increase would be allocated to support smoking cessation, such as free access to anti-smoking centres and free smoking cessation products. Overall, 78.7% of nonsmokers and 49.2% of current smokers were in favour of a 5% increase in prices if the revenues were used for tobacco control. Moreover, 73.6% of nonsmokers and 39.6% of current smokers were in favour of a 20% increase in price.

Respondents were asked how useful they perceived various tobacco control measures to be in reducing tobacco use. Overall, 55.0% of respondents (61.8% of nonsmokers and 36.9% of current smokers) perceived tobacco taxation to be a useful means for reducing tobacco use. There were substantial differences among countries in perceptions of the effectiveness of pricing policies to control tobacco: only 19% of respondents in Hungary perceived price to be a useful tobacco control measure, while over 65% of respondents in Albania, Finland and Italy considered tobacco price and tax increases as useful tobacco control measures.

## Summary

The vast body of international literature provides substantial evidence that tobacco taxation improves public health by preventing initiation of smoking, promoting cessation among current smokers and reducing consumption among continuing smokers. The effectiveness of tobacco taxes for tobacco control is further substantiated by econometric analyses covering periods of 30 - 60 years for 11 European countries. The SimSmoke simulation model suggests that increasing taxes has immediate effects on smoking prevalence and smoking-attributable mortality, with the effects growing over time. Moreover, the European survey indicates that most smokers would attempt to quit in response to a 60% increase in price and that

approximately two thirds of nonsmokers and over one third of smokers perceive price to be an effective measure for limiting tobacco use. Not only are tobacco tax increases effective in reducing tobacco use and its associated burden of disease, but they are also acceptable to European citizens, with support from smokers and nonsmokers alike.

The extent to which public health benefits from tobacco taxation is influenced not only by the structures and rates of excise taxes but also by the extent to which these structures and rates are harmonized across regions, thereby decreasing the incentives for illicit trade. In addition, the effectiveness of tobacco taxation for public health depends on the extent to which the tobacco industry passes on tax increases to the consumer, rather than under-shifting the tax by decreasing their profit margins, and the success of tobacco companies' efforts to lobby governments for weaker tax policies. Tobacco tax structures and rates, illicit tobacco trade and tobacco industry influence on tobacco tax policy are discussed in turn in the following sections.

#### Tobacco tax structures and rates

The structure and rates of excise duties influence the prices of different products, government tax revenues, the quality and variety of products on the market, the administrative burden, the profits and competitive positions of tobacco producers and the distribution of income (1). Excise duties can be specific or ad valorem. A specific excise is levied as a fixed monetary amount of tax per quantity, volume or weight of tobacco, while an ad valorem excise is levied as a percentage of some measure of product value (currently the weighted average price of tobacco). In a purely specific excise structure, the same fixed monetary amount is applied to all tobacco products of a given quantity, volume or weight, irrespective of their pre-tax price. This structure tends to discourage consumption of tobacco products, irrespective of their price. A specific excise structure has the advantage of being easy to administer and narrows the gap between low- and high-priced tobacco brands. The fixed monetary amount does not, however, automatically keep pace with inflation and must be adjusted regularly. A purely ad valorem structure tends to lead to lower prices, with a wider gap between low- and high-price brands. While a purely ad valorem structure keeps pace with inflation, it is more complex to administer. To combine the best elements of both the specific and the ad valorem structure, the two can be combined into a mixed structure that can give preference to the ad valorem or the specific element, depending on the objectives.

The most complex structure is a mixed specific and ad valorem excise with a minimum tax floor. Minimum excise duties are effectively specific excise duties and represent a fixed monetary amount per quantity, volume or weight that applies if the ad valorem excise falls below a minimum floor. In this system, lower-priced products are taxed at the specific minimum rate, while higher-priced products are taxed at the ad valorem rate.

#### Structures and rates of taxes as set out in excise directives

Member States of the European Union must apply a mixed structure with a minimum tax floor. Effective 1 January 2011 to 31 December 2013, the specific component applicable to cigarettes may not be less than 5% or more than 76.5% of the total tax burden, including the specific excise, and the ad valorem excise and VAT levied on the weighted average retail selling price. From 1 January 2014, the specific component must fall within the range 7.5 - 76.5% of the total tax burden. Directive 2010/12/EU applies a substantially lower overall minimum excise rate to other tobacco products including fine-cut tobacco for hand-rolled cigarettes, than the rate applied to manufactured cigarettes.

#### Adjustment of the overall minimum tax

As incomes and costs of living vary among Member States, the minimum monetary tax is currently set at only EUR64 per 1000 cigarettes. This minimum tax must be raised to EUR90 per 1000 cigarettes over the 5 years following the 2010 Directive. Even at this low level, some Member States, under pressure from tobacco companies, have negotiated for derogation for several years, to allow their taxes to remain even lower. This has the effect of causing governments to lose valuable tax revenue and increasing cigarette use and the prevalence of disease related to smoking. This also aggravates problems of cross-border shopping for neighbour countries with higher taxes.

To account for differences in income and cost of living and ensure that tobacco remains unaffordable, the minimum monetary tax could be adjusted by the comparative price level or purchasing power parity, which are available for all European Union Member States. The basic minimum tax could be set for the States with the lowest income and adjusted upwards for each other State. For example, the minimum tax could be set at EUR125 per 1000 cigarettes for one low-price country and adjusted by comparative price level for all other countries. In countries with higher prices, the minimum would be set as above and adjusted upwards annually above inflation and income changes. The basic minimum tax would then be adjusted annually in line with inflation and income levels and the relative cost of living by comparative price level or purchasing power parity.

The index considered for adjusting the overall monetary minimum tax should be: available for most countries (both Member States and candidate countries), provided by an institutional authority (Eurostat), stable, updated annually and published by a single source.

#### Substitution of hand-rolling tobacco for cigarettes

The effectiveness of tobacco taxation can only be fully realized to the extent that tax increases raise the price of the cheapest cigarettes or other tobacco product. Otherwise, there is an opportunity and incentive for the most price responsive smokers to trade down to cheaper brands or products. Directive 2010/12/EU applies a much lower rate of excise on fine cut tobacco than that applied to manufactured cigarettes. Planned excise rate increases on fine-cut tobacco between 2010 and 2020 do not go far enough

to reduce the incentive for consumers to substitute preferentially taxed and thus cheaper fine-cut tobacco for cigarettes.

To levy comparable rates of excise on fine-cut tobacco for rolling cigarettes and on manufactured cigarettes, the weight of tobacco used to prepare hand-rolled cigarettes and manufactured cigarettes must be established. The current conversion rate suggests that 1 kg of fine-cut tobacco is equivalent to 1000 cigarettes (1 g = 1 cigarette); however, this is considered to be inaccurate, particularly with the increasing use of dry ice-expanded tobacco manufacturing processes, which reduces the mass of tobacco in a manufactured cigarette. According to the International Standards Organization norm on measuring tar and nicotine in hand-rolled cigarettes (ISO 15592-3), there are 0.4 - 0.75 g of tobacco per hand-rolled cigarette. This suggests that 1333 - 2500 hand-rolled cigarettes can be made from 1 kg of fine-cut tobacco, rather than 1000.

An estimate of the average weight in grams of a hand-rolled cigarette was obtained from data in the PPACTE European survey using data on daily consumption of and weekly expenditure on manufactured and hand-rolled cigarettes. Respondents were asked to show or recall the weight in grams of the last pack of hand-rolling tobacco they had purchased and how much they paid for it. The weight in grams per cigarette was calculated on the basis of data for 185 smokers of hand-rolled cigarettes:

Grams per cigarette = weekly expenditure / cost of latest pack x grams per pack / days per week / cigarettes per day.

This data estimates that one hand-rolled cigarette uses approximately 0.7–0.8 g of fine cut tobacco implying that that 1 kg of fine-cut tobacco yields 1250.0–1482.6 cigarettes, a narrower and lower range than that indicated by the ISO standards. A reasonable conversion rate is required to achieve full alignment of taxes on manufactured cigarettes and fine cut tobacco for hand-rolled cigarettes.

#### Down-trading from more expensive to cheaper brands

When faced with tobacco tax increases, price-sensitive consumers may continue smoking manufactured cigarettes but ‘trade down’ to a cheaper brand rather than switching to a cheaper product (e.g. hand-rolled cigarettes). Industry pricing can undermine the effectiveness of tobacco tax increases by creating price differentials between brands, so that consumers can trade down to cheaper brands when taxes increase.

Detailed analysis of data from the British market suggests that a multifaceted strategy is being used to keep prices low on the ultra-low price segment of the cigarette market. Between 2006 and 2009, the gap between the most and least expensive brands widened, with a broader range of prices available within each segment; the weighted average price of ultra-low price brands did not increase in real terms, while the average prices of the other brand segments did. An examination of trends in the prices of the best-selling brands during the same period showed that the price of ultra-low-price brands increased by less than 1%, with real price (i.e. inflation-adjusted) decreases in some cases. Meanwhile, the price of premium brands increased by 3–5%

and the price of mid-price and economy brands by 5–6%. Furthermore, examination of patterns of price changes (net of tax) over the same 3-year period suggests that, while tax increases are generally being over-shifted, tax increases are under-shifted on the ultra-low-price brands.

Taken together, these findings suggest that the industry is cross-subsidizing cheaper brands with profits from more expensive brands. As a result of this pricing strategy and the growth in the number of ultra-low-price brands, consumers have greater opportunities to down-trade from more expensive to cheaper cigarettes—and the market share of ultra-low-price brands has increased in response. These findings, combined with an analysis of British survey data showing who is smoking these cheap cigarettes, industry documents on the role of cheap cigarettes (10), industry's willingness to under-shift taxes, plus interviewee responses in the country case studies, suggest that the availability of cheap cigarettes undermines tobacco tax policy, allowing price-sensitive smokers—particularly the young and poor—to continue to initiate and maintain their smoking habits. While this analysis is based on British data, Euromonitor data suggest that the market share of cheap cigarettes is growing in other countries, including Austria, the Czech Republic, Denmark, Hungary, Lithuania, Portugal, Slovakia and Sweden (11).

Under-shifting of tobacco taxes can be discouraged by substantially increasing tobacco excise taxes with a predominantly specific excise. Furthermore, an excise structure that is predominantly specific or has a high minimum floor and a low ad valorem component helps to reduce the price differential between the highest- and lowest-priced brands.

While over-shifting of excise increases is not a public health issue, it reflects a missed opportunity for governments to increase excise rates and thus increase revenues. It is clear that the transnational tobacco companies prefer small, gradual tax increases (12), and evidence is beginning to appear that gradual tax increases are more easily absorbed by consumers and therefore facilitate tax over-shifting, leading to greater industry profit margins. Large excise increases are likely to benefit public health to a greater extent than incremental increases, the difference accruing as government revenue rather than industry profit. Further empirical work is needed to explore this issue.

## Summary

The main issues to be addressed in future European Union directives are: the availability of cheap and ultra-cheap cigarettes, including 'dumped' cheap cigarettes; the relatively very low taxes on alternative products, such as fine-cut tobacco for roll-your-own cigarettes; illicit trade and smuggling; and the pernicious interference and influence of tobacco companies on the development of tobacco tax policy. PPACTE evidence suggests that selling cigarettes below cost and low price-based marketing, including selling below the tax level, should be addressed. It is no easy matter to address all these problems or loopholes, but specific changes to the tobacco tax structure and rates and other supportive legislation could go a long way in this regard.

Illicit tobacco trade

Tobacco tax avoidance and evasion undermine the effectiveness of tobacco taxation by providing access to cheaper tobacco products, and they weaken the impact of other tobacco control policies and increase health disparities, while reducing government revenues (13).

#### Extent of illicit tobacco trade in Europe

Measuring illicit tobacco trade is methodologically challenging, for many reasons. First, it is an illegal activity, and illegal traders are unlikely to document their activities. Secondly, data on illicit trade are difficult to collect, as law enforcement agencies often do not publish information about all their activities, in the interests of security and confidentiality. Thirdly, all the available methods of measuring illicit trade are limited, and the data sources used may bias the estimates. As a result, transparent and public data on illicit trade in Europe.

The limited empirical evidence measuring the extent of illicit trade indicates that tax evasion is much more widespread than tax avoidance, that cigarette tax evasion is more prevalent in countries that have lower cigarette prices and lower cigarette taxes and that the size of the illicit market is inversely related to a country's income.

On the basis of an analysis of data collected by the professional services company KPMG, the European Commission estimated that, in 2004, total market penetration of the illicit cigarette trade represented approximately 8–9% of cigarette sales within the European Union (which had 25 Member States at the time) (14). It also noted that the illicit market share in the new European Union Member States (Estonia, Hungary, Lithuania, Poland and Slovakia) was far higher than the previous average. This report is limited because it is based on cigarette seizures in the European Union and on studies provided by the tobacco trade and governments; however, the overall figure of 8–9% appears to be a reasonable estimate, as it falls between the higher estimates from the United Kingdom and eastern and central European countries and the lower estimates from southern European countries like Italy and Spain.

KPMG continued its research on illicit trade as part of its obligations under the 2004 agreement between Philip Morris International and the European Union. According to the KPMG report, total cigarette consumption in the European Union in 2009 was 685 billion units, and contraband trade accounted for 8.9% of total consumption (15). The content of the KPMG report was made public only in August 2011, after a formal request based on European Union legislation regarding public access to documents (Regulation No. 1049/2001 of May 2001).

Case study findings from Bulgaria and Poland suggest that the tobacco industry might exaggerate the extent of illicit trade as part of their argument against increases in excise duty. For example, Phillip Morris reported in 2010 that the prevalence of illicit trade in Bulgaria represented 34% of total market sales (16), while independent data from the PPACTE European survey suggest a 14.5% prevalence in that year.

European survey on the economic aspects of smoking: purchasing patterns and latest pack



To obtain updated, comparable estimates of the extent of tax avoidance in 18 strategically selected European Union Member States, respondents to the European survey on the economic aspects of smoking were asked about their purchasing patterns and to show their latest purchased pack of cigarettes or hand-rolling tobacco. Among current smokers, an average of 88.1% bought cigarettes from legal tobacco shops (including vending machines), 4.9% from other countries or duty-free shops and 3.6% from smuggled sources. On average, 3.4% smoked cigarettes offered by their peers and 0.1% bought cigarettes over the Internet. The proportion of current smokers who reported that they smoked cigarettes from other countries or duty-free shops was higher in Austria (12.3%), Finland (13.2%) and France (13.2%). More current smokers reported smoking smuggled cigarettes in eastern European countries, particularly in Bulgaria (12.2%) and Latvia (25.9%). Overall, 8.4% of current smokers had bought smuggled cigarettes in the past 30 days, representing at least 1% of their total cigarette purchases.

Overall, 73.9% of current smokers agreed to show the interviewer their latest purchased pack of cigarettes or hand-rolling tobacco. Overall, 81.6% of current smokers had bought a pack of 20 cigarettes, 4.3% a pack of 10 cigarettes, 10.9% hand-rolling tobacco and 3.3% another type of tobacco product. The highest proportion of smokers showing hand-rolling tobacco was observed in England (31.8% overall, 38.2% of men and 24.9% of women), followed by France (17.0% overall) and Finland (14.0% overall).

Overall, 93.1% of current smokers showed a tobacco product with a health warning in the local language and 1.1% a pack with no health warning. The prevalence of current smokers showing a pack with a health warning in a foreign language was lowest in Portugal (0%) and Greece (0.3%) and highest in Austria (12.2%) and Latvia (26.1%). The prevalence of current smokers showing a pack with no health warning was lowest in England, France, Portugal and Sweden (0%) and higher in Latvia (5.2%) and Croatia (8.6%).

Overall, 89.5% of current smokers showed a product with a tax stamp in the local language and 4.5% in a foreign language, 1.7% showed a pack with a tax stamp removed or destroyed and 4.4% had either a duty-free pack or a pack with no tax stamp. Current smokers showed a tobacco product with a foreign stamp most often in Latvia (26.3%), followed by France (11.0%) and Austria (9.6%). The largest proportion of smokers showing a duty-free pack or one with no tax stamp was in England (15.2%), followed by Bulgaria (8.3%) and France (7.7%).

## Summary

The tobacco industry are being presented as partners in the fight against illicit trade, while the same industry uses data on illicit trade that are not publicly available and have not been subject public scrutiny, to attack tobacco control legislation developed and supported by health officials. Transparent and public data on illicit tobacco trade are missing in most European countries. Preliminary data from a survey, undertaken in 18 countries as part of the PPACTE project in 2010, indicate that the illicit cigarette trade is highest in Latvia, Romania, Bulgaria and Poland, countries with low prices, but close to Russia and the Ukraine, important suppliers of illicit cigarettes in Europe.

Hence, in Europe, supply side factors (such as the supply from manufacturers in Russia and the Ukraine) appear to play a key role in determining levels of illicit tobacco trade. This finding contradicts industry arguments on this topic and highlights the need for data on smuggling to be made public. A global tracking and tracing system should be combined with better regulation of the legal tobacco trade. Major tobacco companies are now collaborating in promoting Phillip Morris International's in-house marking system on cigarette packs. This agreement suggests the industry fears the uptake of alternative systems. This and the willingness of these companies to collaborate on this issue raises concerns that such a system would not be in the public interests.

#### Industry influence on tobacco taxation

The European Union and all Member States with the exception of the Czech Republic are Parties to the WHO FCTC and, under Article 5.3, are bound to prohibit the influence of the tobacco industry on the formulation of public health policy. The WHO FCTC states that "in setting and implementing their public health policies with respect to tobacco control, Parties shall act to protect these policies from commercial and other vested interests of the tobacco industry in accordance with national law."

The PPACTE case studies and research clearly show that governments continue to engage with the tobacco industry when formulating tobacco taxation policy. Tobacco companies lobby Member State governments constantly and persuade them to keep tobacco taxes low, arguing incorrectly that if taxes increase tobacco revenue will decrease and smuggling will occur. It is clear from documents on countries acceding to the European Union that transnational tobacco companies were greatly concerned to prevent any significant increase in excise duties on accession of the country to the European Union and to ensure that any such increases would be gradual. The companies worked collectively to prevent and postpone increases in excise and lobbied successfully for derogation of the excise level. As a result of the derogations, and with European Union accession also leading to higher incomes, cigarettes actually became slightly more affordable in some accession countries. To influence policy, industry targeted key government officials at both national and European Union level.

Despite the importance of the influence of tobacco companies on tax policy, most of the empirical studies identified in the literature review for the Handbook were conducted in the United States and a few other high- or middle-income countries and most address the influence of transnational tobacco companies on tax levels, rather than structures. PPACTE addressed this research gap in order to add to understanding of tobacco industry influence on taxation policy and industry pricing strategy in the European Union.

#### Understanding tobacco industry pricing strategy: the cigarette market in Great Britain

Industry pricing strategy was reviewed by examining the British cigarette market. Four price segments were identified in the academic and trade literature: premium, mid-price, economy and ultra-low price, the last emerging since 2006. Brands were categorized into price segments on the basis of recommended retail price data from PriceChecker (1999–2005) and actual sales prices from Nielsen (a global leader in

market research, measurement and information) (2006–2009). Trends (by volume) in the market share by price segment between 2001 and 2009 were observed.

Around half the market was held by economy segment brands. The share held by this segment grew until 2007–2008, when it fell slightly because of gains in the ultra-low-price segment. As the tobacco companies acquired supermarket brands and launched their own ultra-low-price brands after 2006, the share of these brands increased substantially. In contrast, the market share of premium and mid-priced brands fell sharply from 2001 onwards. While the three segments (premium, economy and ultra-low priced) have clearly separate price ranges, the price of mid-price brands now overlaps entirely with the price of lower-end premium brands. Furthermore, the range of prices available within each segment appears to have widened, and the gap between the most and the least expensive brands has doubled.

When trends in price increases by price segment were examined for 63 individual brands, each with a market share of 0.2% or greater (as of November 2006) between 2006 and 2009, it became apparent that the prices of brands in the ultra-low-price segment had increased much less than those of brands in other segments. The price of every brand in the ultra-low-price group increased by less than a 1%, and the real price fell in some cases. Meanwhile, the price of premium brands increased by 3–5% between 2006 and 2009 and that of mid-price or economy brands by 5–6%.

By examining the patterns of price changes in real terms (deflated against the consumer price index, with 2010 = 100), net of tax between November–May when taxes increase and May–November when taxes do not change, it was possible to establish whether tobacco companies over-shifted, under-shifted or simply passed on tax increases to consumers between 2006 and 2009. Overall, the results suggest that tax increases were over-shifted, with greater price increases in November–May when tobacco taxes rise than in May–November. The extent to which tax increases were passed on to smokers differed by brand segment, the price increases for premium and mid-price segments being much higher during November–May than May–November. This suggests that, for these brands, cigarette manufacturers were using the increases in tobacco duty to disguise additional price increases, thus over-shifting taxes. The prices for the economy segment were also being over-shifted, but the larger price increase was timed so that it did not coincide with the tax increase. For the ultra-low-price segment, the prices net of tax actually fell between November and May when the tax burden rose, with a very slight increase in net prices between May and November. Overall, taxes on ultra-low-price brands were under-shifted.

These findings suggest that the tobacco industry is using a sophisticated pricing strategy in Great Britain to cross-subsidize cheaper brands with profits from more expensive brands. This study shows real price increases and over-shifting of taxes in the premium, mid-price and economy brand segments, while the real price of ultra-low-price brands did not increase and taxes on this segment were under-shifted. Consistent with this strategy, the price increases were greatest on mid-price and economy brands and lowest (and often negative in real terms) on individual ultra-low-price brands. Furthermore, the price increases appeared to be timed to accentuate differences in prices between brands in different segments at the time when duties were increased; however, overall prices increased and taxes were over-shifted to consumers, a pattern that contributes to rising industry profits.

As a result of this pricing strategy and the increase in the number of ultra-low-price brands, consumers have more opportunities to down-trade from more expensive to cheaper cigarettes. The market share by volume of ultra-low-price brands has increased in response. The availability of cheap brands undermines tobacco tax policy because it ensures that price-sensitive smokers, particularly the young and the poor, continue to initiate and maintain their smoking habits.

#### Tobacco industry influence on tobacco excise policy in four European countries: case studies in Bulgaria, the Czech Republic, France and Poland

The efforts of transnational tobacco companies to influence tobacco control policy (specifically tobacco excise policy) were examined in four European Union Member States by detailed analyses of tobacco industry documents, in which a socio-historical approach was used. Analysis of documents was triangulated and updated with the results of interviews and secondary data analysis. Countries examined include: Bulgaria (1988–2011), the Czech Republic (1989–2011), France (1990–2011) and Poland (1990–2011).

The countries selected have several attributes that make them interesting for analysis. At the time of market entry, each country was of particular interest to the tobacco industry for its strategic importance and the opportunity it presented for market expansion. Bulgaria was seen as a lucrative market for several reasons. First, the existing production infrastructure, low average salaries and high production provided opportunities for improving profit margins. Secondly, Bulgaria was seen as the gateway to accessing the then closed markets of Turkey and former socialist countries. Thirdly, joint-venture initiatives with Bulgartabac provided opportunities for expansion of the existing brand portfolio. The Czech Republic was of interest because of its strategic location in central Europe, bordering former socialist countries that the transnational tobacco companies hoped to access. France has seen two major tax increases in the past twenty years, and also has close relationships between the industry and state, partly due to the state's former monopoly on tobacco products. The size of the Polish market and the potential for even further growth underpinned the transnational tobacco companies' interest in penetrating the Polish market.

The lack of effective government intervention in tobacco control provided a favourable business environment in each of the case countries. Bulgaria's tobacco control is weak, its ranking on the 'tobacco control scale' falling from 13 out of 30 European countries in 2007 to 24 out of 31 countries in 2010. The Czech Republic has one of the poorest tobacco control records in Europe, ranked fourth lowest in Europe for tobacco control policy implementation in 2010 (7), with senior political figures publicly supporting the tobacco industry. Although France ranked sixth on the 2010 tobacco control scale, rising one place from 2007, the Government's policy on tobacco taxation and pricing is still considered friendly to the industry. Unlike most other central and eastern European countries, Poland had a fledgling tobacco control movement in place in the late 1980s and early 1990s, providing some opposition to the transnational tobacco companies as they entered the Polish market. While Poland was a leader in implementing tobacco control policies in 1995, ranking 14 out of 30

European countries in 2007, it has been described as ‘losing momentum’, and its ranking fell to 19 out of 31 countries in 2010 (7).

In each of the case studies in the central and eastern European countries, the period considered covers the entry of the transnational tobacco companies into the country, privatization of the tobacco industry (except in Bulgaria where privatization is ongoing) and accession to the European Union. Transnational tobacco companies use industry privatization as an opportunity to manipulate tobacco excise structures in their favour, lobby against cigarette excise rate increases and influence the broader regulatory environment (17). Much of this evidence is, however, based on studies from the former Soviet Union and applies to British American Tobacco in particular. Accession to the European Union required elimination of any remaining barriers to European imports and implementation of European Union excise directives, as well as other tobacco control legislation; it also provided an opportunity for industry influence. In France, the study specifically addressed the two large tax increases in 1991–1993 and 2003–2004 and the industry’s response to them, as there is little evidence on the impact of large tax increases.

#### Tobacco industry lobbying on tobacco excise structure and rates

As in studies in the United States and other high- and middle-income countries, the evidence suggests that the tobacco industry tends to lobby collectively against increases in tobacco excise rates but separately on tobacco excise structure.

One of the criteria for European Union accession was to harmonize the country’s tobacco excise system with that required by the European Union, by implementing a mixed system, combining specific and ad valorem components, and a total tax accounting for a minimum of 57% of the most popular price category (18). In 1995, a new directive was introduced, requiring that the specific component represent 5–75% of total excise (19). In response to these accession requirements, the industry formed regional groups to discuss taxation issues, including a ‘central European tax task force’ and an ‘eastern European tax working group’ (20). The aim of the central European tax task force was to review likely excise harmonization scenarios and devise “strategies for halting/slowing the increase in excise incidence” (20). The group later agreed to encourage only “very gradual harmonisation” of excise levels and “to develop joint argumentation aimed at opposing rapid and disruptive excise increases in the individual (accession) markets” (21). The importance of encouraging the governments of central and eastern European countries to seek derogations on tobacco excise was highlighted, amid concern that meeting the 57% threshold would cause cigarette prices to rise considerably in accession states (22). Table 5.2 summarizes the agreed tax harmonization goals and argumentation used by the task force in lobbying for these goals.

The transnational tobacco companies also used passage of the 1992 and 1995 European Commission directives on tobacco excise harmonization to lobby for favourable changes to the French tobacco excise system. The then-State-owned tobacco company Société Nationale d’Exploitation Industrielle des Tabacs et Allumettes (SEITA) sold mainly cheap products and benefited greatly from France’s predominantly ad valorem system; the transnational tobacco companies sought,

unsuccessfully, to persuade the Government that a larger specific tax would improve the tax revenue from tobacco products.

Documents on accession countries show clearly that the transnational tobacco companies were concerned to prevent any significant increase in excise duties with accession and to ensure that any such increase would be gradual (23, 24, 25). The companies collaborated to prevent and postpone any increase in excise (20, 26) and lobbied successfully for derogation of increases in the excise level in accession countries. As a result of the derogations and with the increase in income with accession to the European Union (an issue that the industry appears to have overlooked when claiming that tax increases would lead to rapidly rising cigarette prices), cigarettes actually became slightly more affordable in some accession countries.

Although there was support for discouraging a rapid increase in excise levels, there was disagreement about the optimal speed of transfer to the European Union's mixed excise structure. British American Tobacco is recorded as favouring a swifter move to a mixed excise structure than its counterparts (21). Its support for an earlier transition to the mixed system probably reflected its brand portfolio. While it then promoted a mixed system to advantage itself and disadvantage Philip Morris International, the latter promoted a specific structure to narrow the price gap between its lead brand Marlboro and cheaper brands.

The approach and arguments of the transnational tobacco companies appear to be context-specific (although always with the ultimate aim of securing corporate advantage, including over competitors). For example, in the Czech Republic, Philip Morris International changed its position on the tiered excise structure in accordance with its changing market position, first lobbying against it and then working to maintain it once it acquired Tabak (and thereby an interest in local cigarettes).

#### Industry arguments against increases in excise

Industry arguments against excise increases are questionable and often contrary to the international evidence. A current British American Tobacco employee suggested that the industry exploits a lack of expertise in tobacco excise to 'educate' politicians. In seeking to delay implementation of the European Union's minimum excise requirement, transnational tobacco companies argued that raising taxes would increase smuggling, a claim unsupported by the evidence (27), which indicates that smuggling is more pervasive in countries with low tobacco taxes and loose border regulation (28, 29). In fact, greater European tax harmonization is likely to reduce smuggling (30). In France, the transnational tobacco companies appear to have increased prices (rather than taxes) by 6% per year since 2009, with no concern that this would result in more smuggling. The companies also contended that increased tobacco taxes could reduce government revenue; the French case study showed that the large tax increases of 2003–2004 raised Government revenue by EUR1 billion, and other international evidence indicates that increases in tobacco tax almost certainly increase government revenue (31). The companies further claimed that the tax increases required to meet the European Union's 57% excise level in the Czech Republic should be gradual in order to preserve the country's macroeconomic

stability. It is unlikely that changes in the taxation of tobacco, which is not an essential good (30), could have such a significant impact on a country's overall economy (32), and the industry's approach increased the affordability of cigarettes after accession. The companies' preference for gradual rather than significant tax increases is more probably related to their awareness that consumers absorb gradual increases more easily. The fact that a significant derogation period was granted to accession states in relation to the minimum excise requirement (albeit a shorter period than the transnational tobacco companies were hoping for) suggests the companies were relatively successful in influencing this process, despite their flawed arguments.

To influence policy, industry targeted key government officials at both national and European Union level, as they have done elsewhere (33-36). Interviewees in the Czech Republic suggest that this tactic continues and has been extended to high-level politicians, with whom the industry appears to have significant contact and influence. Industry documents show that the transnational tobacco companies targeted the current French President Nicolas Sarkozy when he was Minister of the Budget (37). Several of President Sarkozy's current advisors and ministers previously worked in the tobacco industry. In the Czech Republic, donations were made to 'friendly' political parties, the transparency of political funding being identified as a concern. Other tactics included trying to ensure favourable media coverage and commissioning third-party research to boost the credibility of the industry claims; again, tactics seen elsewhere (33, 38, 39). In Bulgaria and Poland, the transnational tobacco companies forged strong relationships with Government officials, which appear to continue (40).

In summary, there is clear evidence of an influence of the transnational tobacco companies on excise tax policy in the countries studied, and the influence continues, despite the WHO FCTC and its Article 5.3, which requires Parties to protect policy-making from industry influence. There is also evidence that ministries other than health are under the mistaken impression that Article 5.3 does not apply to them.

Tobacco industry rationale for investing in smokeless tobacco in Europe and their interest and rhetoric on harm reduction

Although the sale of snus has been prohibited in the European Union outside Sweden since 1992, it is sold on the single market via the Internet. It was easily purchased in all 10 European Union Member States where test purchases were attempted. Online sales and promotion of snus contravene three aspects of European Union legislation. First, they clearly contravene the Tobacco Products Directive, which bans sales of snus outside Sweden. Secondly, as the majority of the test purchases were taxed in the country of origin (Sweden), the sales violate Directive 2008/118/EC, which requires that excise duties on distance sales (i.e. via the Internet) be levied in the country of destination. Thirdly, price-based promotions are widespread on the websites selling snus, which is in direct contravention of the European Union Tobacco Advertising Directive, which bans Internet tobacco advertising. Importantly, online vendors deliberately target non-Swedish European Union nationals, and most operate from Sweden, despite Swedish Ordinance 1994:1266 banning the export of snus to other European Union Member States. The apparent willingness of the tobacco industry to contravene European Union and Swedish legislation and profit from unlawful sales

raises questions about the legitimacy of their involvement in consultations on future policy.

There appears to be a mismatch between the prominent rhetoric on harm reduction and the lack of “action” on snus on a number of fronts, which suggests that SLT is not part of the TTCs short-term business future. TTCs have shown interest in investing in SLT before, evidence clearly showing the aim was to create a new tobacco epidemic, with SLT seen as product for “beginners” (in particular young people) who would previously have taken up smoking, for smokers who would otherwise quit or smoke less (for example in smokefree environments). There is no evidence that the TTCs’ recent interest in snus, and current rhetoric on harm reduction, would be different and some evidence that it would be the same. For example, in countries where SLT is legal, it is being promoted for use in smokefree public places and targeted at the young. Their limited snus investments may help the industry’s long-term future (should regulation further constrain the cigarette market), reassure investors (SLT shows growth unlike cigarettes) and, in the interim, provide a vital public relations function. Harm reduction gives the industry the opportunity to rehabilitate their image and justify their inclusion as stakeholders in policy debates, thus undermining Article 5.3. of the FCTC. Removing the EU ban on snus, without establishing a regulatory framework, could reduce the impact of smokefree legislation and create a new long-term SLT epidemic. In fact, there is evidence to suggest that the industry is already undermining EU tobacco control legislation by selling snus online from Sweden to other EU member states, and using the Internet to promote snus use.

### Tobacco taxation and health inequalities

Certain population subgroups have higher rates of tobacco use and find it harder to quit, with declines in smoking over time varying by population subgroup. In addition to having higher smoking rates, the least advantaged members of society tend to start smoking at a younger age, use more tobacco and are less likely to quit (43). A recent review (43) concluded that price increases were the intervention most likely to reduce such inequalities. The effectiveness of tobacco taxation is fully realized, however, only if tax increases lead to increases in the price of the cheapest cigarettes or other tobacco product, whether manufactured cigarettes or hand-rolling tobacco. Otherwise, there is an opportunity and incentive for the most price-responsive smokers to trade-down to cheaper brands or products.

Cheap tobacco products are not limited to discount brands of manufactured cigarettes but include illicit tobacco sold at cut prices and hand-rolling tobacco, which is subject to lower rates of excise within the European Union. The extent to which tax increases result in increases in the average price of the cheapest cigarettes depends on the structure of tobacco taxes and industry pricing strategies. Tobacco companies may use price-based promotions to position brands at various points in the market. Furthermore, as discussed above, companies may absorb tax increases (under-shifting), pass them on to consumers or increase prices on top of tax increases (over-shifting).

### Industry pricing strategy and the availability of cheap tobacco products



As discussed in the previous section, PPACTE evidence suggests that, at least in Great Britain, the tobacco industry is using a sophisticated pricing strategy, in which cheaper brands are cross-subsidized with profits from more expensive brands. Examination of trends in prices by price segment shows real price increases and over-shifting of taxes in the premium, mid-price and economy brand segments, while the real price of ultra-low-price brands has not increased and taxes on this segment are under-shifted. Therefore, the price increases are greatest on mid-price and economy brands and lowest (and often negative in real terms) on individual ultra-low-priced brands. Furthermore, the price increases appear to be timed to accentuate differences in prices between brands in different segments at the point when duties are increased; however, overall prices are increased and taxes are over-shifted to consumers, which contributes to rising industry profits (42).

As a result of this pricing strategy and the increasing number of ultra-low-price brands, consumers have more opportunities to down-trade from more expensive to cheaper cigarettes; and the market share by volume of ultra-low-price brands has increased in response. The availability of cheap brands undermines tobacco tax policy, as it ensures that price-sensitive smokers, particularly the young and the poor, continue to initiate and maintain their smoking habits. If the young and most socioeconomically deprived parts of the population are the predominant users of these cheaper tobacco products, their availability is contributing to widening health inequalities.

Further analysis of annual data from the British General Household Survey (now known as the General Lifestyle Survey) for the period 2001–2008 provided further insight into the trends in the use of cheap cigarettes and hand-rolling tobacco, as well as the profiles of users of such products.

#### Trends in the use of cheap cigarettes and hand-rolling tobacco in Great Britain

While there was a marked decline in the smoking rate in the population of Great Britain as a whole during the period 2001–2008, from 26.8% to 20.8%, this decrease is only in the proportion smoking filter cigarettes (Figure 6.3), which has dropped significantly, from 20.8% to 14.7%. In contrast, the proportion of smokers smoking hand-rolling tobacco has not changed significantly, hovering around 6%. The proportion smoking unfiltered cigarettes has remained negligible, at 0.1–0.2%.

Among people smoking filter cigarettes, the proportion smoking expensive cigarettes has decreased significantly, from 11.1% to 5.1%, while the proportion smoking cheap cigarettes has not changed significantly, remaining at 9.0–9.7% throughout the 8-year period.

Among smokers, the proportion smoking filter cigarettes has fallen and the proportion smoking hand-rolling tobacco has increased in all age groups. This trend was most apparent for 16–24-year-olds, among whom the proportion using hand-rolling tobacco almost doubled, from 16% to 28%. The proportions in 2008 are significantly different from those in 2001 for all groups, although the results are of borderline significance for people aged 25–39 years.

Consistent with the marked decline in the proportion of the population as a whole smoking expensive cigarettes, significant decreases were seen in all age groups except those over 55 years in the proportion of smokers smoking expensive cigarettes, with concomitant increases in the proportion smoking cheap cigarettes. The increase in the proportion smoking cheap cigarettes was greatest in the youngest age group, which now has the highest rate of cheap cigarette use. Three quarters of 16–24-year-olds now smoke cheap cigarettes.

### Determinants of smoking cheap cigarettes and hand-rolling tobacco

Analysis of the British General Household Survey data suggests that the odds of smoking cheap cigarettes are higher for women than men, for younger than the oldest age group, for whites than for other ethnic groups and for people with the lowest socioeconomic and educational status. Women were 50% more likely to smoke cheap cigarettes than men. People aged 16–24 were 3.6 times more likely to smoke cheap cigarettes than those aged over 55 years, and the odds for smoking cheap brands increased with declining age, although the confidence intervals for the intermediate age groups overlapped. The odds for smoking cheap cigarettes were significantly higher for all occupational groups than for managerial and professional occupations, although, as for age, a nonsignificant dose–response relationship was seen. The proportion of full-time students who smoked cheap cigarettes was similar to that of managerial and occupational classes, but the number was too small to reach clear conclusions about their brand choice. In comparison with people achieving A-level or higher qualifications, those with less education were more likely to smoke cheap brands.

The odds for smoking hand-rolling tobacco versus filter cigarettes showed similar inverse socioeconomic and educational gradients to the odds for smoking cheap cigarettes and were greatest for people with the lowest economic and educational status. Marked differences were, however, seen. Men were more likely than women to smoke hand-rolling tobacco, but there were no significant differences by age group or ethnicity.

It is notable that women are 50% more likely than men to smoke cheap cigarettes. Interestingly, inequalities in smoking among women by socioeconomic factors have widened in recent years, while those in men have remained constant. We also found that the rates of cheap cigarette use increased with declining age. Similarly, smoking rates have been rising among young adults, who are more likely to smoke cheap cigarettes, even though overall smoking rates decreased and then remained steady during 2007–2009.

Studies of cessation interventions indicate that quit rates are lower among disadvantaged smokers. Given recent evidence that disadvantaged smokers attempt to quit at the same rate as more advantaged smokers (43), this pattern appears to be attributable to lower rates of success in quitting among the disadvantaged. While several explanations have been considered, including lack of support for quit attempts, in part because other people in their social network are more likely to smoke, greater addiction to tobacco and poorer compliance with treatment (43, 44), the role of the availability and use of cheap, legal sources of tobacco has been overlooked. These

findings, well-established evidence on the importance of price in reducing tobacco use (45-48), particularly among poorer smokers, and newer evidence that the availability of cheap cigarettes reduces the ability of price to promote cessation (44) suggest that the availability of cheap tobacco may partly explain the high smoking rates and low quit rates of the most disadvantaged members of society.

These findings suggest that the availability and use of cheap cigarettes play a key role in determining inequalities in smoking. Moreover, given recent evidence from the British market that the major tobacco companies have been absorbing tax increases on the cheapest cigarette brands (so that the price of these products has not increased in real terms) and using price promotions to sell these brands (sometimes at a loss) (49), this study suggests that tobacco industry pricing may play a role in explaining smoking patterns, including inequalities.

While this analysis was limited to the British market, where the number of hand-rolled cigarettes as a proportion of daily cigarettes is higher than in other European Union countries, the findings are likely to be relevant to numerous other markets. Hand-rolling tobacco represents a substantial proportion of total releases for consumption in Albania, Austria, Croatia, Finland, France, Greece, Hungary, Ireland, Spain and the United Kingdom. Furthermore, releases for consumption of fine-cut tobacco increased between 2002 and 2010 in the European Union overall and particularly in Cyprus, Germany, Greece, Hungary, Poland and Spain. Euromonitor data confirm these trends, indicating that sales of hand-rolling tobacco have increased in the Czech Republic, Germany, Hungary, Poland and Spain, and the share of cheap cigarettes is growing in Austria, the Czech Republic, Denmark, Hungary, Lithuania, Portugal, Slovakia and Sweden.

## Summary

Urgent action should be taken to narrow the price differentials between the most expensive and the cheapest tobacco products (both manufactured cigarettes and hand-rolling tobacco) and to prevent the industry from price-discounting the cheapest brands, cross-subsidizing this practice with profits from more expensive brands. A tax structure that includes a high minimum excise tax, a predominant specific element and a limited ad valorem component would achieve greater convergence of prices across price segments, and comparable rates of excise on other tobacco products would discourage product substitution. Furthermore, price promotions and below-cost selling should be banned. Tighter controls on illicit trade could also contribute to reducing inequalities in smoking and associated inequalities in health outcomes, by restricting the supply of cheap tobacco products.

## Conclusions and policy recommendations

The following recommendations derive from PPACTE research evidence. Future EU tobacco excise Directives must address the following problems: the availability of cheap and ultra low price cigarettes; the relatively low taxes on alternative products, such as fine cut tobacco used for hand-rolled cigarettes; illicit trade or smuggling; and the pernicious interference and influence of tobacco companies on the development of tobacco tax policy. It is no easy matter to address these problems or loopholes, but

these recommended changes to the tobacco tax structure and other supportive legislation, could go a long way towards this aim.

**Recommendation 1:**

We strongly recommend a continuing increase in tobacco taxes, so that the price of tobacco products is raised above the general rise in prices of other goods and rises in incomes. This would make tobacco increasingly less affordable to smokers and potential smokers and result in increased national revenues from tobacco taxes for Member State governments.

**Recommendation 2:**

The European Commission should consider and act upon the high level of support from the citizens of Member States for substantial increases in tobacco taxes, particularly if some of the tax revenue is used to support cessation, public education and prevention.

**Recommendation 3:**

We suggest that selling cigarettes below cost and low-price-based marketing, including selling below the tax level, should be banned, as the deleterious effects of these practices were demonstrated. Member States should be transparent about all aspects of the taxes and publish an annual report showing all aspects of tobacco taxation and revenue and the weighted average price.

**Recommendation 4:**

We recommend that the European Commission move to a tobacco tax structure that makes trading down to cheap cigarettes less attractive. This would avoid the unintentional widening of health inequalities promoted by existing tax structures.

**Recommendation 5:**

We recommend that the ad valorem tax (minimum 80%, ideally 83%) be applied to all cigarettes priced above the weighted average price. This means that the excise tax plus VAT would be at least 80% of the retail price, with a minimum monetary tax equivalent to at least 80% of the average weighted retail price, or EUR125 per 1000 cigarettes, whichever is higher.

**Recommendation 6:**

We recommend consideration of tailoring the minimum tax so that it is comparable in affordability between countries, thereby allowing higher levels to be set automatically in higher-income countries.

**Recommendation 7:**

We recommend that there be full alignment of tax rates, so that fine-cut tobacco for roll-your-own cigarettes (and also pipe tobacco) is taxed at the same rate as manufactured cigarettes and at an appropriate conversion rate. The tax should include both a specific component, based on the weighted average price of cigarettes, and an ad valorem component and not provide a choice between specific and ad valorem, as at present.

**Recommendation 8:**

We recommend that, to support tobacco tax reforms, the European Union continue to support the proposed WHO FCTC protocol on illicit trade in tobacco products. This should include linking codes for individual packs with cartons and master cartons, a measure that is both feasible and essential. It should also be entirely independent of the tobacco industry.

Recommendation 9:

We recommend that the European Commission educate Member States and the public about the beneficial effects of increased tobacco taxes and of improved tobacco tax structures in terms of government tax revenue and improved health of citizens. The International Monetary Fund recommends, even insists, that European Union countries with high debt should increase their tobacco taxes, and the European Commission should reinforce that policy to counteract the misinformation from the tobacco industry.

Recommendation 10:

We recommend that European Union institutions and Member States take action to ensure that tobacco taxation policies are developed without tobacco industry involvement, in conformity with Article 5.3 of the WHO FCTC.

Recommendation 11:

We recommend that the embargo on snus remain, unless clear evidence is provided on its safety and its overall beneficial effects on health. Reversing the European Union ban on snus sales without an appropriate regulatory framework would present a danger to public health and should therefore be considered extremely cautiously.

Recommendation 12:

We recommend that the European Commission (which is responsible for ensuring that European Union law is correctly applied) should investigate illegal sales of snus and Sweden's apparent failure to fulfil its responsibilities under European Union law. To remove any ambiguity, a specific clause should be inserted in the text of the revised Tobacco Products Directive, prohibiting the sale of snus via the Internet, with a clear indication of the penalties facing those who contravene the legislation.

Recommendation 13:

We recommend the tax levels and structures proposed above as important contributions to reducing health inequalities resulting from socioeconomic inequalities in the prevalence of smoking.

Recommendation 14:

We recommend that a percentage of the extra revenue from increases in tobacco tax be earmarked (hypothecated) for smoking cessation services and well-designed mass media campaigns, particularly focused on the needs of low-income smokers.

Recommendation 15:

We recommend that all Member States be required to collect data and make them public, to allow monitoring and analysis of tobacco taxation and smoking prevalence.

At a minimum, data on the following variables should be reported by the relevant government departments of Member States to the European Commission and made

publicly available through Eurostat: annual weighted average price by tobacco product type (e.g. cigarettes, pipe and hand-rolling tobacco, smokeless tobacco, including snus, snuff and chewing tobacco); and annual tax-paid sales or releases for consumption of tobacco, by tobacco product type.

To allow more detailed monitoring and more sophisticated analysis of the effectiveness of tobacco taxation across Europe, data on the following variables should be reported to the European Commission and made publicly available through Eurostat: annual (or more frequent) weighted average price by tobacco product type and price category; annual (or more frequent) tax paid sales or releases for consumption of tobacco by tobacco product type and price category; market share by tobacco product type and price category; annual tobacco tax revenue; tobacco tax structures and rates; data on illicit trade when available; and lists of licensees and registered products.

Furthermore, Eurobarometer and/or national population-based surveys should regularly collect and make publicly available data on: tobacco use prevalence by age, gender, socioeconomic status and tobacco product type, with agreed definitions and measures. In particular, smoking rates at early ages, such as 15–17, 18–21, 21–24 and 25–29 years are needed; and prevalence of former smokers by the number of years since they quit, so that cessation rates can be estimated and tracked.

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## **Potential Impact:**

The taxation of tobacco products is a power intervention capable of changing the patterns of tobacco initiation, consumption and cessation in the population. A significant increase in the taxes and prices of tobacco products is considered the single most effective and cost-effective measure for controlling tobacco use, particularly in sub-groups of the population with limited disposable income as for instance the poor and the young (WHO, 2010). Taxes on tobacco products constitute a formidable ally in the fulfillment of public health objectives targeted at diminishing the incidence of tobacco-attributable disease and death. Tobacco use represents the biggest preventable cause of cancer worldwide. In particular, tobacco smoking is pandemic involving subjects of all ages, affecting over a billion people. Maximizing the effectiveness of tax and price policies in achieving reductions in tobacco use and its health consequences requires a clear understanding of the impact of these policies on initiation and escalation of tobacco use, cessation and relapse, tobacco product consumption, substitutability of tobacco products, tax avoidance and evasion, and related outcomes. At the same time, those making or advocating tobacco tax and price policies must understand the impact of these policies on other outcomes, including their impact on government revenues, employment and inflation. The WP 7 IARC Handbook 14 produced within PPACTE compiles and critically presents the evidence available up to May 2010 on these topics and provides the evaluation of the strength of such evidence supporting the 18 concluding statements. The IARC Handbook has been a key and timely contributor to the WHO-FCTC by providing a thorough review of the evidence to the Working Group on Article 6 (Price and tax measures to reduce tobacco use) of the WHO-FCTC which met in Geneva on 6-9 December 2011. The volume represents a resource to policy makers, regulators, advocates, and scientists in Members States of the EU and to similar stakeholders globally.

Examining these relationships entails describing who uses tobacco, what, when and where products are used and by how much at MS level; what tobacco control interventions, in addition to taxation, are in place and how these co-impact tobacco use; what is the response of the tobacco industry to tobacco tax levels, structures and governments' plans to control tobacco use through price; and what characteristics of the general environment can affect tobacco demand, including social and cultural norms. The PPACTE project has addressed these domains by:

- 1) conducting a survey on the economics of tobacco use using a standard and uniform approach in a representative population sample in each of 18 strategically selected European countries and therefore filling gaps in available data on smoking prevalence and consumption, and allowing between-country comparisons;
- 2) determining key factors that affect the aggregate demand for cigarettes, pipe and hand-rolling tobacco, and snus by analyzing the price elasticities and other key determinants of demand for tobacco in 11 European countries and evaluating to what extent the demand for selected products can be controlled by price and other policy interventions;
- 3) exploring the impact of tax policies and their interaction with other tobacco control measures on smoking prevalence and associated mortality through the use of mathematical simulation modelling (SimSmoke models) for 15 EU countries;
- 4) documenting tobacco industry's influence on tobacco tax policy across the EU through country case studies, conducting research on the tobacco industry's pricing

strategies, rationale and strategy for expanding sales of snus in the EU including online sales and promotion of smokeless tobacco and describing illicit tobacco trade in the EU;

5) convening a working group of international experts to produce a handbook containing a review and critical appraisal of the international literature on the effectiveness of tobacco tax and price policies; and

6) integrating research findings from PPACTE and developing evidence-based policy recommendations to improve market regulation of tobacco products in the EU. The comprehensiveness of the PPACTE project has generated findings with relevant socio-economic impact.

### Socio-economic impact and implication to society

PPACTE's WP2 and WP3 results will be utilized for evaluation, planning and designing of tobacco tax and price policies in the EU with the potential to advance public health as well as to increase tax revenues. Our findings based on the econometric analysis of demand on 11 countries indicate that the real prices of cigarettes should increase at about the same rate as real disposable income to keep consumption of cigarettes constant at country level. An increase in the real price of a tobacco product is expected to cut down individual consumption, while growth in real household disposable income is expected to increase individual consumption, and these two simultaneous effects on tobacco consumption will partly mitigate each other, and thus the effectiveness of price policies in controlling tobacco use may be reduced. Hence future tobacco price policy in the EU ought to take into account the effect of real income development on tobacco consumption in order to be effective in cutting tobacco use incisively in the population.

PPACTE WP2 found substantial differences in terms of smoking prevalence, per capita number of cigarettes per day, smoking dependence, standardized cost of cigarettes, hand-rolled and smuggled cigarette use across 18 European countries surveyed. It is evident that tobacco tax policy can play a major and more decisive role in determining the cost and level of use of tobacco products in the European continent. The use of hand-rolled cigarettes is increasing in various countries since these cigarettes are substantially less expensive than manufactured ones and this differential is favoring product substitution as an alternative lessening the potential impact price can have in inducing quitting cigarette smoking. The proportion of hand-rolled cigarettes on total cigarette consumption was highest in the UK, where pricing policies have been extensively implemented thus suggesting that a non negligible proportion of smokers switched to hand-rolled cigarettes as a consequence of the increases in price. Even in countries where cigarette prices are still relatively low, compared to the UK, hand-rolled cigarettes are frequently used, as is the case of Finland, Spain and Poland. However in Ireland where cigarette prices are highest in the EU and the differential between manufactured and hand rolled is relatively low, use of hand rolled tobacco is still low. Therefore there is need for the EU to aim at, and achieve, full alignment of tax rates so that fine-cut tobacco for roll-your-own cigarettes (and also pipe tobacco) is taxed at the same rate as manufactured cigarettes and at an appropriate conversion rate. This is a PPACTE evidence-based recommendations which if incorporated into policy at EU and MS level will provide an optimum instrument for tobacco control through taxation in the Union.

No specific pattern with reference to total smoking prevalence was evident according to geographic area, although male-to-female smoking prevalence ratio was higher in Eastern European countries, in poorer areas and in countries with less advanced tobacco control measures. This heterogeneity in tobacco use across the continent can guide future policy action at multiple tiers. For instance, giving priority to smoking cessation in men where male prevalence is exceedingly high (i.e., over 35%), focusing on smoking cessation in women in countries where female prevalence is over 25%. Focusing on intervention for smoking cessation in young (25-44 years) and middle aged population (45-64 years) as the first group will be, on average, 75 and the second one 95 years by 2050. Thus, tobacco related deaths will be concentrated in these age groups.

PPACTE, through the WP4 SimSmoke models, evaluated the effects of tobacco control policies on smoking prevalence and related mortality, also considering the potential impact of stronger policy alternatives in those countries for which the models were developed. This output is contained in country-specific reports for each of 15 countries detailing the SimSmoke model assumptions, methodology and findings (available at <http://www.ppacte.eu>). A manual has been developed to guide the use of the model and discusses how the model can be incorporated in the surveillance and evaluation system of Member States. In addition, we have worked with staff in other nations in developing separate country reports.

The models showed the gains in reduced smoking prevalence and averted deaths that would result from increasing excise tax level to 70% of the retail price. The largest reductions are seen in the Russian Federation and Albania where excise taxes are below 35% of the price. For the Russian Federation, a 20% relative reduction is expected in smoking prevalence within 5 years increasing to 37% by 2040. As a consequence, 15,000 lives are saved in 2015 increasing to 96,000 lives saved by the year 2040. While prevalence is predicted to fall even more in Albania, the number of lives saved is much smaller, about 33,000 between 2011 and 2040. Other countries with the potential to avert many deaths through a price increase are the Ukraine (362.500), Turkey (125.000), and Italy (105.000). Model predictions suggest that in each country, substantial reductions in smoking prevalence and lives lost to smoking can be achieved through increasing tobacco taxes alone. Further, the effects grow over time by as much as 50%, because tax increases have the greatest effect on youth and, over time, the reduced smoking rates of youth have an increasingly greater effect on the adult population. The effects of tobacco taxes on deaths are delayed not only because the effects of cessation on death rates are relatively slow to develop. In addition, the greatest tax effects are on youth prevalence, and changes in youth prevalence do not lead to fewer smoking-attributable deaths for at least 20 years (at about age 35).

Our findings show that while tax increases alone lead to large reductions in smoking prevalence in countries such as the Russian Federation, other policies enforced in conjunction with tax increases can also have substantial effects in settings with weak tobacco control policies. As an illustration, if all policies are simultaneously implemented, Russia SimSmoke predicts a reduction in smoking prevalence of 38% (compared to 20% if only a tax policy as the one previously described is implemented), which increases to a 54% relative reduction by 2040. A total of 3.5

million deaths are averted with the implementation of the complete policy package contained in the WHO-FCTC treaty. These findings are of great importance to countries in the continent with relatively weak policies, such as Ukraine, Poland, Germany and the Czech Republic. Even some of the countries with relatively strong tobacco control policies, such as Great Britain, France, and Ireland, are predicted to see reductions in smoking prevalence of nearly 30% or more with putting into practice the complete package of MPOWER policies. In sum, when tobacco tax increases form part of a comprehensive tobacco control strategy in which stronger smoke-free air and youth access laws are implemented, strict tobacco marketing restrictions are promulgated, strong tobacco health warning labels are required, high publicity media campaigns are coordinated with the other policies, strong comprehensive smoking cessation treatment services are provided and all policies are enforced, significant reductions in smoking prevalence and smoking-attributable mortality can be achieved.

PPACTE's WP5 has provided a detailed understanding of the tobacco industry's attempts to mitigate the impact of tobacco tax policies, and hence it will support more effective future EU taxation policy in the EU. Specifically, our findings suggest that EC Directive 2010/12/EU should be amended to ensure that excise taxes on all loose tobaccos should be increased to match those on manufactured cigarettes to improve the efficacy of tobacco taxation policies. So the project has offered evidence from different fronts all pointing to the need for convergence of tax load across different products. Large tax increases have a greater public health benefit than small incremental increases.

The findings on industry interest in smokeless tobacco should make policy makers aware, that without establishing an appropriate regulatory framework, lifting the ban on snus is an opportunity for the industry to introduce a new tobacco epidemic in the EU, this time linked to smokeless tobacco use. In the meantime, the snus test purchases conducted within PPACTE should prompt authorities to monitor, and enforce, existing legislation restricting the availability of snus, and prevent industry from profiting from illegal snus sales. Furthermore, this work will enable policy makers to counter efforts of the industry to undermine WHO-FCTC Article 5.3, by first understanding the hidden advantages smokeless tobacco and harm reduction offer to the industry, including policy access and room for influence, and second by being aware that the industry's rhetoric is not believable and should be treated with caution.

Our work on pricing shows the need for closer and more effective monitoring of cigarette prices, including using weighted average prices instead of recommended retail price to get a better overall picture, and tracking price trends by price segment to ensure that prices are increasing in real terms in all price segments. If our recommendations are enacted, then governments will require industry to provide brand and segment specific price data on a timely basis, and in turn make such data available to researchers in order that tobacco prices can be more closely monitored. Furthermore, a couple of excise interventions should be introduced to prevent the industry from price discounting the cheapest brands and cross subsidising this via profits from more expensive brands, including the introduction of a minimum price, maximising the specific element and reducing the ad valorem element of tobacco excise, approximating taxes on hand-rolled tobacco, cigarettes and now make-your-

own tobacco, and a ban on product innovation. These excise policies should be combined with a prohibition on both below cost selling and price-based marketing.

Finally, PPACTE findings of supply chain tracking and tracing provides evidence that the industry cannot be believed to work as a ‘trusted’ and ‘transparent’ partner in combating illicit trade, and providing information on the size of the illicit trade. The findings should make governments cautious of working with the industry to tackle illicit tobacco trade. The international protocol on the illicit trade of cigarettes agreed on 4 April 2012 in Geneva endorses the tracking system clearly in the interest of public health and stresses to governments the need to be cautious of any proposal advanced by the tobacco industry.

PPACTE has corroborated that groups with lower socioeconomic status, lower incomes or lower educational attainment tend to have a higher prevalence of cigarette smoking. As a consequence, the burden of smoking-related ill health and mortality (including lung cancer, ischaemic heart disease and chronic obstructive airways disease) is increasingly concentrated in these groups. PPACTE has shown that tobacco companies tend to target low-income groups, young people and women, considering these to be their growing or continuing markets, and therefore exacerbate health inequality trends. This evidence provides compelling justification to the EC to implement tough measures against the industry’s promotion of cheap tobacco and incentives to use this highly addictive and toxic product.

The integration of research findings from PPACTE provides a solid base to support to WP6 policy recommendations to guide future EU tobacco tax regulation. PPACTE recommendations are accessible and relevant to each MS while applicable at EU level. For taxation to improve tobacco control and reduce the burden of disease caused by tobacco, future European Union directives must address the following contextual problems: the availability of cheap and ultra cheap cigarettes, including ‘dumped’ cheap cigarettes; the relatively very low taxes on alternative products, such as fine-cut tobacco for roll your-own cigarettes; illicit trade and smuggling; and the insidious interference and influence of tobacco companies in the development of tobacco tax policy. PPACTE has proposed 15 well-substantiated recommendations to the EC which if enacted can lead to significant fiscal and public health gains.

## **Main dissemination activities and exploitation of results:**

The scientific output of PPACTE, published, in press, submitted and in preparation, is an impressive testimony of the productivity, added-value and positive impact of this three-year project. A detailed list of all dissemination activities including conferences, workshops, web sites/applications, press releases, flyers, articles published in the popular press, presentations, exhibitions, interviews, posters, other, , complements the exploitation of resources.

The Handbook developed within the PPACTE project has been presented at four international conferences in the UK (8 September 2010), Canada (18 February 2011), The Netherlands (29 March 2011) and Singapore (21 March 2012). One of these included a symposium dedicated to disseminating the findings of volume 14 at the European Conference of Tobacco or Health in Amsterdam (29 March 2011). Main findings were discussed at WHO in Geneva on the occasion of the meeting of the international working group putting together guidelines for the implementation of Article 6 of the WHO-FCTC (7 December 2011). The hard copy publication of the Handbook was first announced on 11 January 2012 to the tobacco control and policy community in GLOBALINK. The book is advertised in the WHO catalogue of publications

(<http://apps.who.int/bookorders/anglais/detart1.jsp?sesslan=1&codlan=1&codcol=76&codcch=30>).

In addition, the publication of the volume has been announced at the February 2012 meeting of the IARC Scientific Council gathering scientists from all continents. The volume was presented in Brussels on 26 April of 2012 at the Permanent Representation of Ireland to the European Union in the occasion of the public debut of the PPACTE report (referred above as deliverable 7.1.b) “Policy Recommendations for Tobacco Taxation in the European Union, Integrated Research Findings from the PPACTE Project”; a gathering including members of the EC, policy establishment, scientific community and the press.

The Coordinating Centre has presented the PAPCTE project extensively during the life of the project including the Fiscalis Conference in Athens (28-29 May 2009), Annual Research Meeting at the Academy of Health in Chicago (June 2009), ENSP Conference in Athens (October 2009), European Conference of Tobacco or Health in Amsterdam (March 2011), TOBTAXY Conference in Dublin (February 2012), and at a full symposium at the World Conference on Tobacco or Health in Singapore (March 2012). The policy analysis and recommendations for pricing policy and control of tobacco in Europe were also presented at the meeting in Singapore in March 2012. The launching of the report integrating PPACTE research findings and evidence-based recommendations took place in Brussels on 26 April 2012 at the Permanent Representation of Ireland to the European Union. This important publication got coverage through public release, media briefings, radio and national press. The project website, <http://www.ppacte.eu>, offers access to all PPACTE major outputs.

Within the framework of PPACTE, the role of the legislator in the control of smoking and attributable disease and the impact of price in the demand of cigarettes have been presented in Italy at the Annual Meeting of the Italian Tumor Association (25 November 2011) and the EuroEpi Congress (8 November 2010), respectively. The



results of the European survey conducted in 18 countries were given at a session dedicated to PPACTE findings at the World Conference on Tobacco or Health in Singapore in March of 2012. The results of the Finnish econometric analyses of demand of cigarettes, pipe and hand-roll tobacco have been presented in Finland in 2010 at the European Health Economics Conference, in 2011 in Canada at the 8th iHEA World Congress and in Finland at the 10th Nordic Public Health Conference Turku, Åbo. Results of the econometric analysis of tobacco demand for the UK and France were presented at the European Conference on Tobacco or Health in Amsterdam in March of 2011. The report of the PPACTE econometric analysis of tobacco demand for 11 countries was launched in Helsinki on May 10, 2012 and will be presented subsequently in Zurich at the European Health Economics Conference (July 2012).

SimSmoke models developed within PPACTE have been presented at country-specific venues including the Netherlands SimSmoke Model at STIVRO, Amsterdam, in April 2011 and the Turkey SimSmoke Model featured at the European Society for Research on Nicotine and Tobacco (ESRNT) meeting in Turkey in September 2011. Other models were presented at the World Conference on Tobacco or Health in Singapore in March 2012. The role of the tobacco industry in curtailing tax and price policy studied within the PPACTE project has received relevant coverage at the keynote presentation “Tobacco industry strategies to undermine public health policies in Europe” given by Professor Anna Gilmore at the European Conference on Tobacco or health in 2011 in Amsterdam. Audiences at the same venue listened to “Pricing Policies and the Control of Tobacco in Europe: The Tobacco Industry in the Czech Republic” and “the Sales and Marketing of snus on the internet: the European Union (EU)”. In June of 2011 the plenary session entitled “Tactics of the tobacco industry” was given at the UK National Smoking Cessation Conference in London. Important PPACTE-derived reports on different aspects of the industry activities were presented in Singapore in 2012 including: ‘The rise of cheap cigarette brands and hand rolled tobacco in Britain: can tobacco industry pricing explain patterns of tobacco use and inequalities in smoking?’, ‘Tobacco industry pricing strategies undermine tobacco tax policies and understanding pricing is therefore essential to effective tobacco taxation policy: the example of the British market’, ‘Understanding the tobacco industry’s interests in smokeless tobacco and harm reduction in order to inform policy, and How the internet undermines EU tobacco control legislation: online snus marketing and promotion.’

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