32 Jones MR, Navas-Acien A, Yuan J, Breysse PN. Secondhand tobacco smoke concentrations in motor vehicles: a pilot study. *Tob Control* 2009;18:399–404.

33 Rees VW, Connolly GN. Measuring air quality to protect children from secondhand smoke in cars. *Am J Prev Med* 2006;31:363–8.

34 Evans J, Chen Y. The association between home and vehicle environmental tobacco smoke (ETS) and chronic bronchitis in a Canadian population: the Canadian Community Health Survey, 2005. *Inhal Toxicol* 2009;21:244–9.

35 Akhtar PC, Currie DB, Currie CE, Haw SJ. Changes in child exposure to environmental tobacco smoke (CHETS) study after implementation of smoke-free legislation in Scotland: national cross sectional survey. *BMJ* 2007;335:545.

36 Fong GT, Hyland A, Borland R, et al. Reductions in tobacco smoke pollution and increases in support for smoke-free public places following the implementation of comprehensive smoke-free workplace legislation in the Republic of Ireland: findings from the ITC Ireland/UK Survey. *Tob Control* 2006;15:iii51–8.

37 Iacobelli N, Gallus S, Petridou E, et al. Smoking behaviors and perceived risk of injuries in Italy, 2007. *Prev Med* 2008;47:123–6.

38 Daly BJ, Schmid K, Riediker M. Contribution of fine particulate matter sources to indoor exposure in bars, restaurants and cafes. *Indoor Air* 2010;20:204–12.

39 Fernandez E, Pascual JA, Schiaffino A, et al. Validez de un cuestionario sobre exposici¢n percibida al humo ambiental del tabaco. *Gac Sanit* 2007;21:22.

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Effect of policy changes on cigarette sales: the case of Turkey

Charles W. Warren[1], Toker Erguder[2], Juliette Lee[1], Veronica Lea[1], Ann Goding Sauer[1], Nathan R. Jones[3], Nazmi Bilir[4]

1 Centers for Disease Control and Prevention, Atlanta GA, USA,
2 World Health Organization, Turkey
3 Survey Research Center, Paul P. Carbone Comprehensive Cancer Center, University of Wisconsin, WI, USA
4 Department of Public Health, University of Hacettepe, Ankara, Turkey

Correspondence: Charles W. Warren, Centers for Disease Control and Prevention, 4770 Buford Highway, NE, Atlanta, GA 30341-3724, USA, tel: +1 770 488 2040; fax: +1 770 488 4349; e-mail: wwarren@cdc.gov

Background: In 1996, Turkey made tobacco control a health priority. The tobacco control effort was extended in July 2009 with the expansion of the smoke-free law to include all enclosed workplaces and public places and, in January 2010, with a 20% increase in the Special Consumption Tax on Tobacco. **Methods:** Sales data were averaged, by month, for the period January 2005 through June 2009 to establish an 'expected' monthly sales pattern. This was the period when no new tobacco control measures were implemented. The overall monthly average was then calculated for the same period. The expected monthly sales pattern was then graphed against the overall monthly sales average to delineate a seasonal sales pattern that was used to evaluate the divergence of actual monthly sales from the 'expected' pattern. **Results:** A distinct seasonal pattern was found with sales above average from May through August. Comparison of actual cigarette sales to the 'expected' monthly sales pattern following the implementation of the expanded smoke-free law in July resulted in a 5.2% decrease. Cigarettes sales decreased by 13.6% following the January 2010 Special Consumption Tax. Since the implementation of the expanded smoke-free law in July 2009 and the tax increase in January 2010, cigarette sales in Turkey decreased by 10.7%. **Conclusion:** The effect of recent Turkish tobacco control policies could contribute to a reduction in the number of premature deaths related to tobacco use. Evidence has shown that periodic tax increases and strong enforcement of all tobacco control policies are essential to further decrease tobacco consumption.

Introduction

Worldwide, approximately one-fourth of adults currently smoke tobacco.[1] In Turkey, ~31% of adults currently smoke cigarettes; men (47.8%) are more than three times as likely as women (15.1%) to smoke.[2] More than 90% of current cigarette smokers in Turkey smoke manufactured cigarettes (92.6% men; 98.0% women). On average, men who smoke daily consume almost a pack (19.3) of manufactured cigarettes each day, compared with slightly more than half a pack (12.2) each day for women.

In 1996, Turkey made tobacco control a health priority by passing Law 4207: 'Preventing the Hazards of Tobacco Products.'[3] Law 4207 prohibited smoking in many public places, such as health and education institutions and public transportation. In 2004, Turkey's government ratified the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC).[4] Since ratifying the WHO FCTC, Turkey has implemented two important tobacco control measures: (i) expanded smoke-free environments to include all enclosed workplaces and public spaces (19 July 2009); and (ii) increased the Special Consumption Tax on tobacco products by 20% (January 2010). These interventions are among the six effective tobacco control strategies identified by WHO, which can be used by the countries to help develop comprehensive tobacco control programmes.[1] The six strategies are: (i) monitoring tobacco use and prevention policies; (ii) protecting people from tobacco smoke; (iii) offering help to quit tobacco use; (iv) warnings about the dangers of tobacco; (v) enforcing bans on tobacco advertising, promotion and sponsorship; and (vi) raising taxes on tobacco. The WHO FCTC includes specific articles related to each of these six strategies.[4]

The purpose of this paper is to compare monthly cigarette sales data pre- and post- implementation of recent Turkish expanded tobacco control laws and to discuss possible contributing factors of divergence from the expected sales.

Methods

Monthly manufactured cigarette sales data from January 2005 through December 2010 were available from the Turkish Tobacco and Alcohol Market Regulatory Authority (TAPDK)[5] (table 1). Sales data were averaged, by month, for the period January 2005 through June 2009 (table 1). This time period reflected cigarette sales when no new tobacco control measures were implemented in Turkey. The overall monthly average was then calculated for the same period (8982 million sticks/month). The monthly averages were then graphed against the overall monthly average to determine whether a seasonal pattern existed (figure 1). A seasonal pattern was delineated and it was used as the 'expected' monthly pattern, which was then graphed against the actual monthly sales from July 2009 through December 2010 (the

Table 1 Cigarettes sold (in millions), by month and year

Month	2005	2006	2007	2008	2009	2010	Monthly average
January	7747	7751	8684	7940	8623	6860	8149
February	8861	7136	9269	7915	7783	5962	8193
March	8617	8751	6255	8475	9179	7604	8255
April	8929	8255	8098	8743	8895	7692	8584
May	9398	9743	9368	9443	9217	8329	9434
June	10 152	10 439	9420	9592	11 417	8690	10 204
July	10 339	10 319	10 700	10 180	9628	8681	10 385
August	9464	10 032	10 678	10 222	8082	7183	10 099
September	9266	8532	7443	8206	7997	8373	8362
October	6823	8005	10 439	9394	9207	8014	8665
November	8218	9411	8814	9105	8502	7995	8887
December	8903	9534	8287	8644	9020	7998	8842
Total	106 717	107 908	107 455	107 859	107 550	93 381	9005

The overall average monthly sale from January 2005 through June 2009 was 8982 million cigarettes
Source: TAPDK[5]

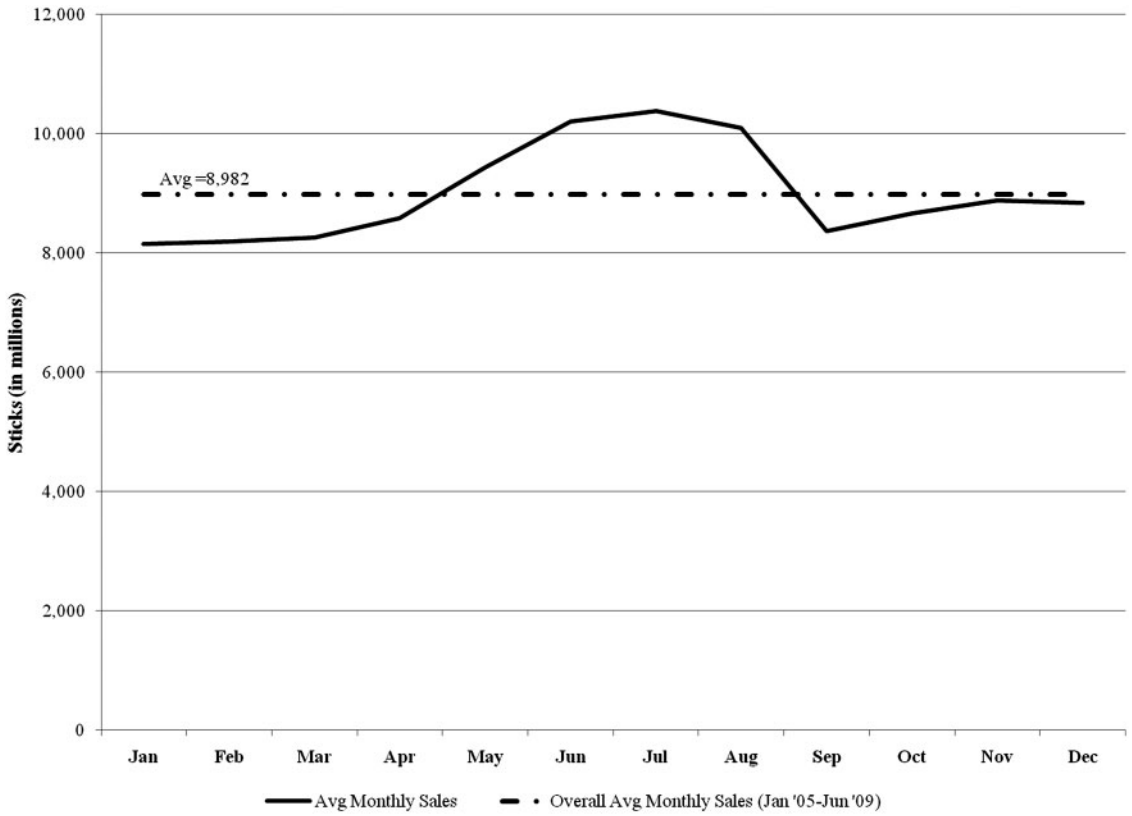

Figure 1 Monthly pattern of tobacco consumption

period when new tobacco control measures were implemented) (figure 2). Divergence by the actual sales pattern from the expected pattern was then discussed.

Results

Trends

The number of manufactured cigarettes sold annually increased from ~96 billion cigarettes in 1996 to almost 112 billion in 2001; however, from 2005 to 2009, sales were relatively constant at ~107 billion cigarettes/year (table 1). In 2010, annual sales of cigarettes decreased to 93 billion; a decrease of >13%.

The monthly pattern from January 2005 to June 2009 is shown in figure 1. The average monthly number of cigarettes sold during January 2005 to June 2009 was above average from May through August, with sales peaking in July (figure 1). Of the 54 months during this period, monthly sales were above the overall average (8982 million sticks/month) in 26 months and 18 of those months were during May–August (table 1).

Impact of comprehensive smoke-free legislation

Turkey expanded its smoke-free legislation in July 2009[6] to include all enclosed workplaces and public spaces, with partial compliance as noted by WHO.[1] Using the monthly pattern (shown in figure 1) as an indicator of expected sales, monthly sales of cigarettes were below expectation in 4 of the 6 months (figure 2 and table 1) with an overall decrease of 5.1% during July–December 2009.

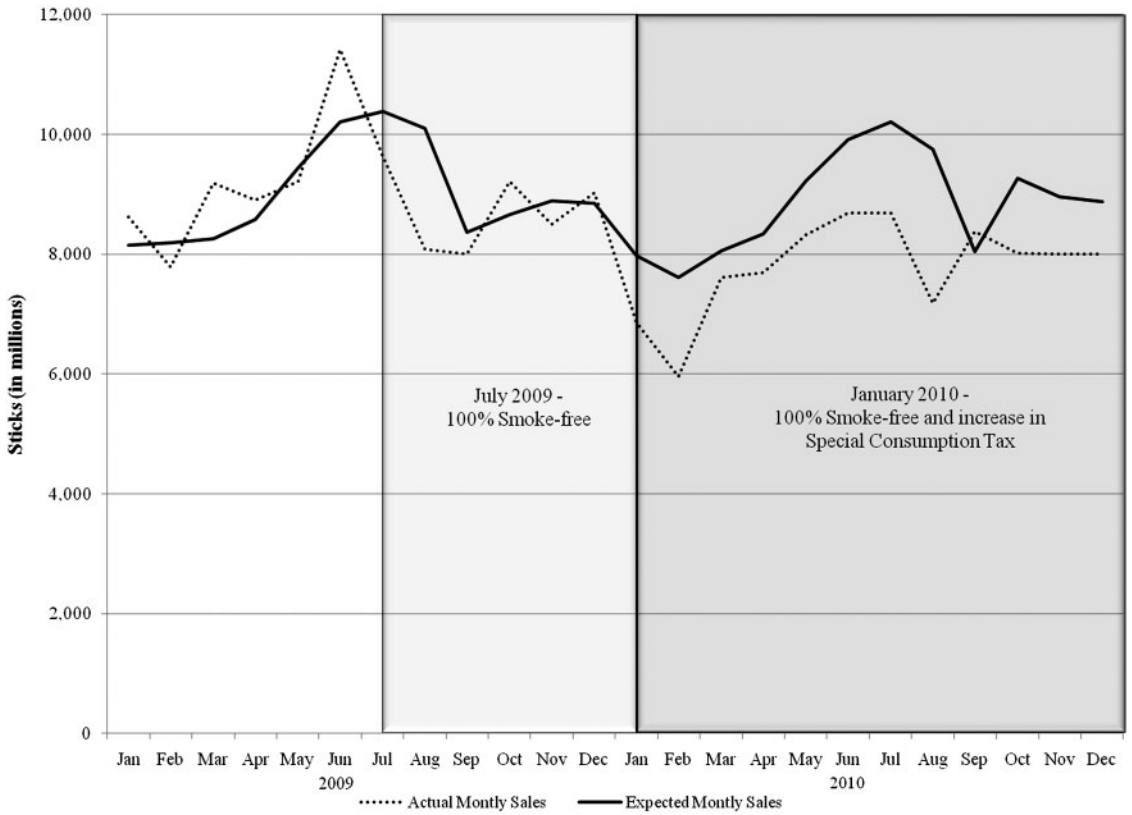

Figure 2 Actual monthly cigarette sales compared with expected monthly cigarette sales, 2009–10

Combined effect of comprehensive smoke-free legislation and tax increase

Turkey passed a 20% increase in the Special Consumption Tax on tobacco in January 2010.[7] During January–December 2010, sales of cigarettes decreased by 13.6%, with monthly sales below the expected value for 11 of the 12 months (figure 2). Since implementation of the expanded smoke-free law (July 2009) and the increase in taxes (January 2010), cigarette sales in Turkey have decreased by 10.7%, with monthly sales below the expected value in 15 of the 18 months.

Discussion

Second-hand smoke

According to WHO, restrictions on smoking in public places decrease the social acceptability of tobacco use, which leads to decreased prevalence and incidence of tobacco use and increased public support for tobacco control.[8] In addition, the World Bank has concluded that smoking restrictions can reduce overall tobacco consumption by 4–10%.[9] A 2002 study concluded that a strong smoke-free workplace policy can result in a 4% decrease in prevalence.[10] After Ireland implemented a smoke-free workplace policy, 59% of smokers reported that they had reduced the number of cigarettes they smoked per day because of the law, and 46% reported that the law made them more likely to quit.[11]

Turkey began its effort to become smoke free with the passage of Law 4207 in 1996.[3] Law 4207 included provisions to ban smoking in public places, such as health and education establishments and public transportation. In 2008, Turkey amended Law 4207 with Law 5727 that expanded the list of smoke-free areas to also include: indoor areas of public workplaces; indoor areas of buildings (education, health, commercial, social, cultural, sports or entertainment); mass transit vehicles, including private taxis; indoor and outdoor areas accepted as premises of pre-school education institutions; primary and secondary schools, including private schools; restaurants and entertainment establishments (cafes, cafeterias and bars).[6] Law 5727 was implemented in two phases. On 19 May 2008, provisions in Law 5727 prohibited smoking in workplaces and public places, such as in the metro, shops and airports. In July 2009, Turkey further expanded the smoke-free law to include all enclosed workplaces and public places such as, hospitality workplaces, restaurants, bars and teahouses. Turkey is one of five European countries that are considered 'smoke-free'.[12] Results from our analysis suggest that the initial effect of the expanded smoke-free legislation on cigarette sales has resulted in a decrease of 5.1% during the 6-month period (July–December 2009). However, as Bilir and Ozcebe[13] noted 'Long term positive effects of smoke free implementation will be expected in several years. The Turkish Ministry of Health recognizes that despite having comprehensive smoke-free legislation these laws need to be enforced by the municipalities and other agencies at the local level to reduce prevalence in tobacco use'.

Taxation

A recent International Agency for Research on Cancer (IARC) monograph[14] evaluated the effectiveness of tax and price policies to prevent and reduce tobacco use. The monograph concluded, '... there was sufficient evidence of effectiveness of increased tobacco excise taxes and prices in reducing overall tobacco consumption.'[14] Earlier studies concur that taxation on tobacco products is one of the most important strategies for smoking cessation and preventing smoking initiation and consumption.[15–18] For every 10% increase in the price of cigarettes, youth smoking reduces by ~7%, and overall cigarette consumption reduces by ~4%.[19] In Europe, smoking consumption decreased by 5–7% when the real price of cigarettes increased by 10%.[20] In January 2010, Turkey increased the Special Consumption Tax on Tobacco by 20%. This increase resulted in the total tax on tobacco in Turkey reaching 79% of the retail price, which meets both the European Union and WHO minimum standards of ≥75% of the retail price.

In 1994, researchers in Turkey reported that a 10% increase in the retail price of cigarettes reduced consumption by 4.1%[21], and it was reported in a 2003 study that a 10% increase in retail price reduced consumption by 10% among poor households and 5.1% among rich households.[22] Between July 2009 and December 2010 tobacco sales in Turkey decreased by 10.7%. A recent study suggested four possible outcomes

resulting from a tax increase. These outcomes included (i) that consumption could likely decrease; (ii) smokers could potentially stockpile cigarettes prior to enactment of the tax increase; (iii) smokers would switch brand preference to lower priced/discount cigarette brands; and (iv) increase cigarettes sold/purchased illicitly.[23]

In the interpretation of our results, we are unable to disentangle the influence of the expansion of smoke-free laws and the Special Consumption Tax. We recognize that other factors may have influenced cigarette sales during this period of time.

Several issues not addressed by this study could be considered for future research. To gain further insight into the effect of secondhand smoke policies, raising taxes and price changes on cigarette sales future research is needed to determine the independent effect or the interactive influence of each policy. The Global Adult Tobacco Survey (GATS) was conducted in Turkey in November 2008 among adults aged ≥15years. Data from GATS can be used as a baseline for self-reported cigarette consumption and a repeat round of GATS could be useful to determine if self-reported consumption shows a decrease consistent with the sales data. Questions could also be included to determine the independent effect of the smoke-free policy and the tax increase. In addition, the impact of implementation of pictorial warning labels (another of the six tobacco control measures) in January 2011 as an inhibitor to tobacco use could be evaluated.

Turkey made great strides in tobacco control in 2009 and 2010. Cigarette sales have decreased >10%. The effect of the policies (comprehensive smoke free and increase in taxes) could contribute to a reduction in the number of premature deaths related to tobacco use. Before 2009, more than 100 000 Turkish adults were estimated to die of tobacco-related diseases each year.[19] Evidence has shown that periodic tax increases and strong enforcement of all tobacco control policies are essential to further decrease tobacco consumption.[21]

Conflicts of interest: None declared.

Key points

- A distinct seasonal pattern was found for the average sale of manufactured cigarettes per month in Turkey with sales above average from May through August.
- When the comprehensive smoke-free law was implemented, sales of cigarettes decreased by 5.1% (July–December 2009) and there was a 13.6% decrease in sales for January–December 2010, post implementation of both tobacco control policies in Turkey.
- Since Turkey's implementation of the expanded smoke-free law and the tax increase, cigarette sales have decreased by 10.7%.

References

1 WHO. *Report on the Global Tobacco Epidemic 2008: The MPOWER package.* Geneva: World Health Organization, 2008. Available at: http://www.who.int/tobacco/mpower/gtcr_download/en/index.html (23 March 2012, date last accessed).

2 Turkey Ministry of Health. *2008 Turkey Global Adult Tobacco Survey Country Report.* Available at: http://www.who.int/tobacco/surveillance/gats/en/index.html (23 March 2012, date last accessed).

3 Tutun Urunlerinin Zararlarinin Onlenmesi ve Kontrolu Hakkinda Kanun. Law No. 4207 Preventing the Hazards of Tobacco Products. T.C. Resmi Gazete (Official Gazette), 26 November 1966:22829. Available at: http://www.mevzuat.adalet.gov.tr/html/875.html (23 March 2012, date last accessed).

4 WHO. *Framework Convention on Tobacco Control.* Geneva, 2003. Available at: http://www.who.int/fctc/text_download/en/index.html (23 March 2012, date last accessed).

5 TAPDK. *Tobacco Products and Alcoholic Beverages Market Regulatory Authority.* est. 2002. OG No. 24635, 9 January 2002—Law No. 4733. (Unpublished monthly sales data).

6 Law No. 5727. Bill amending the law on prevention of hazards of tobacco products. Available at: http://www.tobaccocontrollaws.org/files/live/Turkey (30 September 2011, date last accessed).

7 OG No. 27499. *Tariff on Cigarettes Containing Tobacco, Decree of the Council of Ministers.* 31 December 2009. Available at: http://rega.basbakanlik.gov.tr/main.aspx?home=http://rega.basbakanlik.gov.tr/eskiler/2009/12/20091231.htm&main=http://rega.basbakanlik.gov.tr/eskiler/2009/12/20091231.htm (23 March 2012, date last accessed).

8 Tobacco Free Initiative (TFI). World Health Organization. *Smoking restrictions.* Available at: http://www.who.int/tobacco/research/economics/restrictions/en (23 March 2012, date last accessed).

9 Jha P. *Curbing the Epidemic: Governments and the Economics of Tobacco Control: Development in Practice.* Washington, DC: The World Bank, 1999.

10 Fichtenberg CM, Glantz SA. Effect of smoke-free workplaces on smoking behavior: systematic review. *Br Med J* 2002;325:57–188.

11 Fong GF, Hyland A, Borland R, et al. Reductions in tobacco smoke pollution and increases in support for smoke-free public places following the implementation of comprehensive smoke-free workplace legislation in the Republic of Ireland: findings from the ITC Ireland/UK survey. *Tob Control* 2006;15(Suppl 3):iii51–8.

12 Joossens L, Raw M. *Tobacco Control Scale in Europe, 2010.* Brussels, Belgium: The Association of the European Cancer Leagues, Chaussee de Louvain 479, B-1030, 2011.

13 Bilir N, Ozcebe H. Success Story of Smoke-Free Turkey. *Med J Islamic World Acad Sci* 2011;19:59–66.

14 Chaloupka FJ, Straif K, Leon ME. Effectiveness of tax and price policies in tobacco control. *Tobacco Control* 2011;20:235–38.

15 Jha P, Chaloupka FJ. The economics of global tobacco control. *Br Med J* 2000;321:358–61.

16 Gallet CA, List JA. Cigarette demand: a meta-analysis of elasticities. *Health Econ* 2003;12:821–35.

17 Liang L, Chaloupka F, Michter M, et al. Prices, policies and youth smoking. May 2001. *Addiction* 2003;98:105–22.

18 Jamrozik K. Population strategies to prevent smoking. *Br Med J* 2004;328:759–62.

19 Chaloupka FJ and Warner KE. The economics of smoking. In: Cuyler AJ, Newhouse JP, editors. *The Handbook of Health Economics*. Elsevier, 2000; 1539–627.

20 Gallus S, Schiaffino A, La Vecchia C, et al. Price and cigarette consumption in Europe. *Tob Control* 2006;15:114–19.

21 Onder Z. *Economics of Tobacco Control in Turkey*. Washington DC: International Bank for Reconstruction and Development, World Bank, 2000, (HNP Discussion Paper, Economics of Tobacco Control, Paper No 2).

22 Bilir N, Cakir B, Dagli E, et al. *Tobacco Control in Turkey*. Copenhagen, Denmark: World Health Organization—Regional Office for Europe, 2009.

23 Chiou L, Muehlegger E. *Consumer Response to Cigarette Excise Tax Changes*. Faculty Research Working paper Series 10-020, June 2010. Harvard Kennedy School.

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Health indicators in Europe: availability and data needs

Katri Kilpeläinen[1], Antti Tuomi-Nikula[1], Jürgen Thelen[2], Mika Gissler[3], Ari-Pekka Sihvonen[1], Pieter Kramers[4], Arpo Aromaa[1]

1 National Institute for Health and Welfare (THL), Department of Health, Functional Capacity and Welfare, PO Box 30, FI-00271 Helsinki, Finland
2 Robert Koch Institute (RKI), Department of Epidemiology and Health Reporting, General-Pape-Straße 62, DE 12101 Berlin, Germany
3 National Institute for Health and Welfare (THL), Information Department, PO Box 30, FI-00271 Helsinki, Finland
4 National Institute for Public Health and the Environment (RIVM), Centre for Public Health Forecasting, Antonie van Leeuwenhoeklaan 9, Postbus 1, NL - 3720 BA Bilthoven, The Netherlands

Correspondence: Katri Kilpeläinen, National Institute for Health and Welfare, PO Box 30, FI-00271 Helsinki, Finland, tel: +358 40 724 3182, fax: +358 20 610 8338, e-mail: katri.kilpelainen@thl.fi

Background: The European Union (EU) lacks adequate capacity for public health monitoring. The creation of a stable European Health Information System would help Member States to carry out evidence-based health policy. Such a system would also benefit EU health priorities by providing European wide comparable information. This study is the first comprehensive assessment of the availability of general health data in Europe. **Methods:** The main aim was to assess the availability of the European Community Health Indicators (ECHI) in each EU Member State. This was done by means of a review of international health databases, an online survey and face-to-face discussions with experts in 31 European countries. **Results:** The European average availability score for all ECHI indicators was 74% ranging from 56% to 84%. In most countries, about half of the ECHI indicators can be derived from routinely collected health information. This is true for demographic information, mortality and hospital discharge-based morbidity. However, many important ECHI indicators are lacking in most European countries. These include population representative data for health determinants, the provision and use of health care services, injuries, the quality of health care and health promotion. **Conclusion:** Valid health information is essential for improving people's health across Europe. There is an urgent need to develop harmonized methods for gathering and disseminating representative health data. These methods should be developed jointly by DG Health and Consumers, Eurostat and EU Member States.

Introduction

A useful health information system integrates health data from various sources and as such is the backbone of effective, evidence-based public health policy-making.[1,2] It is known that reductions of risk factors significantly reduce morbidity and mortality.[3,4] The availability of representative population-based health data is a prerequisite for identifying public health problems at community level.[5] Nevertheless, rather than basing their health policies on health determinants, most countries continue to rely on traditional mortality figures due to the lack of health data for many indicators. This reflects different historical developments and needs for information.[6]

The aim of this study was to assess the availability of the European Community Health Indicators (ECHI) in Europe. Much has been done in the recent decades to improve the availability and comparability of health data in Europe, including the creation of the WHO's Health for All statistical database. Health data are currently gathered and disseminated by WHO, Eurostat and OECD,[7–9] and many other international organizations also collect data about specific areas of health. Both the lack of organization and coordination in this field, and the differences in indicators, data collection and calculation methods, have caused much confusion.

The first step on the road to harmonization was the launch of the European Commission's first Health Programme in 1993. Under this programme, projects were financed to develop harmonized health indicators.[10] In 1996, at the request of the European Parliament, the European Commission set up a working group to draft a proposal on how to organize health monitoring in the European Union (EU).[11,12] Next year, the Amsterdam Treaty of 1997 provided harmonized instructions of the public health responsibilities for the Member States.[13] At the same time, a succession of infectious diseases epidemics had created rising public expectations and awareness of the need for health monitoring and disease control.

While most EU-funded health projects have been concerned with specific diseases or health determinants, the multi-phase action 'European Community Health Indicators' (ECHI, ECHI 2, ECHIM and Joint Action for ECHIM) has taken a more comprehensive approach. It aims to establish the core of a European health monitoring system by defining and implementing common health indicators. During 1998–2008, these projects joined forces with experts from all Member States to develop a list of 88 most preferred health indicators in Europe (ECHI indicators).[14–16] Since 2009 work has been ongoing to define these indicators more accurately, and to implement them in all EU Member States. The focus of ECHI indicators is on general public health issues and they are designed to provide a comprehensive overview of health.[17,18] For more specified purposes other agreed indicators are needed.