

## EXPOSURE OF CHILDREN TO SECOND-HAND TOBACCO SMOKE

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### Proportion of children exposed to second-hand tobacco smoke (SHS) inside and outside the home

This summary is based on data on the proportion of children exposed to SHS (also known as exposure to passive smoking) both inside and outside the home. It contains information on the environment and health context and the policy relevance and an assessment of the situation in the WHO European Region, as well as suggestions for improving the monitoring of the situation in the future.

#### KEY MESSAGE

⊕ Over half of all children aged 13–15 years are exposed to SHS at home in the majority of the countries for which comparable information is available. In the Balkans and the Caucasus, exposure exceeds 90%. Exposure is also high outside the home, the lowest level documented being over 60%. Moreover, in countries with relatively low levels of exposure inside the home, exposure outside the home is comparatively high.

Comparable information for western European countries is available from the European Community Health Interview Survey. New data are now available for Belgium and Germany. Policies to ban or restrict smoking and limit advertising are expected to lead to a reduction in exposure of children to SHS. In recent years, countries have implemented more stringent legislation to restrict or ban smoking in public places.

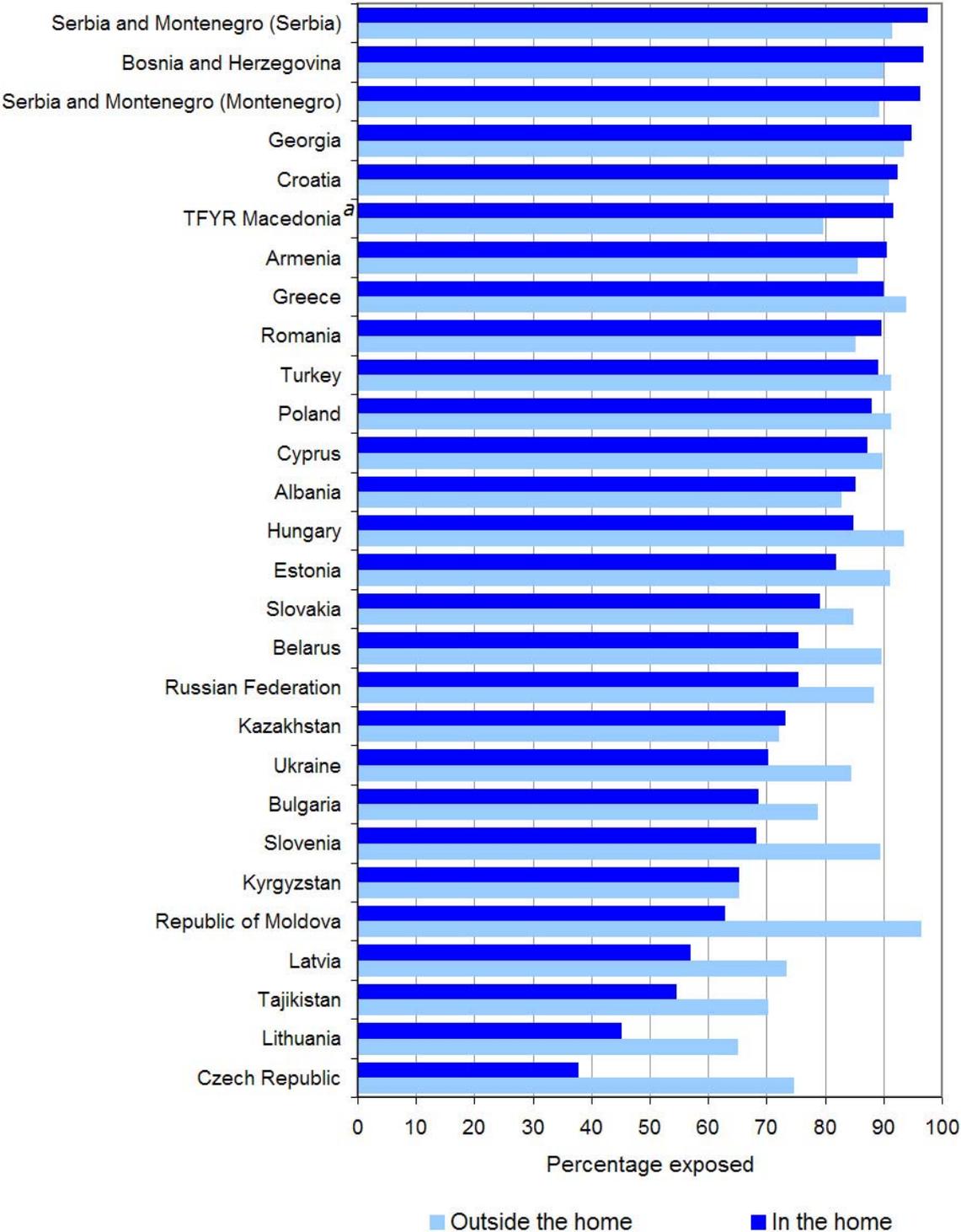
#### RATIONALE

The indicator provides information on the extent of exposure of children to SHS inside and outside the home, thus enabling an assessment to be made of the threat to health from such exposure and the effectiveness of antismoking initiatives across the Region.

#### PRESENTATION OF DATA

Fig. 1 is drawn from the Global Youth Tobacco Survey (GYTS) (1), which covered children aged 13–15 years. It is based on self-reported answers to the questions as to whether they were “living in homes where others smoke in their presence” and were “around others who smoke in places outside their home”. The geographical coverage of comparable data is restricted by the fact that only countries in central and eastern Europe, central Asia, the Caucasus and the Balkans participated in the GYTS. Croatia and the Czech Republic have recently reported updates and coverage is extended to include Bosnia and Herzegovina, Cyprus and Latvia. The data suggest that, in these countries, the proportion of 13–15-year-olds exposed to SHS in their homes ranged from 37% to 97%, while exposure to SHS outside the home was comparatively higher, ranging from 65% to 96%. As regards western Europe, various studies indicate that the proportion of children exposed to SHS at home is between 20% and 58% (2,3).

**Fig. 1. Proportion of 13–15-year-olds exposed to SHS inside and outside the home, 2002–2007**



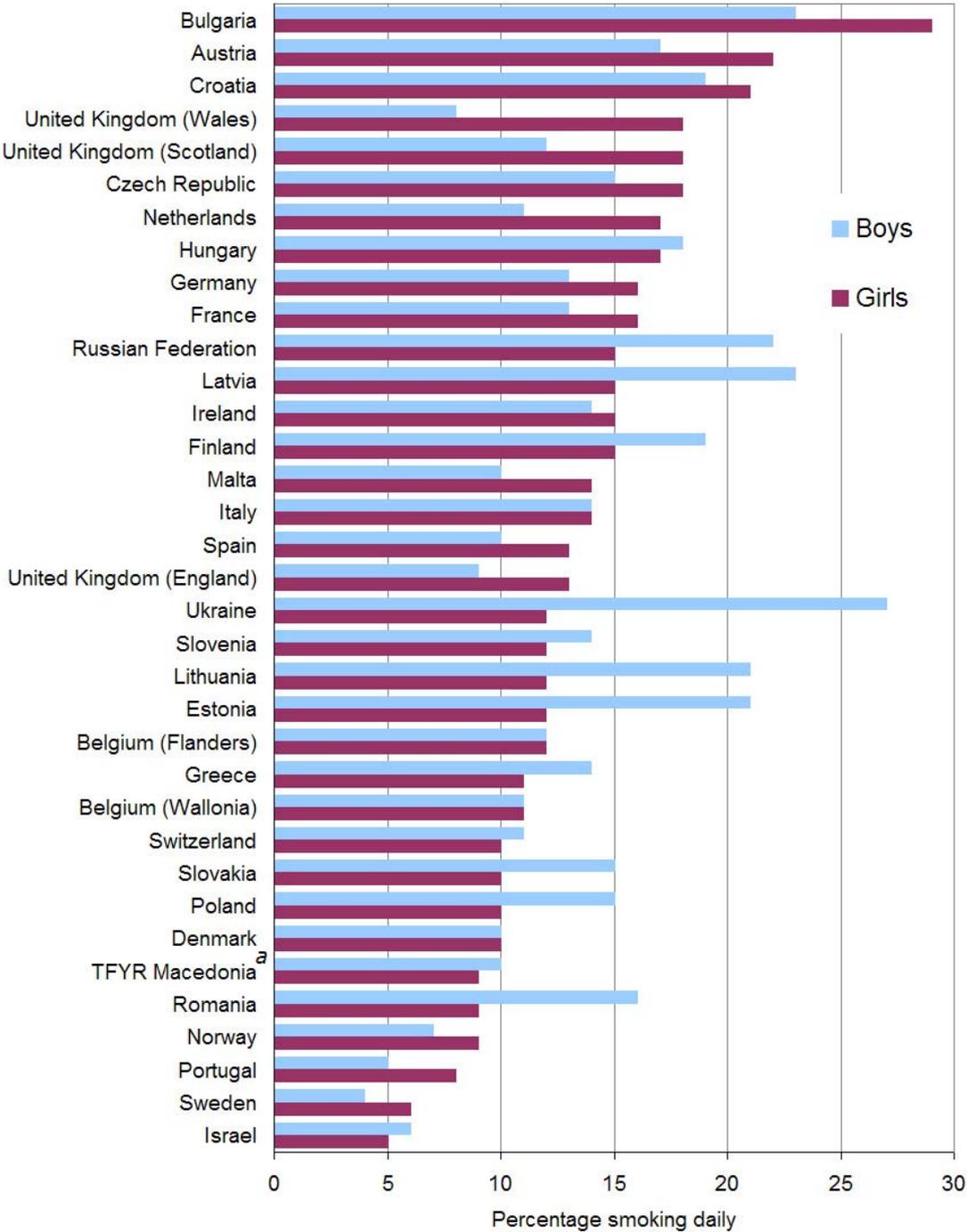
<sup>a</sup> TFYR Macedonia = The former Yugoslav Republic of Macedonia.  
 Source: GYTS (1).

Children who smoke are a potential source of exposure to SHS for their non-smoking peers.

In Fig. 2, the data are also self-reported and reflect the proportion of 15-year-olds that reported smoking every day, as collected in the HBSC survey in 2005/2006 (4). In Germany, only selected regions were included in the survey. On average, approximately 14% of 15-year-old boys and girls re-

ported that they smoked every day compared with 18.1% of boys and 16.9% of girls in the data collected in 2001/2002 (5). This indicates a positive development in the reduction of children smoking, with reductions in smoking prevalence of up to 13% in some countries. Nevertheless, there was considerable variation among countries and between boys and girls.

**Fig. 2. Proportion of 15-year-old children smoking daily, 2005–2006**



<sup>a</sup> TFYR Macedonia = The former Yugoslav Republic of Macedonia.  
 Source: HBSC survey (4).

## HEALTH AND ENVIRONMENT CONTEXT

Exposure to SHS is defined as the involuntary or passive breathing of air contaminated with tobacco smoke by someone who is not smoking. Several comprehensive reviews of the effects of SHS on health have been conducted in the last few years (6–9). Tobacco smoke is a known human carcinogen (8) and no level of exposure to SHS is free of risk. Chronic exposure to SHS among adults increases the risk of death and illness from cancer and cardiovascular and respiratory diseases. In infants and young children, exposure to SHS increases the risk of sudden infant death syndrome (SIDS), acute lower respiratory tract infections, chronic respiratory symptoms, middle ear disease, reduced pulmonary function and asthma. In children with asthma, SHS increases the severity and frequency of asthma attacks. Finally, there is some evidence to suggest that exposure to SHS during childhood may cause lymphoma and brain tumours.

The most recent estimates indicate that more than 72 000 people in the 25 European Union countries die each year due to exposure to SHS at home (10).

WHO has estimated that 9–13% of all cancer cases can be attributed to exposure to SHS in a non-smoking population where 50% are exposed to SHS (11). If it is assumed that 35% of mothers smoke in the home, then 15–26% of lower respiratory illness in infants can be attributed to exposure to SHS (11). Applying these estimates to the population of the European Region suggests that 3000–4500 cases of cancer in adults and between 300 000 and 550 000 episodes of lower respiratory illness in infants are attributable to SHS each year (11).

Further, the effects of exposure to SHS in the home can be manifested not only through the risks described above but, as some studies have suggested, also by potentially inducing nicotine dependence symptoms among young people who have never smoked (12).

A recently conducted large multinational study attempted to take into account levels of exposure by measuring air and hair nicotine concentrations in 31 countries, including 8 countries in the European Region (13). Air nicotine concentration was 17 times higher in households with smokers than in those without smokers. Median hair nicotine concentrations in children (0.68 ng/mg) living with smokers were generally higher than those found in women (0.40 ng/mg), providing evidence for a higher risk from SHS exposure in children (13).

## POLICY RELEVANCE AND CONTEXT

SHS is the dominant form of indoor air pollution where tobacco is smoked, even in areas that are properly ventilated. The burden of illness related to exposure to SHS in public places can be greatly reduced by smoking bans (6,14). A recent study analysing acute coronary events in Italy before and after the implementation of the smoking ban in January 2005 found a statistically significant reduction in acute coronary events in 35–64-year-olds (11.2%, 95% CI 6.9–15.3) and in 65–74-year-olds (7.9%, 95% CI 3.4–12.2) (15).

Other interventions, such as separating smokers from non-smokers or mechanical air exchange, are less effective (6,16). In addition to limiting exposure to SHS, a comprehensive ban on smoking indoors that includes private spaces effectively encourages smoking cessation. Creating smoke-free environments for children should be a major public health objective.

There are two key policies related to SHS exposure in Europe, discussed in detail in ENHIS fact sheet No. 3.7 (17):

- the WHO Framework Convention on Tobacco Control (FCTC) (18); and
- the European strategy for tobacco control (19).

In 2004, the Fourth Ministerial Conference on Environment and Health adopted the Children's Environment and Health Action Plan for Europe (CEHAPE), which includes four regional priority goals to reduce the burden of environment-related diseases in children. One of the goals (RPG III) aims at preventing and reducing respiratory diseases due to outdoor and indoor air pollution, thereby contributing to a reduction in the frequency of asthma attacks and ensuring that children can live in an environment with clean air.

A tobacco control database has been established by the Regional Office as the first step in building a global tobacco control surveillance system (20). So far, countries have shown a commitment to the goal of reducing exposure of children to SHS by implementing legislation to restrict or ban smoking in

public places and transport, as well as prohibiting the advertisement of cigarettes and selling of tobacco to minors (20).

## ASSESSMENT

In the European Region, there is a high rate of exposure of children to SHS. The GYTS found that between 37% and 97% of children aged 13–15 years lived in homes where others smoked in their presence. In all the countries where the GYTS was conducted, except for the Czech Republic and Lithuania, the proportion of children exposed to SHS in their homes remains at over 50%, with over 90% in the Balkan countries and in Armenia and Georgia. Importantly, levels of exposure to SHS outside the home are comparatively high even in countries with relatively low levels of exposure inside the home. The updates for Croatia, the Czech Republic and Latvia each showed a slight reduction in the percentage of exposure to SHS inside the home, but exposure outside the home had marginally increased.

Data for western Europe are available from studies conducted in the late 1990s. These found rates of exposure to SHS ranging from 20% in the Netherlands to 35% in the United Kingdom (England) for children aged up to 4 years, an age group at particular risk of illness related to SHS (2). In France, 47% of children aged 4–10 years were exposed to SHS, while a similar proportion was found among 13–14-year-olds in Ireland (2). Other studies found that the proportion of children aged 6–12 years living with a current smoker in the household was around 50%: 48% in Switzerland and 58% in Italy and the Netherlands (3). Recent Health Interview Survey data show that 40% of children aged 11–17 years in Germany and 43% of children aged 13–15 years in Belgium are exposed to SHS (21).

In an evaluation of the impact of SHS on SIDS by the European Environment and Health Information System (ENHIS), exposure–response functions developed by Anderson et al. (22) were applied to the 4.6 million children under one year of age in countries. Prevalence of exposure in the home was estimated according to the Tobacco control database (20). At the current levels about 25% of all SIDS cases can be attributed to SHS exposure.<sup>1</sup>

The impact of SHS on asthma episodes in children aged under 14 years was estimated using a recent meta-analysis (6) and current estimates of smoking prevalence in ENHIS countries (20).<sup>1</sup> The results suggested that exposure to SHS increases the number of asthma episodes by 6–10%, depending on the underlying smoking prevalence. The average increase in the countries evaluated was 7.5%.

Such estimates must be considered in the light of difficulties encountered when attempting to estimate a quantified measure of exposure to SHS, in particular the scarcity in international databases of data required to conduct a health impact assessment of SHS at the European level.

Although exposure to SHS among children is strongly associated with patterns of smoking among parents, children may also be exposed to SHS outside the home by other people who smoke actively, including their peers. The HBSC survey found that, on average, around 14% of boys and girls aged 15 years in Europe smoked every day in 2005/2006 (4), this being a reduction of 4% from the results of the previous two studies in 2001/2002 and 1997/1998. Nevertheless, the change masked national trends, including increases in some countries (Croatia, Greece, Malta and the Russian Federation) and the consistent reduction of smoking in the remaining 24 out of 27 countries. In the majority of the countries surveyed, 15-year-old girls were as likely to smoke daily as boys, if not more so. This varied within the European Region, with more boys than girls smoking in the east and more girls than boys smoking in the north and west. The pattern of differences between the sexes in smoking is similar to changes observed in the adult population and may be associated with broader changes in the status of women in industrialized countries (5).

## DATA UNDERLYING THE INDICATOR

### *Data source*

1. GYTS (1).
2. HBSC (4).

### *Description of data*

The school-based survey contains self-reported data on tobacco use among children aged 15 years when asked how often they smoked tobacco at present.

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<sup>1</sup> The study area included the following European countries: Austria, Bulgaria, the Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and the United Kingdom.

### Method of calculating the indicator

Percentage of respondents in a nationally representative survey sample.

### Geographical coverage

27 Member States of the WHO European Region.

### Period of coverage

2002–2007.

### Frequency of update

The first updates of the GYTS took place in 2007; no surveys were undertaken in during 2006. The HBSC was updated for the fourth time in 2005/2006, the previous survey being in 2001/2002.

### Data quality

Data from the GYTS participant countries are considered uniform and comparable using a common methodology and core questionnaire. Other than the GYTS, there is no comparable information. This assessment suggests that there is a strong need for a harmonized mechanism for collecting information over a broader geographical area and period of time in Europe.

Ultimately, an internationally harmonized system providing surveillance of the exposure of non-smokers to SHS and monitoring the implementation of policies, as envisaged in the FCTC, should be established to permit monitoring of exposure to SHS.

## REFERENCES

1. *Global Youth Tobacco Survey (GYTS)* [web site]. Geneva, World Health Organization, 2009 (<http://www.who.int/tobacco/surveillance/gyts/en/index.html>, accessed 18 August 2009).
2. WHO European Centre for Environment and Health. Exposure to environmental tobacco smoke in Europe, a review. Copenhagen, WHO Regional Office for Europe, 2003 (technical report).
3. Pattenden S. et al. Parental smoking and children's respiratory health: independent effects of prenatal and postnatal exposure. *Tobacco Control*, 2006, 15:294–301.
4. Currie C et al., eds. Inequalities in young people's health: HBSC international report from the 2005/2006 Survey. Copenhagen, WHO Regional Office for Europe, 2008 (*Health Policy for Children and Adolescents*, No. 5) (<http://www.euro.who.int/Document/E91416.pdf>, accessed 18 August 2009).
5. Currie C et al., eds. Young people's health in context. Health Behaviour in School Children (HBSC) study: international report from the HBSC 2001/2002 survey. Copenhagen, WHO Regional Office for Europe, 2004 (*Health Policy for Children and Adolescents*, No. 4) (<http://www.hbsc.org/downloads/IntReport04/HBSCFullReport0102.pdf>, accessed 18 August 2009).
6. U.S. Department of Health and Human Services. The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General. Rockville, MD, Office of the Surgeon General, 2006 (<http://www.surgeongeneral.gov/library/secondhandsmoke/>, accessed 18 August 2009).
7. Courage CM, Tamburlini G, von Ehrenstein OS. Environmental tobacco smoke. In: Tamburlini G, von Ehrenstein OS, Bertollini R, eds. Children's health and environment: a review of evidence. Copenhagen, European Environment Agency and the WHO Regional Office for Europe, 2002 (*Environmental Issue Report No. 29*) (<http://www.euro.who.int/document/e75518.pdf>, accessed 18 August 2009).
8. Tobacco smoke and involuntary smoking. Lyon, International Agency for Research on Cancer, 2004 (*IARC monographs on the evaluation of carcinogenic risks to humans*. Vol. 83) (<http://monographs.iarc.fr/ENG/Monographs/vol83/mono83.pdf>, accessed 18 August 2009).
9. Protection from exposure to second-hand tobacco smoke. Policy recommendations. Geneva, World Health Organization, 2007 ([http://www.who.int/tobacco/resources/publications/wntd/2007/who\\_protection\\_exposure\\_final\\_25June2007.pdf](http://www.who.int/tobacco/resources/publications/wntd/2007/who_protection_exposure_final_25June2007.pdf), accessed 19 August 2009).
10. Green Paper. Towards a Europe free from tobacco smoke: policy options at EU level. Brussels, European Commission, 2007 (*Com2007 27 final*) ([http://ec.europa.eu/health/ph\\_determinants/life\\_style/Tobacco/Documents/gp\\_smoke\\_en.pdf](http://ec.europa.eu/health/ph_determinants/life_style/Tobacco/Documents/gp_smoke_en.pdf), accessed 19 August 2009).
11. Air quality guidelines for Europe, 2nd ed. Copenhagen, WHO Regional Office for Europe, 2000 (*WHO Regional Publications, European Series*, No. 91) (<http://www.euro.who.int/document/e71922.pdf>, accessed 19 August 2009).
12. Bélanger M et al. Nicotine dependence symptoms among young never-smokers exposed to second-hand tobacco smoke. *Addictive Behaviours*, 2008, 33:1557–1563.
13. Wipfli A et al. Second-hand smoke exposure among women and children: evidence from 31 countries. *American Journal of Public Health*, 2008, 98:672–679.
14. Spencer N et al. Parent reported home smoking bans and toddler (18–30 month) smoke exposure: a cross-sectional survey. *Archives of Disease in Childhood*, 2005, 90:670–674 (<http://adc.bmj.com/cgi/content/full/90/7/670>, accessed 19 August 2009) (<http://www.euro.who.int/document/e71922.pdf>).
15. Cesaroni G. et al. Effect of the Italian smoking ban on population rates of acute coronary events. *Circulation*, 2008, 117:1121–1123.
16. Graham H. When life's a drag. London, HM Stationery Office, 1993.
17. Policies to reduce the exposure of children to environmental tobacco smoke. Copenhagen, WHO Regional Office for Europe, 2009 (*ENHIS fact sheet No. 3.7*, [www.euro.who.int/ENHIS](http://www.euro.who.int/ENHIS)).
18. WHO Framework Convention on Tobacco Control. Geneva, World Health Organization, 2003 (<http://whqlibdoc.who.int/publications/2003/9241591013.pdf>, accessed 19 August 2009).
19. European strategy for tobacco control. Copenhagen, WHO Regional Office for Europe, 2002 (<http://www.euro.who.int/Document/E77976.pdf>, accessed 19 August 2009).

20. Tobacco control database [online database]. Copenhagen, WHO Regional Office for Europe, 2006 (<http://data.euro.who.int/tobacco/>, accessed 19 August 2009).
21. Lampert T. Smoking and passive smoking exposure in young people – results of the German Health Interview and Examination Survey for Children and Adolescents. *Deutsches Aerzteblatt International*, 2008, 105:265–271.
22. Anderson HR, Cook DG. Passive smoking and sudden infant death syndrome: review of the epidemiological evidence. *Thorax*, 1997, 52:1003–1009.

## FURTHER INFORMATION

Children's Environment and Health Action Plan for Europe. Fourth Ministerial Conference on Environment and Health, Budapest, 23–25 June 2004 (EUR/04/5046267/7) (<http://www.euro.who.int/document/e83338.pdf>, accessed 19 August 2009).

Council of the European Union. Council recommendation of 2 December 2002 on the prevention of smoking and on initiatives to improve tobacco control, 2003/54/EC. Brussels, Publications Office, 2007 ([http://eur-lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=32003H0054&model=guichett](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=32003H0054&model=guichett), accessed 19 August 2009).

Tobacco [web site]. Brussels, European Commission, 2009 ([http://ec.europa.eu/health-eu/my\\_lifestyle/tobacco/index\\_en.htm](http://ec.europa.eu/health-eu/my_lifestyle/tobacco/index_en.htm), accessed 19 August 2009).

Tobacco Free Initiative (TFI) [web site]. Geneva, World Health Organization, 2009 (<http://www.who.int/tobacco/en/>, accessed 19 August 2009).

Smoking & tobacco use [web site]. Atlanta, GA, Centers for Disease Control and Prevention, 2009 (<http://www.cdc.gov/tobacco>, accessed 19 August 2009).

Smoke-free Homes and Cars Program [web site]. Washington, DC, US Environmental Protection Agency, 2009 (<http://www.epa.gov/smokefree/>, accessed 19 August 2009).

Tobacco control in the WHO European Region: current status and developments. Copenhagen, WHO Regional Office for Europe, 2002 (Fact sheet 06/02) (<http://www.euro.who.int/document/CMA/rc52fstob0602e.pdf>, accessed 19 August 2009).

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