Research Note

Are children’s lifestyles compromising their future? What policies can promote better lifestyles? by Corinna Sorenson and Cristina Masseria

Abstract:
Patterns of behaviour are often established early in life and can extend into adulthood. Childhood is a critical stage in the development of habits, such as diet and physical activity, that will affect health and well-being across the lifespan. Such behaviours can have profound long-term implications on disease, disability, and quality of life. Moreover, good physical and mental health in childhood influences the ability of young people to successfully navigate the challenges posed during the transition to adulthood.

Children’s lifestyles have progressively changed over the last two decades due to social, cultural, and environmental transformations in the ecological landscape. The emergence of electronic media, availability of convenience and fast foods, increased dependence on automotive travel, and changing family dynamics are just a few developments impacting current childhood lifestyles. Four lifestyle behaviours, in particular, have influenced the health and development of children: 1) use of electronic media, 2) tobacco use, 3) increased physical sedation, and 4) poor dietary habits. While most of these behaviours have significantly contributed to the burgeoning rise in childhood obesity, they also affect the onset of non-communicable disease (e.g., type 2 diabetes), physical growth, scholastic achievement, and mental health. For example, while the use of media may contribute to externalized behaviour problems, it can actually impact positively on cognitive and social development, if harnessed appropriately.

Public policies are central to the promotion, protection, and enhancement of health and development. As many lifestyle patterns originate in childhood, the potential for achieving the highest standards of health and well-being in Europe by assuming a life-course perspective on relevant policy initiatives is considerable. The alarming ascendance in obesity highlights the need for improved action and policy coordination, across both national and European levels, to address those childhood lifestyle behaviours that deleteriously affect short- and long-term health and development. A comprehensive long-term, multi-sector approach is necessitated to create an environment that empowers and encourages children, families, and communities to adopt healthy lifestyles.

The scope for potential policy intervention is vast, including 1) national/EU policy councils or platforms to set guidelines and coordinate efforts on nutrition, physical activity, obesity prevention, as well as smoking prevention, 2) restrictions on food advertising targeted to children, 3) support for alternative modes of transport (e.g., cycle paths), 4) public education campaigns to improve health and media literacy, 5) school policies and curricula that encourage healthy diets, physical activity, and prevent t

This Research Note has been produced for the European Commission by Corinna Sorenson and Cristina Masseria from the Health Status and Living Conditions Network of the European Observatory on the Social Situation and Demography. The views expressed are those of the authors and do not necessarily represent those of the European Commission.
Are children’s lifestyles compromising their future? What policies can promote better lifestyles?¹

I. The issue

Lifestyles comprises a diverse array of actions that impact both short- and long-term health and well-being. Such activities include dietary practices, physical activity, tobacco and alcohol consumption, social interaction, and stress management. Patterns of behaviours develop early in life and often extend into adulthood. Indeed, childhood is a critical stage in the development of habits that will affect health and prosperity across the lifespan.² Many experiences and exposures in childhood can have profound long-term implications on disease, disability, and quality of life. For example, physical inactivity during childhood significantly increases the probability of obesity and chronic disease, such as heart disease, in adulthood.

The lifestyles of children have progressively changed over the last two decades as a result of a myriad of social, cultural, and environmental factors. Recent technological advances (e.g., television, video games, Internet), availability of convenience and fast foods, increased dependence on automotive travel, and changing parental roles and family dynamics are just a few ecological developments that impact current lifestyle behaviours in children. Although many of these transformations in the modern milieu have resulted in new opportunities and enhanced conveniences, such changes come with risks and challenges to optimal physical and mental development.

Four developments in childhood lifestyles, in particular, have influenced the behaviour of modern youth:

- Use of electronic media
- Tobacco use
- Increased physical sedation
- Poor dietary habits

The consequences of these lifestyle changes are vast, with important short- and long-term implications across a variety of health and development domains – physical, social, mental, and intellectual (Figure 1). In particular, related behaviours can affect weight maintenance, blood pressure and cholesterol, physical growth and development, scholastic achievement, and mental well-being.

Figure 1. Impact of childhood lifestyle behaviours on health and development domains

On a broad level, these behavioural patterns and associated outcomes can significantly impact youth’s ability to deal effectively with the complex landscape that currently characterizes child- and young adulthood. Increasingly, young people confront a variety of hurdles and pressures during childhood.

¹ The views expressed are those of the authors and do not necessarily represent those of the European Commission.
² This policy brief predominately address mid-childhood and young adulthood; it does not examine lifestyle behaviours in early childhood.
and the transition to adulthood. Good physical and mental health provides the foundation from which youth can successfully navigate these challenges and function optimally throughout the lifespan.

II. The facts

CHILDHOOD LIFESTYLE BEHAVIOURAL PATTERNS

Television and other media

The emergence of a multimedia culture has transformed the daily lives of children and young people. In today's society, media are thoroughly integrated into the fabric of life, with television, movies, videos, music, video games, and computers central to both work and play. Increasingly, such media are assuming an integral role in children's leisure, educational, and social activities, across both private and public spheres. Further, the influence of media is reaching children at a younger age than ever before, as evidenced by the rapidly growing markets for early childhood television programming, computer software for toddlers, and infant-oriented video series.

With the introduction of television in the 1940s, its popularity has proliferated rapidly worldwide. Access to a family television is almost universal in European homes. Ever more, households own multiple televisions and daily consumption is substantial. According to the WHO (2004a), more than 25% of young people watch TV for more than four hours during weekdays, with increasing intake during the weekends (Table 1). In almost all countries, boys spend more time watching television than girls. The highest use of television among young people occurs in the Baltic countries, with the lowest use in Austria, Malta, and Sweden.

Access to and use of personal computers in Europe is also on the rise. Unlike television ownership, however, access to computers among youth varies widely across countries (Livingstone and Bovill, 2001). In Belgium and the Netherlands, between 80-90% of girls have a personal computer at home, while only half of households do in Germany, Denmark, Spain, England, and Italy. Access also varies by age and socio-economics status, with older children and those from higher-income households more likely to own a personal computer (Livingstone and Bovill, 2001).

Of families with access to computers, daily use is common among children. On average, 13% of youth use computers for more than three hours per day, and more on weekends (WHO, 2004a). According to the 2000-2001 Health Behaviour in School-aged Children (HBSC) survey3, Estonia and Scotland have the highest percentage of children who use computers more than three hours per day; young people in France, Greece, and Italy use computers less frequently (Table 1). Across all countries, high levels of computer use are more common among males than females.

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3 The Health Behaviour in School-aged Children (HBSC) survey covers the physical, emotional and psychological aspects of health, and the influences of the family, schools, and peers on young people aged 11, 13 and 15 years in 35 countries and regions in the WHO European Region and North America.
### Table 1. Daily media consumption during weekdays among young people aged 11, 13, and 15 years old

<table>
<thead>
<tr>
<th>Country</th>
<th>TV ≥4 hours weekdays</th>
<th>Computer ≥3 hours weekdays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys (%)</td>
<td>Girls (%)</td>
</tr>
<tr>
<td>Austria</td>
<td>16.8</td>
<td>13.2</td>
</tr>
<tr>
<td>Belgium (Flemish)</td>
<td>26.4</td>
<td>18.3</td>
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<tr>
<td>Belgium (French)</td>
<td>21.1</td>
<td>17.1</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>29.3</td>
<td>22.9</td>
</tr>
<tr>
<td>Denmark</td>
<td>25.5</td>
<td>21.1</td>
</tr>
<tr>
<td>England</td>
<td>31.3</td>
<td>29.7</td>
</tr>
<tr>
<td>Estonia</td>
<td>43.3</td>
<td>33.6</td>
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<tr>
<td>Finland</td>
<td>18.6</td>
<td>19.6</td>
</tr>
<tr>
<td>France</td>
<td>21.4</td>
<td>16.9</td>
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<td>Germany</td>
<td>22.6</td>
<td>18.3</td>
</tr>
<tr>
<td>Greece</td>
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<td>Latvia</td>
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<td>Poland</td>
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<td>Portugal</td>
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<td>Scotland</td>
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<td>Slovenia</td>
<td>20.9</td>
<td>16.9</td>
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<tr>
<td>Spain</td>
<td>22.8</td>
<td>21.9</td>
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<tr>
<td>Sweden</td>
<td>18.7</td>
<td>17.0</td>
</tr>
<tr>
<td>Wales</td>
<td>31.1</td>
<td>32.3</td>
</tr>
</tbody>
</table>

Source: HBSC (2000-2001)

The diffusion and use of new media, such as the Internet, electronic games, mobile phones, and MP3 players, has also permeated European youth culture. While the use of the Internet is most pronounced in the Nordic countries, electronic games are more commonplace in the United Kingdom and Sweden (Livingstone and Bovill, 2001). The use of mobile phones among youth has grown exponentially over recent years and this trend is expected to continue. One study found that global youth ownership of mobile phones will increase substantially from 257 million to almost 400 million in 2007 (Wireless World Forum, 2005). Although youth in the US, Japan, China, and Brazil are the highest consumers of mobile phones, Europe is not far behind. In the UK alone, there are now 13 million young people with a mobile phone, and as many as 9 million are under the age of 15 (Wireless World Forum, 2005). While there are few gender differences in terms of Internet and mobile phone use, electronic games appear to be an almost exclusively-male activity, with females preferring to listen to music during their leisure time (Livingstone and Bovill, 2001). The extent of utilization of new media is likely to expand rapidly across the EU, as such technologies continue to diffuse a multitude of different venues – households, libraries, schools, child-care settings, grocery stores, shopping malls, theatres, cafes, and sporting events.

**Tobacco use**

Tobacco use continues to be the largest single cause of death and disease in the EU killing over 650,000 people every year (European Commission, 2004). Beyond the direct effects to the user, tobacco smoke is a serious environmental health hazard; current estimates indicate that approximately 100,000 non-smoking Europeans die each year due to second-hand smoke (PAHO, 2001). If current smoking patterns continue, it will likely cause nearly 10 million deaths each year by
In addition to the public health impacts, the EU bears a substantial economic burden due to smoking. Conservative estimates project the costs of tobacco use to range between €98-130 billion a year or 1.04-1.39% of the Gross Domestic Product (GDP) for 2000 (European Commission, 2004).

Although the vast majority of tobacco-related death and disability occurs in middle-aged and older adults, smoking behaviour is most commonly established in childhood and adolescence. In fact, the vast majority of smokers begin using tobacco products well in advance of 18 years old (US DHHS, 1994). Young smokers may acquire the habit and become addicted prior to adulthood, rendering it difficult to quit and increasing the risk for tobacco-related health problems later in life. It has been estimated that unless current trends change, 30 to 40% of the approximately 2.3 billion children and teenagers worldwide will become smokers in early adult life and beyond (Petro et al., 1996). Pierce and Gilpin (1996) found that half of all new male adolescent smokers will smoke for at least 16 years, while females continue the habit for 20 years.

The reasons for tobacco use among youth are vast and complex, but predominately relate to the behaviour, attitudes, and expectations of parents, peers, and broader society (Tyas and Pederson, 1999). Young people are more likely to become smokers if they have parents, older siblings, and/or friends who smoke (Eisner et al., 1997; Tyas and Pederson, 1999). While parents serve as important models of smoking behaviour, peers are particularly influential, with peer-pressure or peer-bonding considered a major reason for adolescent smoking (Engles et al., 1998; Loud, 1997). Peers also tend to serve as the initial access point for cigarettes (Carvajal et al., 2000). Conversely, children who believe their parents or peers disapprove of smoking are less likely to become smokers (Simantov et al., 2000). Interpersonal factors, such as low-esteem, externalized behaviour problems (e.g., anxiety, depression), and exposure to trauma or abuse, also contribute to young people's smoking (Verduykt, 2002). For example, girls with poor body image are more likely to adopt smoking to control weight and appear more attractive (Verduykt, 2002).

Other determinants for youth tobacco use include cultural and religious norms, availability of tobacco products, tobacco control policies and strategies (e.g., pricing of cigarettes), and tobacco advertising, promotion, and marketing efforts (WHO, 2001; Hastings and Atiken, 1995). Increasingly, tobacco advertising and promotional activities are playing a role in the onset of smoking in children and adolescents, especially considering the multitude of new indirect marketing channels that are used to target children, such as sponsoring sporting events and branding merchandise (e.g., clothing, toys). In fact, studies have shown that exposure to cigarette advertising is predictive of smoking among youth (Evans et al., 1995).

According to the 2000-2001 HBSC survey, the proportion of young people in the EU who has ever smoked rises significantly with age, from 15% for 11-year-olds to 40% for 13-year-olds and 62% for 15-year-olds. The increase in the proportion of children who ever smoked is most significant between 11 and 13 years of age, where half of all countries had rates at least three times higher for 13-year-olds than for 11-year-olds (WHO, 2004a). The proportion of children who ever smoked across all age groups was highest in Estonia, Latvia, Lithuania, and the UK, while Greece and Malta had a lower percentage of tobacco use. There are also gender differences in the prevalence of smoking among youth. Among younger children, rates of smoking are substantially higher for boys than for girls in almost all countries. However, with increased age, more girls than boys have smoked, with differences being particularly marked in Scotland and Wales.

In terms of smoking frequency, 84% of young people (average of all age groups) do not currently smoke. Across all countries, approximately one third of those who smoke do so less than once a week (5%), with the other two thirds (11%) smoking at least once a week (World Health Organization, 2004). The remaining 7% (approximately half of all smokers) smoke daily. Again, weekly and daily smoking rates increase substantially with age and gender. The percentage of children who smoke daily increases from an average of 1% among 11-year-olds, to 5% among the 13-year olds, and it reaches 18% in the oldest age group (table 2). Among the youngest children, daily smoking habit is highest in Hungary, England and Portugal; while in Sweden, the Netherlands, and Denmark either no children or less than 0.2% smoked daily among this age group. Gender differences are similar to

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4 This proportion includes a wide range of people, including those who just experimented, those who become regular smokers and even those who smoked in the past but now have stopped.

5 Children were asked how often they smoke tobacco at present. Responses categories were: ‘I don’t smoke’, ‘Every day’, ‘At least once a week but not every day’, ‘Less than once a week’.
those emphasised previously, among 15-year-olds, girls tend to smoke more than boys in half of the countries, particularly in Northern and Western Europe.

Table 2. Percentage of young people aged 11, 13, and 15 years old who smoke every day

<table>
<thead>
<tr>
<th></th>
<th>11-year-olds</th>
<th>13-year-olds</th>
<th>15-year-olds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys (%)</td>
<td>Girls (%)</td>
<td>Boys (%)</td>
</tr>
<tr>
<td>Austria</td>
<td>0.9</td>
<td>0.4</td>
<td>3.3</td>
</tr>
<tr>
<td>Belgium (Flemish) (Flemish)</td>
<td>0.3</td>
<td>0.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Belgium (French)</td>
<td>0.7</td>
<td>0.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1.3</td>
<td>0.3</td>
<td>6.2</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.0</td>
<td>0.2</td>
<td>3.0</td>
</tr>
<tr>
<td>England</td>
<td>1.5</td>
<td>0.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Estonia</td>
<td>1.5</td>
<td>0.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Finland</td>
<td>0.3</td>
<td>0.1</td>
<td>6.6</td>
</tr>
<tr>
<td>France</td>
<td>0.8</td>
<td>0.4</td>
<td>3.5</td>
</tr>
<tr>
<td>Germany</td>
<td>1.5</td>
<td>1.3</td>
<td>10.2</td>
</tr>
<tr>
<td>Greece</td>
<td>0.8</td>
<td>0.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>2.4</td>
<td>0.6</td>
<td>5.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.8</td>
<td>0.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Italy</td>
<td>0.6</td>
<td>0.0</td>
<td>3.4</td>
</tr>
<tr>
<td>Latvia</td>
<td>0.5</td>
<td>0.3</td>
<td>8.8</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1.2</td>
<td>0.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Malta</td>
<td>0.8</td>
<td>0.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.0</td>
<td>0.1</td>
<td>3.5</td>
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<tr>
<td>Poland</td>
<td>1.2</td>
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<td>7.5</td>
</tr>
<tr>
<td>Portugal</td>
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<td>1.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Scotland</td>
<td>0.8</td>
<td>0.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1.1</td>
<td>0.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Spain</td>
<td>0.9</td>
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<td>5.0</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.0</td>
<td>0.0</td>
<td>2.8</td>
</tr>
<tr>
<td>Wales</td>
<td>0.9</td>
<td>0.9</td>
<td>6.0</td>
</tr>
</tbody>
</table>


If 2002 smoking rates are compared with those of earlier HBSC data, no clear pattern can be found; they increase in some countries and decrease in others. Countries with the highest increase in smoking prevalence in the oldest age group are the Czech Republic and Lithuania (12% increase from the 1997/1998 HBSC survey).

The mean age of onset of smoking was 12.5 years, with a range of 11.5 years in Lithuania to 13.7 years in Greece. The earlier children started smoking, the higher the likelihood they became regular smokers. Among those who adopted smoking at age 15, 61% smoked at least weekly and 37% daily. On average, boys started smoking earlier than girls.

Physical activity

In general, children today tend to be more inactive than those of previous generations. Modern life has modified the environment in such a way that can stymie physical activity among children – daily use of motorized transport, lack of open “green” spaces, increased crime and safety concerns, access to more sedentary activities, such as electronic games and television, and curriculum changes to school physical education programmes.

Current guidelines for young people recommend at least one hour of moderate physical activity per day and further specific activities to improve muscular strength, flexibility, and bone health to be undertaken two or more days per week (Biddle et al., 1998; Pete et al., 1998). However, young people only undertake one hour or more of moderate physical activity for an average of 3.86 days per week (Table 3). In all countries, boys are more physically active than girls. The most active countries are
Ireland, Czech Republic, and England, while France, Belgium (Flemish), and Portugal are less active. Moreover, physical activity tends to decline with age, most notably among females in most countries (World Health Organization, 2004a; HBSC, 2004).

### Table 3: Percentage of school children aged 11, 13, and 15 years old undertaking at least one hour of moderate physical activity per day

<table>
<thead>
<tr>
<th>Days of Physical Activity &gt;1 hour</th>
<th>Boys (%)</th>
<th>Girls (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>4.50</td>
<td>3.87</td>
</tr>
<tr>
<td>Belgium (Flemish)</td>
<td>3.40</td>
<td>2.83</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4.57</td>
<td>4.00</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.93</td>
<td>3.63</td>
</tr>
<tr>
<td>England</td>
<td>4.63</td>
<td>3.83</td>
</tr>
<tr>
<td>Estonia</td>
<td>3.63</td>
<td>3.27</td>
</tr>
<tr>
<td>Finland</td>
<td>3.93</td>
<td>3.67</td>
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<tr>
<td>France</td>
<td>3.50</td>
<td>2.70</td>
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<tr>
<td>Germany</td>
<td>3.87</td>
<td>3.33</td>
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<tr>
<td>Greece</td>
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<td>Hungary</td>
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<td>3.37</td>
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<td>Slovenia</td>
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<td>Spain</td>
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<tr>
<td>Sweden</td>
<td>4.03</td>
<td>3.80</td>
</tr>
<tr>
<td>Wales</td>
<td>4.37</td>
<td>3.70</td>
</tr>
</tbody>
</table>

Source: HBSC (2000-2001)

### Dietary habits

Childhood is a time of significant nutritional import. The physiological need for nutrients is at the highest level than any other time during the lifespan and the demands placed by constant physical and cognitive development necessitates a diet of high nutritional quality. Social, environmental, and cultural factors all significantly influence dietary habits in childhood. Eating behaviour of children often reflects the influence of the family and the increasing role of peers on food choice and meal patterns. Moreover, with the emergence of media, especially television, children are increasingly influenced by pervasive food advertising. In the UK alone, approximately £522 million was spent by advertising companies in 2003 on food, beverage, and chain restaurant promotion, with children being one of the principal target markets (Office of Communications, 2004).

While family, peers, and the media can all positively influence children toward making healthy food choices, the dietary habits of modern youth tend to reflect a ‘convenience culture’, characterized by nutrient-deficient choices such as fast food, soft drinks, sweets, and processed snacks. These dietary patterns are often encouraged in the academic setting, as vending machines selling unhealthy snacks are now a common fixture in most school environments. Moreover, meals in most European schools are poorly regulated and of low nutritional value, and catering staff are often inadequately educated on nutrition principles to ensure healthy meal provision (IOTF, 2002).

The role of breakfast and the consumption of fruits and vegetables are essential for good physical health. Moreover, a nutritious diet can help facilitate scholastic achievement through improved...
than 40% of young people consume such foods on a daily basis. A significant portion of children's diets, especially in Malta, Scotland, and the Netherlands, where greater consumption is evident. Countries with the highest proportion of young people eating fruit daily are Portugal, Malta, and Poland; children in the Northern countries tend to consume less. Soft drinks and sweets comprise a significant portion of children's diets, especially in Malta, Scotland, and the Netherlands, where greater than 40% of young people consume such foods on a daily basis.

Table 4: Daily eating habits among European youth aged 11, 13, and 15 years old

<table>
<thead>
<tr>
<th>Country</th>
<th>Breakfast every school day</th>
<th>Vegetables every day</th>
<th>Fruit every day</th>
<th>Soft drinks every day</th>
<th>Sweets every day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys (%)</td>
<td>Girls (%)</td>
<td>Boys (%)</td>
<td>Girls (%)</td>
<td>Boys (%)</td>
</tr>
<tr>
<td>Austria</td>
<td>61.8</td>
<td>52.9</td>
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Source: HBSC (2000-2001)

The role of the family meal is pivotal in influencing a child’s dietary choices and meal patterns (Neumark-Sztainer et al., 2004). Beyond the impact on eating behaviours, family meals can also indirectly affect alcohol, drug, and tobacco use as well as the development of social skills. However, the family meal is becoming less frequent in today’s society (Mestdag and Vandeweyer, 2005; Mestdag, 2005). Consequently, children are increasingly eating alone or with peers, within and outside the home, which often results in low-nutrition food choices. While changing societal dynamics (e.g., dual-income, single parent families) have likely contributed to this phenomenon, the proliferation of television has significantly influenced family meal patterns. More and more, family members are

memory and concentration (Center for Hunger, Poverty, and Nutrition Policy, 1998). On average, 68% of boys and 59% of girls have breakfast every school day (Table 3), with notable variation across countries. In Portugal and the Netherlands, almost all young people consume breakfast, while it is less frequent in Slovenia and Greece. Although the percentage of girls who partake in breakfast every morning is lower than boys, they tend to consume more fruit and vegetables (Table 4). Again, significant variations exist across countries. The consumption of vegetables among young people is common is Belgium, France, and the Netherlands, but less so in Spain, Hungry, Estonia, and Malta. Countries with the highest proportion of young people eating fruit daily are Portugal, Malta, and Poland; children in the Northern countries tend to consume less. Soft drinks and sweets comprise a significant portion of children’s diets, especially in Malta, Scotland, and the Netherlands, where greater than 40% of young people consume such foods on a daily basis.
consuming meals while watching television, but as many households possess multiple televisions and the preference for and choice of programming is diverse, families are increasingly eating separately.

**IMPACT OF LIFESTYLES ON HEALTH**

**Television and other media**

The effects of electronic media on children has garnered increased attention, as consumption continues to rise and new information and entertainment technologies infiltrate the daily lives of youth and families. The new media environment presents both opportunities and risks to the health and development of children and young people. While the use of media may stimulate learning, improve motor skills, and offer educational opportunities not otherwise available to certain populations, it also has the potential to displace physical activities, encourage poor dietary habits, facilitate psychological problems (e.g., aggression, anxiety), and hinder scholastic achievement and cognitive development.

Several studies have shown increased externalized behavioural problems, such as anxiety and aggression, among children who frequently watch television (Rydell & Bremberg, 2006). For instance, exposure to continuous violent images and characters on television or in other media can influence youth to exhibit aggressive behaviour, especially among children that become absorbed in the violent characters and imagery of television or electronic games (Rydell & Bremberg, 2006). Televised violence, experienced via television or other media, can also induce feelings of fear, anger, and anxiousness (Cantor and Hoffner, 1996; Crum, 1994). In one particular study, it was found that for every additional 2.9 hours of TV viewed per week at age one, a child was 28% more likely to exhibit attention disorder symptoms at age seven (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004). Externalized behaviour problems related to media exposure are more commonly exhibited in boys than girls, in part because boys have a greater tendency towards physical aggression and are more attracted to violent programming (Rydell & Bremberg, 2006).

Media consumption can also directly and indirectly impact children’s dietary and physical activity habits. Children and youth represent a major focus of food marketing initiatives, primarily disseminated via television commercials. In Britain, it is estimated that food-related commercials account for approximately 75% of all advertisements targeted to children (Office of Communications, 2004). There is a strong evidence base to suggest that children’s food preferences, eating patterns, and food purchase behaviours are influenced by exposure to television advertising (Coon and Tucker, 2002; Borzekowski and Robinson, 2001; Isler and Popper, 1987). Unfortunately, the preponderance of products marketed for children are energy-dense, nutrient-poor, and generally inconsistent with healthy eating guidelines. While television remains the primary vehicle for targeted media marketing, food promotion channels have expanded to include the Internet, where food manufacturers are advertising products with a variety of new interactive techniques (e.g., pop-up ads, clips of commercials, screensavers), and indirect forms of sales promotion, such as marketing through in-school activities, cross-branded toys, and product placement.

There is some evidence to suggest that the integration of media in daily life has lead to a more sedentary lifestyle for many children by displacing more physical leisure activities and play, thereby elevating the risk of overweight and obesity (Hancox et al., 2004; Marshall et al., 2004; Steller et al., 2004). For instance, body fat and body mass index increased most between the ages of 4 and 11 among children who watched the most television (Proctor et al., 2003), and watching television and using a computer for more than one hour per day increased the risk of obesity by almost 50% (Kautiainen et al., 2005). The impact of media on weight is more pervasive in girls and there exists differences between countries, with excessive television consumption being a more significant risk factor for childhood obesity in Austria, Finland, Germany, and Belgium (Janssen et al., 2005). Part of the television-obesity dynamic, however, might be explained by the fact that inactive and obese children tend to watch television and spend time on the Internet to a greater extent, as such activities require minimal physical effort (Rydell & Bremberg, 2006).

The use of media can also influence childhood cognitive development and school achievement. While there is concern that television and the Internet are taking precedence over time spent on homework, reading, and other intellectual activities, the primary determinant on behaviour is not necessarily the volume of consumption, but programming content (Rydell and Bremberg, 2006). Age-appropriate, curriculum-based educational programming can facilitate comprehension and language and knowledge acquisition, as well as stimulate creativity and flexible thinking skills (Anderson et al., 2000; Rice et al., 1990). Moreover, viewing such programming at an early age can increase children’s school readiness (Wright et al., 2001). Preschool-aged children who viewed educational television programs obtained higher grades and read more books in high school, while entertainment television viewing...
was related to fewer educational activities and less social interaction (Anderson et al., 2001; Huston et al., 1999).

**Tobacco use**

Tobacco use in childhood has both short- and long-term health effects. In the short-term, smoking can lead to several health consequences, including reduced lung function, addiction to nicotine, increased asthmatic problems, coughing, shortness of breath, and an increased susceptibility to respiratory illness (US DHHS, 1994; CDC, 1994). Smoking also negatively impacts physical fitness in terms of both performance and endurance, which can facilitate a sedentary lifestyle (US DHHS, 1994). Moreover, smoking is suspected to be a gateway to other types of risk behaviours, such as illicit drug and alcohol use, antisocial and violent actions (e.g., fighting), and unprotected sex (US DHHS, 1994). In general, youth who use tobacco are 2.4 times more likely than their non-smoking peers to report poor overall health (Arday et al., 1999). Consequently, teenage smokers are more likely to have visited a doctor or other health professional for an emotional, psychological, or physical complaint (Arday et al., 1999).

Most of the long-term health consequences of youth smoking are facilitated by the fact that most young people who smoke regularly continue to smoke throughout adulthood. Cigarette smoking reduces the rate of lung growth and increases the risk of lung cancer (US DHHS, 1994). Women that smoke are also more susceptible to breast cancer (Abergavenny, 2002). For most smoking-related cancers, the risk of cancer rises as the individual continues to smoke. Children that use tobacco are also more likely to develop heart disease and stroke in adulthood, if not before. Studies have show that early signs of these diseases can be found in adolescents who smoke (US DHHS, 1994).

Petro et al. (1996) predicted that if the pattern of youth smoking continues, a lifetime of tobacco use would result in the death of 250 million children and young people currently alive. Not only does premature death deny individuals of years of potential life, but people typically die of tobacco-related causes in middle age, which has deleterious affects on families and a robust and productive national workforce.

**Physical activity and dietary habits**

Physical activity and good nutrition are essential for optimal health at all ages. Proper fitness and eating habits in childhood establishes a healthy precedent for adulthood - an active and fit child is likely to be an active and fit adult. Both physical activity and good dietary habits offers a range of benefits during childhood, including healthy growth and development, maintenance of energy balance, weight control, bone development, and psychological well-being.

Physical inactivity and poor eating habits are leading risk factors of non-communicable diseases, including cardiovascular disease, type 2 diabetes, and certain types of cancer. The scope of non-communicable diseases is significant. In 2001, non-communicable disease accounted for nearly 69% of deaths in developed countries and for 47% of the global burden of disease (WHO World Health Report, 2002). An active lifestyle and good nutrition in childhood can help protect against the development of non-communicable disease throughout the lifespan.

The majority of children across Europe do not get enough physical activity nor do they eat enough healthy, nutrient-dense foods in their daily lives. One of the most significant consequences resulting from this trend is the increasing prevalence of obesity among children. In fact, childhood obesity is rapidly reaching an epidemic level in many European countries and is closely approaching rates in the United States (Flodmark et al., 2004). According to the International Obesity Task Force (IOTF), more than 14 million children in the EU are overweight or obese (IOTF, 2004). In a mere 10 years, the prevalence of obesity has increased by 10-40 percent in the majority of European countries, with the number of overweight or obese children rising approximately 400,000 per year (IOTF, 2004). If this trend continues, two out of three Europeans will be overweight or obese by 2030 (IOTF, 2004).

Countries with the highest percentage of overweight children are Malta and Wales, while the lowest prevalence is observed in Scandinavian countries and central Europe (World Health Organization, 2004a). Unsurprisingly, countries with high rates of overweight children tend to also have increased rates of obesity (Figure 1). Current evidence suggests that British and Greek rates of obesity are increasing more rapidly than other EU countries, but it appears there is a general pan-European trend to the growth in prevalence (IOTF, 2004). Conversely, the lowest rates of obesity are observed in

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6 Obesity is defined as a Body Mass Index (BMI) over 30. An individual with a BMI less than 20 is considered to be underweight, 20-35 is normal weight, and 25-29.9 is classified as overweight.
Lithuania, Latvia, the Netherlands, Estonia, and Poland. Overall, the rate of obesity is higher for boys than among girls and more common in younger children (aged 7-11 years), but the extent of the difference between genders and age groups varies across countries (IOTF, 2005).

Rates of overweight and obesity also vary by socio-economic status. Children from low socio-economic backgrounds have a greater risk of obesity than those residing in more affluent households (Parsons et al., 1999). Explanations for this disparity include limited opportunities to engage in physical activity due to safety concerns, inadequate facilities for physical activities outside of school, and lack of resources to participate in extracurricular sports and fitness clubs. Moreover, physical and economic barriers to accessing healthy foods, particularly fresh fruits and vegetables, are more likely to be present in areas of socio-economic deprivation.

The prevalence of overweight and obese children is of growing concern for a variety of reasons. First, overweight and obese children are more likely to become overweight or obese adults (World Health Organization, 2004; Parsons et al., 1999). Current estimates indicate that between 50-75% of overweight or obese children will remain as such throughout adulthood (National Office for Statistics, 2002; Flodmark et al., 2004). Further, overweight children are at higher risk for developing cardiovascular disease, diabetes, hypertension, and cancer later in life. To exacerbate the problem, “diseases of old age” are beginning to manifest in overweight and obese children, most notably type 2 diabetes. Type 2 diabetes, confined to older adults for most of the 20th century, now affects many overweight and obese children. Analyses by the IOTF (2003), indicate that approximately 58% of diabetes mellitus globally can be attributed to a BMI greater than 21 kg/m². However, in western countries, approximately 90% of type 2 diabetes cases are attributable to weight gain, and childhood overweight and obesity are now leading to an unusual pattern of premature type 2 diabetes, which is particularly difficult to manage once established.

Figure 1. Percentage of school children aged 13 and 15, obese (BMI > 30)
Beyond non-communicable disease, obesity has both short- and long-term consequences for children’s physical, emotional, and social functioning and well-being. Obese children are more likely to suffer a host of physical (Box 1) and psychological problems, including low self-esteem, depression, and body dissatisfaction (Parsons et al., 1999). Obese children are also at increased risk for discrimination. Negative stereotypes towards weight and body shape develop from an early age and overweight and obese youth frequently encounter discrimination in school and community settings (Must & Strauss, 1999). Overall, existing evidence suggests that being obesity deleteriously affects girls more than boys. For example, obese adolescent girls are less likely to be accepted into a university, married, and economically well off in adulthood (Latner & Stunkard, 2003).

### III. Policy conclusions

There is considerable potential for improving health and well-being in Europe through assuming a life-course perspective on relevant policy initiatives. Because of the lifestyles associated with obesity, chronic disease, cancer, and poor psychological health are established early in life and largely preventable, childhood is the optimal point of entry to modify the major behavioural and environmental factors that can negatively impact health and development across the lifespan.

Due to the interrelated and protracted nature of many childhood behaviours, a comprehensive approach is necessitated to create an environment that empowers and encourages children, families, and communities to adopt healthy lifestyles. Specifically, strategies aimed at children must take a long-term perspective and engage all sectors of society, including government, schools, civil society, media, and the food, agricultural, and transport industries, in order to effectively induce sustainable improvements in life-long health. Further, it is important that actions also address any existing social and economic inequalities that hinder the adoption of healthy lifestyles.

In particular, the pace and extent of the rise in childhood obesity highlights the need for improved action and policy coordination, across both national and European levels, to address risky childhood lifestyle behaviours. As the EU offers a complex, highly differentiated picture of overweight and obesity, it is important for regional bodies to formulate programmes and policies that reflect national conditions and existing structures and processes. Further, national coordination mechanisms are needed to provide clear leadership and ensure effective allocation of resources during the development and implementation of lifestyle-related policies (World Health Organization, 2001).

While increased concern regarding obesity in many EU Member States has initiated some action at the national level, as evidenced below, the mechanisms for effective policy formulation and coordination are not yet sufficiently developed (Lang and Rayner, 2005). Moreover, there is a paucity of evidence on the effectiveness of existing national strategies in reducing childhood obesity due to several factors: a) lack of comparability due to small sample sizes, b) limited long-term follow-up, c) majority of studies are US-based, and d) individual national states frequently employ different data collection methods (Wilson et al., 2005; Lang and Rayner, 2005). All of these factors pose problems for translating results to the EU. The urgency for a cogent policy response to obesity within national governments has been emphasized recently by attention surrounding the finalization of a global strategy on addressing non-communicable diseases (World Health Organization, 2004). Specifically, the WHO strategy calls for the development of national initiatives to encourage healthy diets and increase physical activity, and monitor and harmonize relevant data methodologies to facilitate policy formulation. In addition to better policy development and coordination within countries, similar improvements are required at the EU level, especially given the transboundary nature of many factors impacting lifestyle behaviour (e.g., food manufacturing and advertising).

Although additional actions are needed to close the existing gaps between evidence and effective policy development, there are several efforts currently underway in Europe to improve the dietary habits, physical fitness, and general development of children. Such programmes and policies include:

**Box 1: Physical obesity-related complications**

- Adverse blood lipid profiles
- Sleep apnoea
- Orthopaedic problems
- Gallbladder problems
- Asthma
- Menstrual irregularities
- Stress incontinence
- Digestive difficulties
WHO Regional Office for Europe developed an Action Plan for Food and Nutrition Policy for years 2000-2005. The Action Plan guides WHO Member States in developing inter-sectoral food and nutrition policies to reduce the burden of food-related disease and disability (World Health Organization, 2001). In particular, some of the strategies outlined in the Plan include:

- Collate existing knowledge and scientific evidence to support food and nutrition policy development and implementation
- Develop innovative channels to communicate technical information
- Mobilize inter-sectoral partnerships
- Strengthen political commitment to food and nutrition policy at the EU level

The EU recently launched a Platform for Action on Diet, Physical Activity, and Health (European Commission, 2005) addressing the rise in obesity, particularly among children. The Platform outlines several fields of action:

- Consumer information, including labelling
- Education
- Physical activity promotion
- Food marketing and advertising
- Composition of foods, availability of healthy food options, and portion sizes

The European Vending Association has developed guidance for vending practices in schools. Some member companies do not vend in primary schools, while others remove branding from machines and offer healthier snacks.

The UK Department of Education and Skills (DfES) is revising the nutritional standards applied to school meals in order to reduce the fat, sugar, and salt content and to increase consumption of fruit and vegetables. Subject to legislation these standards will be introduced from September 2006 and will be extended to other food in schools, including vending machines.

In Scotland, the Scottish Executive and NHS Health Scotland have launched healthyliving, a programme to promote healthy eating and physical activity.

The Department of Health in England, in collaboration with the Department of Education and Skills and the Department of Culture, Media, and Sport, has implemented a number of initiatives to halt annual increases in obesity in children under 11 by 2010. These efforts include the Food in Schools and Fitbods!, a programme aimed at increasing exercise in primary school children.

Several organizations have developed and disseminated weight management guidelines for children including the UK NHS Centre for Reviews and Dissemination (2002), Scottish Intercollegiate Guidelines Network (2003), International Obesity Task Force (2004), and the National Institute for Health and Clinical Excellence is slated to devise guidance by 2007.

Norway and Sweden have both instituted ‘Food and Exercise Councils’ to improve coordination among various stakeholders on policies related to nutrition, physical activity, and the environment.

In Germany, a platform has been created to facilitate stakeholder collaboration on the prevention of childhood obesity. The platform provides a forum for testing new approaches, delivering information to the public on nutrition and physical activity, and developing best practices for policies and programmes.

England has recently created a School Transport Bill, designed to enable local authorities to develop innovative transport schemes that encourage students to walk and cycle to school whenever possible.

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**Box 2: Food Advertising and Children**

Specific actions taken to restrict advertising aimed at children in Europe:

- **Sweden** does not permit advertising aimed at children less than 12 years of age.
- **Belgium** restricts any commercials to be broadcast during television programming for children, as well as 5 minutes before and after.
- In the **Netherlands**, public broadcasters are not allowed to interrupt programmes that are aimed at children under 12 with advertisements.
- **Ireland** has introduced a ‘Children’s Advertising Code’, applying health warning messages to the advertising of fast food, sweets, and soft drinks.
In addition to the above initiatives, the advertising and marketing of foods to children have been a key focus of recent EU and national policy. Governments are establishing partnerships with consumer groups and the private sector (e.g., food industry, advertising) to develop multi-sectoral approaches to appropriate and responsible food promotion. For example, the commercial arm of the British Broadcasting Company (BBC) halted the use of children’s TV characters to promote high fat, high sugar, and high salt foods. Moreover, while all EU Member States are subject to the Television without Frontiers Directive, various states, particularly the Nordic countries, have subscribed to formal regulatory schemes in efforts to restrict television advertising targeted at children (Box 2) (European Commission, 2005).

At the European level, there is ongoing debate about limitations on food marketing practices, with the food and advertising industries generally resistant to regulatory controls. However, some examples of voluntary self-regulation are seen endorsing restrictions on advertisements targeted at children. The Confederation of EU Food and Drink Industry (CIAA), for instance, developed a code of principles for product advertising to children, by which member organizations must agree to conform (CIAA, 2004). Some companies are following the CIAA principles and similar guidelines promulgated by other industry organisations, such as the UK Food and Drug Federation (FDF). For example, the Kellogg Company has voluntarily improved the nutritional labelling on its food products and has invested in initiatives to promote physical activity, and Coca-Cola recently withdrew all advertising on its vending machines in secondary schools in Scotland (FDF, 2005). However, it is important to monitor that these initiatives are not a further strategy of a broader marketing campaign. Alternative approaches to regulatory regimes centre on public health campaigns and industry-sponsored initiatives to educate parents and schools on how and why marketing and advertising targets children and young people. While efforts are moving in the right direction, the food, beverage, and marketing industries should continue to work with government, scientific, public health, and consumer groups to establish and enforce the highest standards for the marketing of food products to children.

Based on current evidence for healthy lifestyle development in children, additional policy and programmatic actions are recommended.

- Long-term government-sponsored education campaigns are required to increase public awareness of the relationship between lifestyle behaviours and health. Information should be communicated through, and coordinated among, several channels: schools, health care providers, community organizations, and mass media. Enhancing the health literacy of parents is crucial to the success of such campaigns.

- While the pervasive consumption of electronic media is unlikely to change in near future, initiatives can support the improved content of associated programming. The effectiveness of educational television on skill acquisition and learning is well-substantiated. Therefore, more funding should be aimed at increasing access to such programmes through public television or other media. In addition, ongoing formative and evaluative research on educational media is needed to ensure that programmes are fulfilling the learning requirements promulgated by governments, school, and broadcast affiliates.

- While many policy actions have been initiated to control tobacco use among youth, smoking remains an important public health concern; therefore, continued efforts are needed.
  - Investigate the effectiveness of tobacco advertising bans to date and assess the role of such restriction in the Framework Convention on Tobacco Control (FCTC).
  - Prevention-focused programmes and policies should target adolescent girls and tailor such activities to the factors that initiate the onset of smoking (e.g., weight control).
  - While there is increasing evidence on the effectiveness of tobacco-related interventions, this is still need to pursue a multi-sectoral research agenda.8
  - Strengthen public education, especially in the school-setting.

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7 The Television without Frontiers Directive (1989) restricts advertising and upholds that advertising must not take advantage of children’s inexperience or directly encourage children to persuade parents to purchase advertised products.

8 European governments should take note of the research project currently underway at The Institute of Medicine in Washington which examines the effectiveness of tobacco prevention programmes, investigates the barriers to action, and seeks to determine how policies need to be changed or adopted. http://www.iom.edu/CMS/3793/20076.aspx
• Involve and engage youth in the conception, development, and implementation of tobacco control programmes and policies.

• Multi-sectoral policies are needed to promote physical activity throughout Europe. Urban development and transport policies and other infrastructure constraints on physical activity should be assessed. Schools should provide daily physical education and introduce a healthy lifestyle (i.e., nutrition, fitness, social and mental well-being) component in teacher training. Additional funding and other incentives is needed to create safe and accessible sport and recreation facilities.

• Schools present an important means of reaching children with programs and approaches for healthier lifestyles. Schools, government, and relevant health authorities should collaborate to support good nutrition by offering healthy food choices in the school environment (e.g., cafeterias, vending machines) and requiring nutrition education for all students. Further, it may be beneficial for schools to offer media literacy education to provide children with an informed and critical understanding of media.

• Sustained commitments by industry should be made to promote the availability, accessibility, and appeal of nutritious food products, and governments should provide incentives to industry for the development of healthier food products for children.

• Given the limitations and gaps in the current evidence base, research is needed on the:
  o Long-term outcomes of media use patterns in early childhood on various health and development outcomes, particularly obesity, psychological well-being, and academic achievement.
  o Impact of physical activity on obesity and associated co-morbidities.
  o Effectiveness and implications of self-regulation vs. formal regulatory controls on advertising, marketing, and promotion activities targeted at children.
  o The dynamics of new media platforms (e.g., Internet, electronic video games, and mobile phones) and promotional vehicles (e.g., toys and products with brand logos, in-school marketing) on children’s cognitive, physical, and social development.
  o Effectiveness of policy interventions and models of policy coordination on nutrition, physical activity, and obesity. As the majority of existing research is US-based, future evaluative studies should reflect the European experience. Given the paucity of evidence on effective interventions, it is of import to ensure that high quality evaluations are put in place as programmes and initiatives are implemented.

• Better data and surveillance systems are needed to monitor the risk factors and associated outcomes of obesity and to evaluate the effectiveness of related policies and programmes. EU Member States should collaborate to develop systematic and comparable data collection systems and regional networks.
  o It would be beneficial to initiate a systematic survey effort to examine the synergies between a comprehensive range of childhood behaviours (e.g., tobacco use, nutrition, physical activity, alcohol/drugs, obesity) and their impact on health across the lifespan.

• Innovative, reliable, and sustained funding streams are needed for national and EU programmes aimed at promoting healthy diets, physical activity, and tobacco prevention and cessation.

• Fiscal controls and market regulation schemes (e.g., taxes and subsidies) should be considered to support national nutritional targets, encourage the distribution and marketing of fruit and vegetables to children, and support the availability of public sector facilities that foster physical activity.

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E.g. The Institute of Medicine is currently undertaking a study to assess progress in obesity prevention actions and promote the implementation of the previous findings from studies outlined in the 2004 report Preventing Childhood Obesity: Health in the Balance which reported the nature, extent, and consequences of obesity in US children and youth (Institute of Medicine 2004).
• The European Commission should work with expert groups to develop new targets and
guidelines, monitor progress, and oversee coordination of national and European-level
strategies on childhood nutrition, tobacco use, and physical activity.

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