



World Health Organization

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# Socio-environmentally determined health inequities among children and adolescents



Tuscany Region, Italy



Health Behaviour in School-aged Children

A World Health Organization Cross-national Study



CREPS

Centro Ricerche educazione e promozione della salute



Azienda Ospedaliera Universitaria Senese  
Complesso Ospedaliero di Rilievo Nazionale e di Alta Specializzazione  
Policlinico Santa Maria alle Scotte



WHO Collaborating Centre for Health Promotion and Public Health Development



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# **Socio-environmentally determined health inequities among children and adolescents**

**Summary of outcomes, background  
papers and country case studies**

## ABSTRACT

There is ample evidence to show that young people living in poorer circumstances are more likely to be at risk of unintentional injuries and lack of physical activity than those from more affluent families. Unintentional injuries are the leading cause of death in children aged 5–19 years in the WHO European Region, with road traffic, drowning and poisoning ranking among the top 15 causes of death in 0–19-year-olds. Deaths in countries with the highest injury rates are almost seven times those in countries with the lowest rates, with five out of six child injury deaths taking place in poorer countries. Physical inactivity in childhood and adolescence is recognized as having profound negative implications for the health of young people as they grow into adulthood, and being subject to socio-environmental influences. WHO/HBSC Forum 2009, the third forum in a series designed to promote adolescent health, was held on 19 and 20 October 2009 in Siena, Tuscany Region, Italy. It concentrated on action on socio-environmentally determined health inequities among children and adolescents. This publication presents the summary of outcomes from WHO/HBSC Forum 2009. It also features two background papers on injuries and physical activity and environmental inequalities among children and young people which set the context and present a summary of the evidence on the topics, and 10 country case studies which share national experiences.

## Keywords

SOCIAL ENVIRONMENT  
SOCIOECONOMIC FACTORS  
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**Editors:** Alex Mathieson,<sup>1</sup> freelance writer and editor, and Leda Nemer, technical officer, children's health and environment, WHO European Centre for Environment and Health, WHO Regional Office for Europe.

**Administrative focal point:** Lucia Dell'Amura, administrative clerk, WHO European Centre for Environment and Health, WHO Regional Office for Europe.

**Designers:** Marta Pasqualato and Lucia Dell'Amura, administrative clerk, WHO European Centre for Environment and Health, WHO Regional Office for Europe.

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**World Health  
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REGIONAL OFFICE FOR **Europe**

**WHO/HBSC FORUM 2009**

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**Summary of outcomes, background  
papers and country case studies**

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## Acronyms

ADHS	Armenian demographic and health survey (Armenia)
APUG	German environment and health action programme (Germany)
BGP	bank of good practices (Poland)
BZgA	Federal Centre for Health Education (Germany)
CEHAPE	Children's Environment and Health Action Plan for Europe
COAF	Children of Armenia Fund
CPR	cardiopulmonary resuscitation
CSAP	child safety action plan for Europe
CSDH	Commission on Social Determinants of Health
DALYs	disability-adjusted life-years
DCSF	Department for Children, Schools and Families (United Kingdom (England))
DI	deprivation index
ECSA	European Child Safety Alliance
EEA	European Environment Agency
ETS	environmental tobacco smoke
EU	European Union
EU15	(countries belonging to) the European Union before May 2004
EU-SILC	European Union Survey on Income and Living Conditions
FAS	Family Affluence Scale
FCA	framework cooperation agreement
GDP	gross domestic product
GRP	gross regional product
HBSC	Health Behaviour in School-aged Children (study)
HDL	high-density lipoprotein
HEAL	Health and Environment Alliance
HRQoL	health-related quality of life
ICD-10	International Statistical Classification of Diseases and Related Health Problems, tenth revision
IEC	information, education, communication
ILO	International Labour Organization
KiGGS	German Health Interview and Examination Survey for Children and Adolescents (Germany)
M&E	monitoring and evaluation
MVPA	moderate-to-vigorous physical activity
NATO	North Atlantic Treaty Organization

NCO	National Children's Office (Ireland)
NGO	nongovernmental organization
NI	National indicator (United Kingdom (England))
NIGZ	Netherlands Institute for Health Promotion
OMCYA	Office of the Minister for Children and Youth Affairs (Ireland)
PCBs	polychlorinated biphenyls (toxic pollutants)
PINCHE	Policy Interpretation Network on Children's Health and Environment
PISA	Programme for International Student Assessment
POPs	persistent organic pollutants
PYLL	potential years of life lost
RIF	rapid inquiry facility
RPGs	Regional Priority Goals (of CEHAPE)
RTIs	road traffic injuries
SES	socioeconomic status
SIAF	Scuola Internazionale di Alta Formazione [International School of Higher Education] (Italy, Tuscany Region)
SMR	standardized mortality ratio
SRH	self-rated health
THE PEP	Transport, Health and Environment Pan-European Programme
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
VPA	vigorous physical activity
WOSP	Wielka Orkiestra Świątecznej Pomocy [Great Orchestra of Christmas Charity] (Poland)

## Foreword

At the Fourth Ministerial Conference on Environment and Health, held in June 2004 in Budapest, Hungary, Member States of the WHO European Region made a commitment to implementing national-level actions to ensure a better future for the children of the WHO European Region by means of the Children's Environment and Health Action Plan for Europe (CEHAPE) (1) and a Conference Declaration (2). Following the conference, the WHO Regional Committee endorsed the CEHAPE and the Declaration.

CEHAPE as a policy framework goes beyond the physical environment alone, also taking into account social environments that affect a child's or adolescent's exposure, such as safety in the home, school and neighbourhood.

The WHO/Health Behaviour in School-aged Children (HBSC) Forum process began in 2005. It is not a stand-alone event, but is rather a process of capacity-building and awareness-raising that entails the preparation of: national and subnational case studies on relevant policies, strategies and interventions; background papers, outcome reports and capacity-building materials; and media outreach.

Each WHO/HBSC Forum is dedicated to addressing the socioeconomic determinants of a priority public health issue affecting young people. The first, held March 2006, was dedicated to the topic of socioeconomic determinants of healthy eating habits and physical activity levels among adolescents. The second, in October 2007, focused on the topic of social cohesion for mental well-being among adolescents.

This report reflects the third forum, which took place in Siena, Italy in October 2009, with the theme of socio-environmentally determined health inequities among children and adolescents. The products from the forum contribute to CEHAPE Regional Priority Goal II and the Fifth WHO Ministerial Conference on Environment and Health, held in Parma, Italy, in March 2010.

The HBSC survey conducted in 2005/2006 involved 204 000 young people (aged 11, 13 and 15 years) in 41 countries and regions across Europe and North America. It found large inequities in young people's health and health-related behaviours across the regions and strong but complex relationships between adolescent health and the socioeconomic status of families (3).

The case studies, background papers and workshops which form the heart of the WHO/HBSC Forum clearly identify a range of challenges faced by Member States at national, regional and local level in addressing the risks and opportunities posed by environmental factors to children and young people in relation to reducing injuries and increasing physical activity.

Common factors identified during the forum are outlined in detail in the report, but essentially they include:

- the need for clear cross-governmental policies and actions in this arena;
- access to, and interpretation of, a wide range of "intelligence" sources beyond the normal health and environment areas;
- active and positive engagement with young people from the outset of policy, strategy and operational planning; and
- the continued opportunity to share experience and emerging practice within and between Member States.

At the beginning of the second decade of the 21st century, awareness of the importance of our environments to the health and well-being of all citizens has never been higher. This report of the WHO/HBSC Forum 2009 provides politicians, policy-makers, service providers, researchers, communities and, importantly, young people with a strong starting point to share and address issues focusing on reducing injuries and improving opportunities for increased physical activity across the European Region.

**Guenael R. Rodier, MD**

Director

Division of Communicable Diseases, Health Security and Environment

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## About the WHO/HBSC Forum 2009 process

There is ample evidence to show that young people living in poorer circumstances are more likely to be at risk of unintentional injuries and lack of physical activity than those from more affluent families.

According to the WHO *European report on child injury prevention (1)*, unintentional injuries are the leading cause of death in children aged 5–19 years, with road traffic, drowning and poisoning ranking among the top 15 causes of death in 0–19-year-olds. The report also states that deaths in countries with the highest injury rates are almost seven times those in countries with the lowest rates, with five out of six child injury deaths taking place in poorer countries.

Physical inactivity has been estimated to result in approximately 1.9 million deaths per year, 19 million lost years of healthy life (measured as disability-adjusted life-years (DALYs)), and 10–16% of breast and colon cancers. While these figures are for the general population, they have serious implications for young people who are growing into adulthood (2).

Responding to this challenge, representatives from 10 Member States of the WHO European Region were involved throughout 2009 in a process of reviewing evidence on socio-environmentally determined health inequities among children and adolescents. The process entailed analysis of data on physical environment barriers and risks to child and adolescent health, specifically in relation to unintentional injuries and promotion of physical activity. An international, multidisciplinary task force was also set up to support the 2009 process.

Country experiences dealing with one or both of these topics were captured through case studies drafted by interdisciplinary teams at national and subnational levels. Development of the case studies was supported by a case study drafting meeting in Galway, Ireland on 8 June 2009.

The WHO/Health Behaviour in School-aged Children (HBSC) Forum 2009, the third forum in a series designed to promote adolescent health, was held on 19 and 20 October 2009 in Siena, Tuscany Region, Italy to enable intersectoral delegations from each country involved and other forum participants to share country experiences and knowledge.

WHO/HBSC Forum 2009 concentrated on action on socio-environmentally determined health inequities among children and adolescents. The first forum (in 2006) addressed socioeconomic determinants of healthy eating habits and physical activity levels among adolescents, and the second (2007) focused on social cohesion for mental well-being among adolescents.

Series objectives include:

- translating research on young people's health into policies and action within and beyond the health sector;
- scaling up intersectoral policies and interventions to promote adolescent health;
- reducing health inequities among young people; and
- involving young people in the design, implementation and evaluation of policies and interventions.

Representatives from the following Member States prepared case studies: Armenia, Germany, Hungary, Ireland, Italy, Kazakhstan, Lithuania, Norway, Poland and United Kingdom (England). In addition, two background papers were provided, the first an overview of unintentional injury and physical activity using cross-national HBSC data, and the second a review of the evidence on environmental inequalities among children and adolescents, including policy implications in Europe.

The WHO/HBSC Forum 2009 process synergizes with follow up to the Fourth Ministerial Conference on Environment and Health held in June 2004 in Budapest, Hungary, the Children's Environment and Health Action Plan for Europe (CEHAPE) (3) and the related policy framework adopted by Member States. It also provides support to countries through the WHO European strategy for child and adolescent health and development (4).

The WHO/HBSC Forum 2009 process was co-organized by representatives from the WHO European Centre for Environment and Health (Rome), WHO Regional Office for Europe; the HBSC network; and the Tuscany Region (Italy), in partnership with: the Azienda Ospedaliera Universitaria Senese (AOUS); the Local Health Unit USL7 in Siena; the Centre for Research and Health Promotion of the University of Siena (CREPS); the WHO collaborating centre for health promotion capacity building in child and adolescent health (health promotion programme, A. Meyer University Children's Hospital, Florence, Italy); and the WHO collaborating centre for health promotion and public health development (NHS Health Scotland, United Kingdom (Scotland)).

Other valuable technical inputs were provided by the United Nations Children's Fund (UNICEF) Innocenti Research Centre and the Schools for Health in Europe network led by the Netherlands Institute for Health Promotion (NIGZ), WHO collaborating centre for school health promotion. Representatives from most of these agencies were included in the WHO/HBSC Forum 2009 task force or served as topic-specific experts.

The forum series comprises part of the Framework Cooperation Programme between the WHO Regional Office for Europe and the Tuscany Region. The Regional Office's WHO European Centre for Environment and Health in Rome was responsible for overall coordination of the Forum 2009 process, in conjunction with the task force. Additional technical input was provided by the Office for Investment for Health and Development and the Department of Child and Adolescent Health and Development of the WHO Regional Office for Europe.

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David Pattison,<sup>1</sup> Leda Nemer.<sup>2</sup>

<sup>1</sup>Head of International Development, NHS Health Scotland, United Kingdom (Scotland).

<sup>2</sup>Technical Officer, Children's Health and Environment, WHO European Centre for Environment and Health, WHO Regional Office for Europe.

### 1. Why address socio-environmentally determined health inequities among children and adolescents?

Poor environments are health-damaging. Children and adolescents are more vulnerable than adults to harm from a variety of environmental factors, because:

- their organ systems are rapidly developing;
- they live and play “closer to the ground”;
- latency agents have a longer time in which to exert an influence;
- they have less control over their environment than adults; and
- they may begin to adopt behaviours during adolescence that put them at greater risk of exposure.

Children facing adverse socioeconomic conditions are at higher risk of exposure to health-damaging environments that put them at higher risk of unintentional injuries. They also have little or no access to facilities and environments that enable them to safely take part in physical activity. Many of the serious morbidities seen in adult life, such as ischaemic heart disease, cerebrovascular disease, type II diabetes and some cancers, have their origins in the development of inactive behaviours in childhood and adolescence, which continue into adulthood.

Health inequities and their socioeconomic determinants was a cross-cutting theme of the Fifth Ministerial Conference on Environment and Health held in Parma, Italy in March 2010.

### 2. What is the issue?

Children in the WHO European Region are at risk from exposure to a variety of environmental hazards, including high levels of road traffic, lack of suitable facilities for safe physical activity, synthetic chemicals, indoor and outdoor air pollution, contaminated food and water, unsafe buildings and radiation. These risks combine in the settings where children live, learn and play to generate or trigger a wide range of negative health effects, including unintentional injuries and overweight and obesity. Every year, more than 100 000 child deaths can be attributed to exposure to environmental risks, which are unequally distributed across the Region and within countries.

There is a socioeconomic gradient in exposure to environmental risk factors that is reflected in household, school and communities settings. The term “social gradient” in health refers to the stepwise or linear decrease in health that comes with decreasing social position (1). Children and adolescents living in extremely adverse conditions, such as abandoned children, street children, those who are exploited or trafficked, child labourers, undocumented child migrants and those suffering from the consequences of armed conflict, are most at risk of injuries, psychological trauma, acute and chronic infections, noncommunicable diseases, impaired growth and development, disability and death. All of this is compounded by a socioeconomic gradient in access to quality health services, with disadvantaged children typically benefiting less from health systems than children in more privileged positions.

The recently published Marmot review of health inequalities in United Kingdom (England), *Fair society, healthy lives* (2), recommends that universal actions be taken to reduce the steepness of the social gradient in health and exposure to environmental risk factors. These actions need to correspond to the scale and intensity that is proportionate to the level of disadvantage, an approach called “proportionate universalism”.

In 2004, Member States of the WHO European Region made a commitment to implement national-level actions to ensure a better future for children through the *Children's Environment and Health Action Plan for Europe* (CEHAPE) (3). The CEHAPE policy framework addresses the environmental risk factors that most affect the health of European children. It consists of four regional priority goals (RPGs), a grouping of selected environmental risk factors agreed upon by the Member States which cover a range of environmental determinants of health. The main focus of WHO/HBSC Forum 2009 was on CEHAPE RPG II (unintentional injuries, physical activity, mobility and living environments), bringing an environmental inequities lens to examining the physical and social facilitators and barriers to reducing injuries and increasing physical activity among children and adolescents.

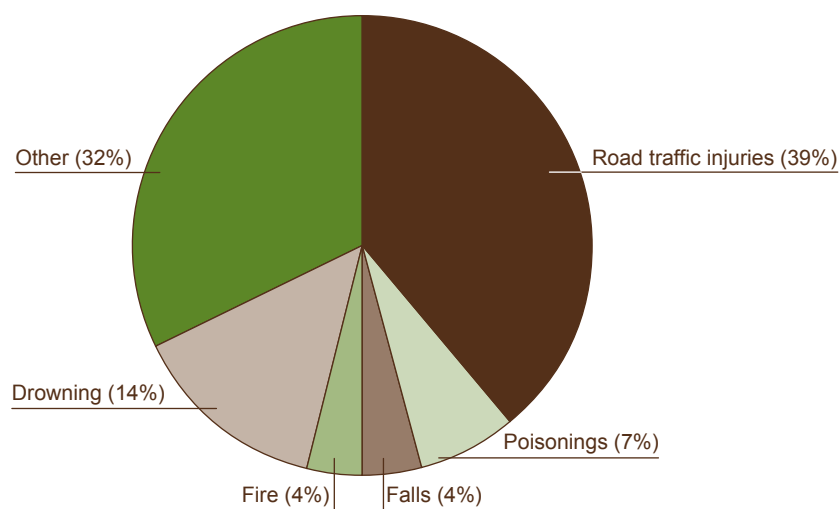
### 3. How is the issue known about?

Injuries, mostly unintentional, affect children and adolescents throughout the entire European Region. Road traffic accidents have the highest incidence in western Europe, while death from poisoning is more common in the eastern part of the European Region.

According to the WHO *European report on child injury prevention* (4), unintentional injuries is the leading cause of death in children aged 5–19 years, with road traffic accidents, drowning and poisoning ranking among the top 15 causes of death in 0–19-year-olds (Fig. 1). The report also states that deaths in countries with the highest injury rates are almost seven times those found in countries with the lowest rates, with five out of six child injury deaths taking place in poorer countries.

**Fig. 1**

Proportion of unintentional injury deaths among 0–19-year-olds, WHO European Region (total deaths: 42 000)



It is widely recognized that significant proportions of children and young people in the European Region are not meeting physical activity guidelines, which recommend one hour or more of at least moderate physical activity daily (in most countries). The Health Behaviour in School-aged Children (HBSC) survey conducted in 2005/2006 involving 204 000 young people (aged 11, 13 and 15 years) in 41 countries and regions across Europe and in North America found that fewer than half of young people meet these guidelines (5).

Physical inactivity has been estimated to result in approximately 1.9 million deaths per year, 19 million lost years of healthy life (measured as disability-adjusted life-years (DALYs)) and 10–16% of breast and colon cancers. Inactivity is also linked to 22% of the incidence of ischaemic heart disease, 11% of ischaemic stroke and 14% of type II diabetes. While these figures apply to the general population, they have serious implications for young people who are growing into adulthood (6).

## 4. What factors influence socio-environmentally determined health inequities among children and adolescents?

The final report of the Commission on Social Determinants of Health (CSDH) (7) indicates that there is a clear inverse association between the socioeconomic status of a community and the extent to which its residents, including children, will be exposed to toxicities or hazards such as wastes, air pollutants, poor water quality, excessive noise, residential crowding and poor housing quality. CSDH recommendations specifically call for improvements in the conditions of daily life and the circumstances in which people are “born, grow, live, work and age”, and for action to tackle the inequitable distribution of power, money and resources – what the report refers to as “the structural drivers of those conditions of daily life” – globally, nationally and locally.

The HBSC survey (5) found large inequities in young people’s health and health-related behaviours across Europe and North America and strong but complex relationships between adolescent health and the socioeconomic status of families.

With reference to unintentional injuries, the HBSC survey found the proportions of boys and girls who sustained injuries requiring medical attention once or more in the previous 12 months to increase between the ages of 11 and 15 years, with consistent gender and socioeconomic differences. At age 15, the rates for boys range from 28% to 65%, while for girls they range from 21% to 50%. Deaths in childhood from injuries show a social gradient and are associated with poverty, single parenthood, low maternal education, low maternal age at birth, poor housing, large family size and parental alcohol and substance abuse (8).

For physical activity, the HBSC survey found that girls across all countries and age groups report being less active than boys, with the gender gap increasing with age. The survey found that 15-year-olds (average 16%) were less likely to report meeting the physical activity guidelines than 11-year-olds (average 26%) in the majority of countries. In under half the countries, those from more affluent families were more likely to meet the guidelines (5).

## 5. Why does this matter?

Unintentional injuries and lack of physical activity significantly contribute to the burden of disease in the adolescent age group, with the former being the leading cause of death for young people in the European Region.

As the sections above have demonstrated, there is ample evidence to show that young people living in poorer circumstances are more likely to be at risk than those from more affluent families. A clear link can also be made between identification of risk factors, remediation of environmental conditions and settings, and improvement of health outcomes. As most of the identified socio-environmental risk factors are modifiable, effective action can be taken at regional, country and local level to reduce morbidity and mortality among children and adolescents.

Improving physical environments can greatly increase young people’s opportunities for health, particularly by removing the barriers to participation in physical activity and by reducing the risks of injury. Multisectoral attention to this issue is particularly important in low-income communities, as children and adolescents from such communities may face greater environmental risks and have fewer opportunities for physical activity. Schools and communities have an important role to play in boosting the protective factors associated with positive environments and physical activity.

## 6. Why act now?

Although patterns of environmental inequalities may vary across populations and countries, the overall pattern is that children living in adverse social circumstances:

- suffer from multiple and cumulative exposures;
- are more susceptible to a variety of environmental toxicants; and
- often lack environmental resources or access to quality health care to reduce the health consequences of environmental threats.

Multisectoral action which promotes the active involvement of children and young people, parents/guardians and communities is needed along the entire causal pathway of the social divide in environmental hazards, with priority being given to policy measures aimed at removing socially determined differences in environmental conditions.

## 7. What lessons did the WHO/HBSC Forum 2009 process identify for policy-makers?

### Intersectoral collaboration

The findings from the WHO/HBSC Forum 2009 relating to intersectoral collaboration and work highlight a number of key issues, including:

- the overall generic benefits of taking this approach;
- the need for capacity-building to effectively adopt such an approach;
- the importance of uniting behind a common goal to reduce inequities; and
- the early integration of relevant stakeholders to enable understanding of each partner's corporate objectives and capacities.

It was also agreed that it is critically important for health ministries to develop awareness of the policies and strategic objectives of other ministries and how they can contribute to or alleviate health inequalities before entering into discussions. This approach allows the contribution each stakeholder can make to tackling health issues within the country to be made visible. It also provides an opportunity to demonstrate how the ministry of health can support other ministries to reach their own corporate objectives, which is considered a valuable step towards engaging partners in intersectoral work.

The benefits of engaging in intersectoral action were reflected in a number of case studies, summarized below.

- The case study from Norway reports success in the development of the *Action plan on physical activity 2005–2009: working together for physical activity (9)* due to close collaboration among eight ministries. All ministries were engaged early in the development of the action plan and were asked to identify concrete actions for which their ministry could take responsibility.
- The case study from Hungary reports on the development of a national action plan on child and youth safety. This was created as a result of cooperation among 18 experts on health, education, the environment and consumer protection, transportation, law enforcement and social sectors, as well as young people, and is based on the national programme for infant and child health, *Children, our common treasure (10)*. The case study attributes achievement of the action plan to the joint efforts of the 18 experts, support from decision-makers, involvement of children and young people and utilization of the resources and capabilities of not-for-profit organizations.
- The case study from Poland describes the development of the “My sports field – Orlik 2012” programme and how it is possible to achieve cooperation among stakeholders. The programme was developed to provide accessible sports fields to populations in each community and is expected to contribute to the reduction of regional health inequalities through its contribution to creating sustainable development within regions. As a result of “My sports field – Orlik 2012”, cooperative agreements between ministries and local communities have been put in place and many institutions have started to engage in joint projects, with cooperation between institutions and merging of programmes with common goals being observed.

Case studies and discussions stressed the need to build capacity to work intersectorally. Examples include the following.

- The strategic framework on environment and health in United Kingdom (Scotland), *Good places, better health (11)*, adopts an intersectoral approach. The framework uses an ecological public health model to take a comprehensive approach to health and well-being and embraces a wide spectrum of interacting determinants in the evidence used to inform choices.
- The case study from Armenia highlights the importance of working intersectorally. It describes how the health care sector has focused on improving access to services while the education sector has fully renovated schools, with consequent

improvements in hygienic conditions and provision of facilities for sports and other indoor and outdoor physical activities. The case study shows that despite low levels of public expenditure, activities targeted at improving child and adolescent health can work, particularly when focused on prevention of negative environmental influences. Further support would be needed to show partners the benefits of intersectoral collaboration.

From an inequities perspective, especially during the current economic climate, there can be no doubt that working across government ministries, across regional and local government departments and in partnership with other agencies (including those from civil society) provides the opportunity to maximize scarce economic and physical resources. Intersectoral work also enhances the identification at national, subnational and local levels of communities and individuals most in need or who are most vulnerable and the ability to develop more coherent policies, strategies and action plans aimed at reducing inequities.

From a public engagement perspective, including working with young people, adopting an intersectoral approach allows a range of partners to engage more constructively and inclusively in addressing inequities within their communities. It also provides opportunities to put in place performance management systems to measure impact and effectiveness, which is vital.

### Settings approaches

The WHO/HBSC Forum 2009 found that the use of a settings approach can also contribute to reductions in inequities, as it focuses on where children and adolescents can best be reached and where they are most at risk.

The Forum and its case studies identified that schools, the built and natural environment in communities and the health system (both the physical facilities that comprise the health system and the corporate entity) can play a key role in creating effective action to improve environments, reduce injury and increase physical activity. A settings approach provides a positive medium for addressing the environmental conditions that often characterize disadvantaged communities, such as the presence of highly pollutant industries, lack of water and sanitation infrastructure, dangerous traffic conditions, lack of safe playgrounds and close vicinity to hazardous waste sites. It can also help identify examples of existing positive environments that are addressing these issues, enabling the sharing of learning and experience.

Advantages of using a settings approach to reduce environmental inequities include having greater control over the environment, the possibility of concentrating investment more directly (as parameters can be set) and easier targeting of resources.

Examples of the use of a settings approach include the following.

- The case study from Germany describes, among other initiatives, the Federal-Ministry-of-Health-supported Safe Kids Germany. This organization provides a platform for the provision of information, the promotion of cooperation and the initiation and coordination of measures aimed at injury prevention in children. Safe Kids Germany provides information resources for people working in preschool and school settings and has produced several paper-based resources for parents and an online database in cooperation with the Federal Centre for Health Education (BZgA). It has also developed recommendations for improving child injury prevention in Germany (12).
- The case study from United Kingdom (England) describes *The play strategy* (13), which aims to develop new and improved play areas and child-friendly public spaces across England and to provide all children with increased opportunities for play and informal recreation close to where they live. The strategy has been developed to invest in play, embedding it as a priority for local authorities and national bodies and encouraging play throughout childhood, from “early years” and children’s centres to school, physical education and youth settings. It aims to make public spaces more child-friendly by instituting guidance and training for all key professionals involved in planning, designing, building and managing public spaces.
- A good example for the school setting is the health promoting school approach, which is focused on inclusion of all attending individuals. The case study from Norway describes a joint intervention programme involving the ministries of

education and health entitled “Physical activity and healthy meals in school”. Four hundred schools have been involved, each receiving a small sum of money to stimulate development of efficient models. The schools were given guidelines based on principles developed through the Norwegian Network of Health Promoting Schools on how to create and implement strategies and activities to promote physical activity and healthy school meals.

These case studies concur that the safer the setting, the better the chances of preventing injuries and engaging in physical activity, especially among lower-income groups.

It should be kept in mind that a settings approach alone is not sufficient to reduce environmental inequities: it should be complemented by other approaches. In addition, care needs to be taken to ensure that inequities are not widened by the use of a settings approach, as an unintended consequence can be exclusion of individuals who do not go to school or whose involvement in schools is limited: schools can only reduce inequities if children attend.

### **Translating research into policy**

The importance of frequent and open dialogue with policy-makers and securing their engagement is highlighted by a number of case studies. While recognizing the importance of maintaining the right of researchers to have independence, most agree that researchers have a responsibility to engage policy-makers to ensure that their research benefits society. At the same time, they should engage with all relevant stakeholders early to formulate relevant policy questions to be answered by research. The WHO/HBSC Forum 2009 case studies illustrate not only data gaps but also challenges in accessing data on, for example, health and the environment.

The Bolte et al. background paper (pp. 24–53) shows that, to be able to adequately portray the environmental inequities “picture” in a country, research resources should be targeted at those who are most at risk and groups most in need.

There was general agreement in Forum discussions that to deal with data gaps in Europe, government ministries would benefit from assessing whether they have sufficient data to deal with the complexity of environment and health issues and consider investing in appropriate intelligence systems. This could be achieved through the development of an understanding of a much wider range of “intelligence” systems and sources by all partners to help resolve research data gaps, as many potentially useful sources are currently not being utilized. Knowledge of “intelligence systems” and obtaining access to the information they can provide can aid in evidence-informed decision-making and enable better targeting of interventions to reduce inequities.

Examples of the use of alternate sources of data and information arose in a number of case studies, summarized below.

- The case study from Kazakhstan uses data on children’s mortality and morbidity due to road traffic injuries (RTIs) derived from traffic police reports and studies conducted by the authors of the case study.
- The case study from Armenia accesses data from the education sector for physical activity as well as data from a child labour survey.
- The case study from Lithuania shows the burden of child and adolescent injury in the context of alcohol and traffic-control policy in the country over the last decade using four HBSC surveys and other relevant data retrieved from national and international databases. It recognizes a lack of scientific data informing new policy aimed at reducing injury rates among the youngest inhabitants of the country.

### **Youth participation**

The WHO/HBSC Forum 2009 recognized children and youth as key players in confronting environmental and health challenges. They are the future citizens of their countries and have the capacity to influence policy-makers – indeed, they are the policy-makers of the future.



Forum discussions identified the need for a clear, strategic approach to youth involvement that could be facilitated by a supportive national strategy. Such a strategy would set a precedent for youth involvement in addressing the impact of the environment on their health. A greater sense of influence and ownership of the decisions being made on their behalf would be likely to encourage greater participation and engagement from youth, which in turn is likely to lead to better (and more achievable) policy decisions being taken.

The case study from Ireland included an exploration of the relationships between engaging in physical activity and perceptions of local area among children, highlighting the importance of local facilities, and children's perceptions of such facilities in promoting physical activity. All this was accomplished within the context of recent policy and strategy development for children in Ireland. An example is given of the involvement of children in developing indicators of well-being for children. These indicators are being reported on every two years, employing data taken from HBSC surveys in Ireland.

There was consensus that, to effectively involve youth, young people should be informed and engaged early as key players and equal partners in any process that aims to reduce environmental and health inequities. The need to build professional capacity on how to involve youth arose in Forum discussions; for some organizations, this will require investment in training programmes for staff at all levels on youth engagement approaches.

It was also considered critically important to reach beyond mainstream youth and to take specific age and cultural needs into consideration. Increasing participation and empowering youth may help to reach those who do not frequent mainstream settings or who do not press for action to protect their health.

The Italian case study illustrating the regional project “Di testa mia” [“The ideas of Tuscan youth for their health”] offered an opportunity for all young people living in Tuscany to set out proposals to improve their own health and well-being by means of a peer-to-peer approach. An open competition for young people was held where they were invited to present projects to deal with five thematic areas. The project “Have fun in a safe way” was selected as a winner because of its practical nature and its adoption of a peer-education approach. Another project, “Koinè”, has as its main objective the redevelopment of an urban area in Grosseto as a youth cultural centre. This project aims are to move young people away from boredom and risky activities towards an education in arts and culture, and to create open dialogue with health care institutions.

## 8. What immediate steps can policy-makers take?

The WHO/HBSC Forum 2009 identified key actions that would be needed to tackle environmental and health inequities among children and adolescents. Specifically in relation to policy-makers, the following actions were highlighted.

Policy-makers at national, regional and local level should consider the potential benefits of:

- ensuring the involvement of a wide range of stakeholders (including proactive engagement with young people) early on in the process and recognizing this as essential for success;
- investing in systems which promote and support working across sectors, including training on collaborative methods;
- being willing to consider individual “common-sense measures”, even in the absence of traditional supportive scientific evidence, and providing guidance to governments on how to implement such measures;
- ensuring that appropriate systems are in place to proactively engage with the research community to commission research and to receive and understand research findings;
- recognizing the importance of accessing and interpreting a wide range of data from different sectors to support the aims to be achieved, taking into account disaggregation;
- recognizing the importance of focusing on daily life settings for environmental and health work;
- focusing on reaching the most vulnerable groups within countries and tackling inequities across the social gradient through the universal provision of services that have a scale and intensity proportionate to the level of disadvantage; and
- using new technologies such as Internet forums and other media to assist in carrying out and disseminating this work.



Actions for Member States to consider are:

- ensuring the highest standard of health for all citizens, as no level of inequity is acceptable;
- recognizing the importance of taking even small steps towards solving the problem, rather than taking no steps at all;
- strengthening all four functions of the health system (stewardship, resource generation, service delivery and financing); and
- using policy analysis, including systematic reviews of policy, more extensively and asking if existing policies might have a detrimental effect in increasing inequities.

These suggestions are not exhaustive. Nor are they unique to environment and health. They do, however, represent a growing recognition across the WHO European Region of the importance of all government departments working in partnership to reduce inequity and improve the health and well-being of their citizens.

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## Injury and physical activity in context: findings from the HBSC study

Michal Molcho,<sup>1</sup> Antony Morgan,<sup>2</sup> and the Violence and Injury Prevention Working Group<sup>3</sup>  
and the Physical Activity Working Group.<sup>4</sup>

<sup>1</sup> School of Health Sciences, National University of Ireland, Galway.

<sup>2</sup> University of Hertfordshire, United Kingdom, England<sup>§</sup>.

<sup>3</sup> Members of the Violence and Injury Prevention Working Group: Will Pickett, Katrin Aasvee, Dora Varnai, Yossi Harel.

<sup>4</sup> Members of the Physical Activity Working Group: Ronald J. Iannotti, Alexander Komkov, Joel Warsh, Lis Hentze Poulsen, Pia Elena Henriksen, Jorma Tynjälä, Mika Vuori, Jari Villberg, Alberto Borraccino, Ellen Haug, Ole Melkevik, Hanna Kololo, Luis Calmeiro, Robert Balazsi, Jo Inchley, Michael Kogan, Jing Wang, Chris Roberts.

### Introduction

It is well known that the social, physical and economic environment within which young people grow up has a significant impact on their ability to achieve and sustain health now and in the future. Creating supportive environments, a long-term goal of health promotion, has the potential to protect young people from adverse risks and promote healthy lifestyles which maximize the possibility for health.

Given the burden of death, disability and chronic illness associated with unintentional injuries and physical inactivity, it is important to understand the socio-environmental determinants of these key issues. This paper uses data from the HBSC study to highlight some of the important factors that need to be considered to find ways of reducing the risk of injury and to promote physical activity in young people's daily lives.

### Injuries

Globally, injuries are the leading cause of death in people under the age of 45 years. The proportion of deaths related to injuries is particularly stark for younger age groups – for example, 36% of deaths in children under 15 years (1) and 23% of deaths among those under 19 (2). In the WHO European Region, injuries kill 800 000 people every year (8% of all deaths in Europe) (3). For every death, it is estimated that injuries send 30 people to hospital and 300 others to emergency departments for outpatient treatment (3,1). Injuries that do not result in death may have short- or long-term effects on the health of the injured person, on many occasions leaving him or her with a disability.

In the European Region, injuries account for 14% of overall DALYs, a summary measure that combines the impact of illness, disability and mortality on population health. One DALY equals one lost year of healthy life (3).

### Physical activity

Physical activity is associated with many health benefits. In adulthood, regular physical activity is associated with reduced risk for cardiovascular diseases, cancer of the colon, obesity, type II diabetes and osteoporosis (4). The benefits of physical activity go beyond physical health, with findings linking regular physical activity to an overall improved quality of life (5). Among adolescents, moderate-to-vigorous activity is associated with decreased adiposity, improvement in metabolic syndrome, decreased triglyceride levels, increased high-density lipoprotein (HDL), higher bone density, muscular strength and endurance, and improved mental health (6–8). Healthy patterns of physical activity established during childhood and adolescence tend to carry into adulthood (7,9–13). Furthermore, adolescent physical inactivity predicts obesity and abdominal obesity in adulthood (14,15).

Although physical activity clearly has many health benefits, it is also linked to an increased risk for injury; the likelihood of musculoskeletal injury increases with increases in activity levels. Data collected through the HBSC study suggested that more than half of the medically attended injuries reported by young people aged 11–15 years occurred during sports or recreational activities (16,17).

<sup>§</sup> Working group for the WHO/HBSC Study 2009.

There seems to have been a decrease in childhood injuries in recent years (see, for example, (18)). This could be the result of the introduction of new safety measures, or may be due to changing patterns of participation in physical activity. Physical activity poses a risk for injury, but its contribution to individuals' health status cannot be underestimated. Physical activity should therefore be promoted, while efforts are made to minimize the risk for injury.

This background paper summarizes the findings from the HBSC study to assess the socio-environmental determinants of physical activity participation and self-reported rates of injury. Specifically, it examines patterns of these two health-related indicators in relation to children's social class (using the Family Affluence Scale (FAS)) and their physical environment (using an indicator of their perceptions of neighbourhood). The paper also examines the relationships between physical activity and injuries and, where possible, physical activity and severe injuries. Finally, it aims to establish the protective factors that will allow reductions in injuries and increases in participation in physical activity.

## The HBSC study

The HBSC research network is an international alliance of researchers that has been operating since 1982, with 41 countries and regions in Europe and North America collecting data in the 2005/2006 academic year.

The overall aim of the study is to gain new insights and increase understanding of adolescent health behaviour. The study questionnaire is developed by the network in English and is subsequently translated into national and subnational languages. The questionnaires are self-administered in classrooms with methods to ensure confidentiality and anonymity. Sampling is conducted in accordance with the structure of the national education systems within countries and is sometimes stratified by region or school type, with school class being the sampling unit in this study.

Children aged 11, 13, and 15 years are the target for the international study. These age groups represent the onset of adolescence, the challenge of physical and emotional changes, and the middle years when important life and career choices are beginning (19).

### Methods

#### Measuring physical activity

Measuring physical activity through self-report and in a school-based survey is a complicated task. A study of pupils' physical activity rating of school physical education identified many factors that influence the way children perceive their levels of physical activity. These factors include individual pupils' competencies, environmental issues, group and peer dynamics, peer pressure and physical performance expectations (20). This suggests that whatever measure is used, the results will depend on the environment and the individual operating within it. Still, some evidence of the validity of self-reported physical activity does exist (21–28).

HBSC uses measures of physical activity in two distinct ways: “moderate-to-vigorous physical activity” (MVPA) and “vigorous physical activity” (VPA). MVPA measures the sum of all activities with a focus on the physical aspect of any daily activity, not just exercising. In contrast, VPA explicitly encompasses a dimension of physical activity as a recreational pursuit or hobby.

The two measures express different behavioural patterns and may even have different outcomes (29). The MVPA is based on physical activity during (i) the past seven days and (ii) a typical or usual week. The reliability of these measures has been tested and confirmed (21,30). The VPA is measured through items focusing on vigorous physical activity (defined as getting out of breath or breaking sweat) outside of school hours, in terms of frequency and duration (31).

#### Measuring injury

The study of injuries in youth requires the identification and definition of injury as primary dependent variable of interest. However, some consistent criteria must be applied to avoid overwhelming the data set with frequent and insignificant events that are unrelated to mortality and morbidity and occur on a daily basis (such as cut finger and skinned knee).

Although a variety of definitions and coding schemes has been employed to identify the occurrence of an injury of some significance, the most commonly used criteria are the requirements for medical attention and impairment of activity (32–36). For consistency with this widely accepted approach, medical attention is used as the definition of a significant injury in the HBSC study. Some countries in HBSC collect additional data relating to the alternative criterion, “loss of normal activity to some degree”, which allows the further definition of injury and identify biases resulting from different medical systems (32–34).

Since the 1994/1995 study, HBSC has also collected other measures which give further information about the circumstances of the injury event, such as where the injury occurred and during what activity. Understanding this context is important for mapping possible approaches to prevention (35). The measures include data on the location of the most serious injury in the past 12 months and details of the activity leading to injury. Both are examined using closed questions that provide a range of descriptions of the location where the injury occurred and specifics about the external cause (36).

Another important parameter of injury is the severity of the outcome. In traditional injury-control work, the severity of each injury event can be classified according to the source or type of injury treatment (where the injury was treated and the treatment required). Another measure of severity that helps to overcome the differences in access to medical care in the different countries is “loss of activity” due to an injury (37). Consequently, the effects of access to care can be minimized and the large number of minor and questionable injuries can be separated (34).

Any prevention programmes aiming to increase participation in young people’s organized physical activity must pay attention to minimizing the risk to injury. Overpeck et al. (36) have shown that rates and severity of sports and recreational injuries vary by the degree of organization that is a factor for the risk of injury. This paper will therefore also use data available within HBSC to examine injury occurring during organized activity.

## Findings from the HBSC study

### Injury

In 2005/2006, just over 40% of schoolchildren reported at least 1 medically attended injury in the past 12 months; however, there are large country and gender variations.

Among 11-year-old boys, injury ranged from 32% in the former Yugoslav Republic of Macedonia to 65% in Spain; variations in girls were more marked, ranging from 16% in Poland to 55% in Spain. Among 13-year-olds, injury ranged from 32% in the former Yugoslav Republic of Macedonia to 66% in Spain in boys, and from 20% in Poland to 52% in Spain in girls. Among 15-year-olds, injury variations in boys ranged from 28% in Bulgaria to 65% in Spain, and in girls from 21% in Bulgaria to 50% in Norway.

Although the prevalence of injury is widely spread, injury that requires medical attention is prevalent in all countries, with consistent gender and socioeconomic patterns: boys and more affluent groups show higher prevalence of injury (19).

Other evidence from HBSC provides a picture of the size and nature of the problem across Europe and North America. Papers looking at injury control, including etiological studies, examined the prevalence of injury across countries and against a variety of social determinants of injury (16,38–41). In all countries, both medically attended injury and injury resulting in loss of days of activity were prevalent: medically attended injury was reported to vary from 24% in Poland to 50% in Israel and Ireland, and injury resulting in loss of days of activity varied from 13% in Poland to 31% in Ireland (16).

Across all studies, injury was found to be less prevalent among girls and more prevalent among children reporting both high and low family affluence (injury was less prevalent among those who ranked in the middle of the FAS). Another cross-national study looked at the associations of multiple risk behaviours (simultaneous engagement in multiple risks such as substance use, truancy and failure to use safety precautions) with various forms of injury, clearly suggesting that the risk for injury increases with the number of risk behaviours in which an individual is involved (42).

Evidence from national studies covered a range of topics relating to injury. They include:

- lifestyle behaviours as determinants of injury in Canada (42,43) and Lithuania (44);
- social determinants of “repeated” injuries in Polish students (45);
- prevalence studies of injury rates and patterns (17,46); and
- studies of socioeconomic status (SES) and injury (47,48).

In Canada, Janssen et al. (43) found that 40% of reported injuries occurred during sport/recreational physical activity outside of school, with a further 8% in school. Their findings suggest that high involvement in physical activity increased the risk for injury, but only outside of school.

Another study in Canada found that schoolchildren with disabilities were found to be at a significantly higher risk for injury, with no gender differences within this group. Among children with disability, fewer were injured while engaging in physical activity and more were injured while fighting. Children with disabilities, who also reported lesser involvement in physical activity compared to the general sample, were less likely to report an injury occurring in sport facilities. Interestingly, all injury consequences (cuts/puncture, bruises, broken/dislocated bone, concussion, burns and operations), with the exception of sprains, were more common among children with disability. They were also more likely to report being treated in emergency departments, being admitted to hospital and being seen by the school’s health services, and were more likely to miss days of activity due to injury, making them a group at high risk of injury (49).

While involvement in risk behaviours has been identified as a risk for injury and, more specifically, head and neck injury (50), Pickett et al. (51) focused on social climates at school and in the home and risk for injury, finding that supportive social climates act as a protective factor for injury among younger children. Younger children (grades 6–8) experiencing high levels of support at home and at school were less likely to report medically attended injury at any setting (school and home). Among older children (grades 9–10), however, a supportive climate in the home was associated with more injuries, while supportive climates in school were associated with fewer injuries.

The relationship between involvement in risk behaviours and individual-level social class is well established, but some studies have also looked at neighbourhood-level measures. The multilevel study of Simpson et al. (48) used Canadian census data to extract area-level measures for the school surrounding. These included the percentage of lone parents in the area, percentage of unemployment, percentage of residents with less-than high-school education and average employment income. At the individual level, the more affluent children were more likely to report an injury and more likely to report sport/recreational injury. Children who were less affluent, on the other hand, were more likely to report fighting-related injury.

Experiencing food poverty was associated with injury requiring hospitalization and fighting-related injury, but not with sport/recreational injury. Lack of sense of security in the local area and poor perception of the locality were both associated with increased risk of a medically attended injury, but not with sport/recreational injury. At the area level, a high percentage of lone parents, low income and low level of education were all associated with injury hospitalization, while high income in the area was associated with increased risk of sport/recreational injury.

A similar study was carried out in Israel (52) and found that, at the individual level, high family affluence, drunkenness, binge drinking and vigorous physical activity all increased the risk of medically attended injuries and injuries occurring at school. At school level, the injury rate was higher in schools where the aggregated academic expectation of teachers and parents from students were deemed too high, compared to schools where no such expectations existed. Low SES of the school’s neighbourhood (high housing density, low rate of entitlement to matriculation and low rate of professionals) also predicted a high school-injury rate. In predicting the school rate of sport injuries, low SES of the neighbourhood and a high SES profile of the students attending the school were found to predict a higher injury rate.

The multilevel analysis of injury revealed that the strongest predictors were involvement in risk behaviours, followed by the aggregated school perceptions and the socioeconomic profile of school neighbourhood. The individual social class of the students and the socioeconomic profile of the school were of less importance. Similar patterns were found with respect to school injury, with neighbourhood SES playing a more important role in predicting such injury than personal SES.



## Physical activity

Results from the 2005/2006 study reveal that most schoolchildren do not meet the recommended guidelines of at least 60 minutes physical activity every day, although there is wide country variation.

Among 11-year-olds, meeting the guidelines varied from 15% in Switzerland to 43% in Slovakia; among 13-year-olds, from 12% in France to 42% in Slovakia; and among 15-year-olds, from 8% in Israel to 37% in Slovakia. Overall, boys and younger children were more active than girls and older children.

Family affluence was associated with physical activity in some countries, but not all. Where such association existed, it suggested that more affluent children were more likely to meet the physical activity guideline (19).

Despite relatively low levels of participation in physical activity, a cross-national time trends analysis carried out in seven countries revealed that in most countries between 1986 and 2002, level of participation in physical activity (as measured by vigorous activity) either increased or remained unchanged (53).

Other HBSC studies have examined age, gender and socioeconomic differences in physical activity (53–59). Participating in physical activity was also used to explore: sleep quality (60); sedentary behaviour and weight problems (61–63); the influence of SES on health behaviours, including physical activity (57); and physical activity and health complaints (64). All of these studies pointed towards large gender, age and socioeconomic differences (boys and younger children are more active than girls and older children; high level of family affluence is associated with higher levels of participation in physical activity), but no evidence was found of associations between physical activity and sedentary behaviours in most countries (54,57).

Multilevel analyses have also been carried out to explore the relative importance of physical environments and school policies as predictors of physical activity in school. At individual level, the study found that most students were interested in having more opportunities for physical activity in school, and that the level of interest in such activities was associated with higher levels of physical activity (65). At school level, the study found that students in secondary schools with a larger number of outdoor facilities were more likely to be physically active compared to schools with fewer such facilities (66), and that schools with a written policy for physical activity and those offering organized noncurricular physical activity several times a week had a higher proportion of students reporting daily participation in break-time physical activity (67).

## Physical activity and injury

This review of published HBSC studies has revealed some clear themes across both topics.

Both injury and physical activity are more prevalent among boys and younger children. In both topics, a clear socioeconomic gradient is evident: affluence is associated with higher levels of physical activity and with higher risk of any injury (not just sport related). When broken down by types of injury, sport/recreational-related injuries were found to be associated with affluence, while more severe and fighting-related injuries were associated with low levels of affluence.

Multilevel analyses focusing on neighbourhood-level data (such as rates of unemployment in the neighbourhood, rates of high school graduates and other measures at area level) revealed that injuries are more prevalent in areas of low SES, with the exception of sport-related injuries, which are more prevalent in high socioeconomic environments. No evidence was found in relation to physical inactivity and area-level measures.

A number of gaps have been found in the knowledge base. This paper attempts to fill one of those gaps by further exploring some aspects of the relationships between physical activity and injury risk. Additional analyses were carried out to explore the association between perception of local area and injury and physical activity, identify the risk of injury among active versus non-active children, identify the different types and location of injury by level of activity, and explore injury in organized sports activity.



## Statistical analysis

Statistical tests were employed to identify the associations between injury and physical activity (Chi-square tests) and to identify the perceptions of the local area that predict injury and physical activity (logistic regressions). All multivariate analyses were controlled for age, gender and family affluence. Statistic analysis was carried out using SPSS 15.0.

## Results

This section presents the relationship between different types of injury, injury circumstance and injury consequences and physical activity. Lastly, the paper presents analysis of the relationships of perceptions of the local area and physical activity and injury.

### Injury and physical activity

For the purpose of this analysis, MVPA was calculated based on 60 minutes of physical activity in the last 7 days. The variable was dichotomized to being active for 60 minutes or more on 7 days per week, and to those not active on a daily basis. VPA was based on reported hours of vigorous activity (getting out of breath, sweating) outside of school for two hours or more per week.

Overall, 50% of schoolchildren who reported daily MVPA for 60 minutes or more reported a medically attended injury in the past 12 months, compared to 42% of schoolchildren who were less active ( $p<0.001$ ). Of those reporting frequent VPA, 49% reported a medically attended injury, compared to 38% of schoolchildren who did not participate in frequent vigorous activity ( $p<0.001$ ). These findings were evident and statistically significant in all participating countries.

### Injury circumstances and physical activity

Table 1 presents the location of the most serious injury (if more than one injury was reported) in the last 12 months among schoolchildren reporting medically attended injury in the past 12 months. Children reporting participation in daily MVPA or in frequent VPA were more likely than others to report that their most serious injury occurred in a sport facility ( $p<0.001$  for both).

**Table 1**

Levels of physical activity by site of reported injury, 11–15-year-olds (percentages)

Settings	MVPA– daily		VPA – frequent	
	No	Yes	No	Yes
At home/yard	25	21	31	20
At school, school time	13	12	14	11
At school, after hours	4	3	4	4
At a sport facility	28	36	19	37
Street/road/parking lot	8	8	8	8
Other location	23	20	25	20

Children participating in physical activity (both MVPA and VPA) were more likely to report that their most severe injury occurred while playing sport ( $p<0.001$ ), with a stronger effect among children participating in frequent VPA. Children who were less active were slightly more likely to report that their injury occurred while walking or running, not for sport purposes ( $p<0.001$ ) (Table 2).

**Table 2**

Activity during which the most serious injury occurred, by level of physical activity, among schoolchildren reporting an injury (percentages)

Activity	MVPA		VPA	
	No	Yes	No	Yes
Cycling	10	11	12	9
Playing sport	33	41	25	42
Skating	6	8	6	7
Walking/running (not for sport)	13	8	14	10
Riding in/driving a car	3	3	3	3
Fighting	5	6	6	5
Work	2	1	2	2
Other	28	23	32	23

### Injury severity and physical activity

Further analysis was carried out to explore whether there were differences in the outcomes that young people reported as a result of their injuries between active and non-active children. The two measures used were: injury requiring medical treatment (such as application of a cast, hospitalization or admission to an emergency department); and one or more days of lost activity due to injury.

In relation to needing further treatment for the injury among those injured, no differences were found between the active (at MVPA level (58%)) and non-active children (59%). However, fewer of those participating in higher-level activity (VPA) reported an injury that required further treatment (54%) compared to non-active children (67%). This pattern was reversed when days of lost activity were considered. A higher proportion of the MVPA and VPA groups reported three or more days of activity lost compared to non-active children (35% versus 28%,  $p < 0.00$ ; and 36% versus 28%,  $p < 0.001$ , respectively).

### Physical activity, injury and neighbourhood perception

Previous HBSC research has shown that the environment plays an important part in young people's ability and desire to participate in physical activity and their risk of injury. This research was based on area-level measures (such as rates of unemployment) of the neighbourhood. Here we explore whether individual perceptions of the local area influences (including safety of the locality and SES of the local area) participation in physical activity and injury. We use logistic regression models to observe the independent effects of these perceptions after controlling for age, gender and family affluence.

Table 3 presents neighbourhood perceptions as predictors of daily MVPA and frequent VPA. Although most of the neighbourhood perceptions were statistically significant in predicting daily MVPA, the odds ratios are small. Overall, positive perceptions of the neighbourhood slightly increase the odds of children being physically active daily. However, perceiving the neighbourhood as a good place to live, reporting that the neighbourhood is safe for young children to play and people not taking advantage of them have all predicted lower participation in daily MVPA (although the effect is weak). In relation to frequent VPA, perceiving the local area as being well-off, being able to ask for help from people and people not taking advantage were the only neighbourhood perceptions that were associated with frequent VPA, all predicting higher levels of participation.

**Table 3**

Neighbourhood perceptions predicting involvement in physical activity – models of logistic regression (odd ratios)

Perceptions	MVPA– daily	VPA – frequent
Local area is quite or very well-off	1.12**	1.22***
I always feel safe in my local area	1.14**	0.98
The local area is a good place to be in	0.88*	1.01
Most people in my local area say “hello”	1.10*	1.10*
It is safe for young children to play outside in my local area	0.90*	1.09*
I can trust people in my local area	1.00	0.96
There are good places to go to in my local area	1.14**	1.01
I can ask for help in my local area	1.15**	1.22***
People in my local area do not take advantage	0.91*	1.28***
Number	20 293	20 440

\*  $p \leq 0.05$ \*\*  $p \leq 0.01$ \*\*\*  $p \leq 0.001$ 

Table 4 presents neighbourhood perceptions as predictors of medically attended injury in the past 12 months, injury treatment and loss of activity due to injury. Of all the injury measures, neighbourhood perceptions mainly predicted the overall measure – medically attended injury. Not feeling safe in the neighbourhood, not perceiving the local area as a good place, and having most people in the local area saying “hello” all increased the risk of injury. Not having good places to go to predicted injury that required treatment. None of the neighbourhood perception measures predicted loss of activity due to injury.

**Table 4**

Neighbourhood perceptions predicting injury – models of logistic regression

Perceptions	Medically attended injury	Injury requiring treatment	Loss of activity (3+ days)
Local areas is quite or very well-off	1.07*	0.91	1.07
I always feel safe in my local area	0.82***	1.12	1.17
The local area is a good place to be in	0.83***	1.41	1.17
Most people in my local area say “hello”	1.23***	0.88	0.89
It is safe for young children to play outside in my local area	0.97	0.90	1.08
I can trust people in my local area	0.95	0.96	0.89
There are good places to go to in my local area	1.03	0.76**	0.93
I can ask for help in my local area	1.05	0.87	0.95
People in my local area do not take advantage	0.97	1.24*	0.93
Number	20 563	2 320	2 316

\*  $p \leq 0.05$ \*\*  $p \leq 0.01$ \*\*\*  $p \leq 0.001$ 

## Discussion

This background paper has aimed to summarize what is known about the predetermining factors associated with participation in physical activity and risk of injury among 11–15-year-olds using existing published research and new analysis of the 2005/2006 HBSC data set.

The review of published papers suggests that the majority of students do not participate in regular physical activity, that boys are more active than girls, that children from affluent families tend to be more active, and that older children are less active

than younger children. In addition, trend analyses included in this review gave no indication that physical activity was in decline.

Data on injury suggest that here, too, boys and younger children are at higher risk for injury. Children from affluent families reported more injuries, but this was mainly found in relation to sport/recreation-related injury, while children from less-affluent families were more likely to report other types of injuries (through, for instance, walking or running (not for sport), cycling and fighting). Other risk factors for injury included involvement in risk behaviours and participation in physical activity.

There were varying patterns of both injury and physical activity across countries. When multilevel analysis was applied, area-level measures were not found to predict injury, although good school facilities and physical activity policies were found to be associated with higher rates of physical activity in school. For injury, poor socioeconomic measures at area level were associated with increased level of injuries, but more-affluent areas were associated with increased levels of sport-related injury.

The new analysis presented in this paper supports previous findings (42,43) which suggest that students who are more active are also more likely to report an injury and to report that their injury was sustained while doing sport and in sport facilities. Students who are not active are more likely to be injured in the home or while running or walking not for sport purposes. Other injury locations or activities were found to be similar across active and non-active children. In relation to the consequences of injuries, injuries that require treatment in emergency departments, hospitalization or application of a cast are more evident among non-active children, although no differences are evident in relation to activity loss due to injury.

Interestingly, while the injury literature highlights the unequal distribution of injury, with people from lower socioeconomic classes being at higher risk, findings in HBSC suggest a different pattern. HBSC findings present a U-shaped pattern, with higher injury prevalence in children from both low and high socioeconomic groups. Further investigation into the types of injury revealed that only sport-related injuries were more prevalent among affluent children, while other types of injury were prevalent among less-affluent children. This coincides with the increased involvement of affluent children in physical activity, making affluent children more exposed to injury.

Previous studies have also shown that severe injuries were more prevalent among children with low family affluence. This coincides with our finding on the severity of injuries among non-active children. The findings reviewed here and the current analysis both suggest that although physical activity is a risk for injury, it is not a risk for severe injury. Home injuries that were slightly more prevalent among less-affluent children could be the result of unsafe environments. Many interventions exist to tackle home-related injuries that are more prevalent among disadvantaged populations, such as fires, falls and poisoning. These interventions can be applied at individual, family and community level and are important in targeting these populations.

Lastly, data presented here show very little evidence for environmental influence on both injury and physical activity. While previous studies had not provided evidence for neighbourhood-level measures in predicting physical activity, such evidence does exist in relation to injury. Yet previous studies used small area statistics from the country's census to calculate neighbourhood-level measures, while in this paper, we examined individuals' perceptions of the local area. In this study, individual-level data contributed very little to our understanding of physical activity participation, or to identifying risk for injury.

## Strengths and limitations

The HBSC study offers a unique opportunity for cross-country investigations. The standardization of methods allows an extensive study into the health and health behaviours of schoolchildren across Europe and North America. Yet, being a self-administrated study, there is a potential for a self-report bias. The HBSC instruments are subjected to constant extensive and vigorous piloting and validation efforts, but the possibility of biased reporting motivated by a desire to provide socially desirable responses must be recognized.

Additionally, the HBSC study is of a cross-sectional design which does not allow us to explore the true causal, allowing only

study of associations. Although the associations between physical activity and injury are strong, these data are unable to indicate the direction of the associations or offer a causal explanation for the results.

Lastly, it should be noted that some of the measures used in the analysis presented here come from optional packages available to countries participating in the HBSC study. The findings are based on data from only five countries that opted to include items relating to injury circumstances and consequences. This obviously limits our ability to make judgements about the consistency of relationships across all European countries.

## Conclusions

The risk of injury and lack of physical activity are both important health issues for young people. This paper shows that a sizeable proportion of children are injured every year, while a relatively small proportion of children are physically active. The findings show a clear link between medically attended injury and participation in physical activity: the risk for injury increases with increasing levels of physical activity. However, severe injuries are more common among non-active children, even if their overall risk for injury is lower.

Sports-related injuries are perhaps easier to address. The findings clearly suggest that active children are injured in sport facilities while doing sport; creating safer playing environments can consequently reduce that particular type of injury. Home-related injuries, in contrast, are harder to address and require an assumption of greater societal responsibility to ensure that the home environment, including building safety standards and the safety of consumer products, lead to inherently safer environments, and that vulnerable population groups (such as children living in disadvantaged areas) receive appropriate assistance and support so that injury in the domestic environment can be prevented through evidence-based interventions.

Although the literature and, indeed, this paper show associations between physical activity and injury, the less-severe nature of those injuries clearly suggests that the benefits of physical activity outweigh the risk for injury. All steps should be taken to maximize opportunities for children and adolescents to be physically active.

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# Environmental inequalities among children and adolescents: a review of the evidence and its policy implications in Europe

Gabriele Bolte,<sup>1</sup> Martina Kohlhuber,<sup>1</sup> David O. Carpenter,<sup>2</sup> Giorgio Tamburlini<sup>3</sup>

<sup>1</sup>Department of Environmental Health, Bavarian Health and Food Safety Authority, Oberschleissheim, Germany

<sup>2</sup>Institute for Health and the Environment, University at Albany, Rensselaer, New York, United States.<sup>3</sup>Institute for Child Health, IRCCS Burlo Garofolo and Centro per la Salute del Bambino - onlus, Trieste, Italy

## Summary

During the past decade, the impact of socioeconomic inequalities in the living environment and in exposure to environmental pollution has increasingly been recognized as a major contributing factor in the production of health inequalities. Likewise, awareness of the importance of children's environmental health has increased. Consequently, protecting children from undesirable environmental exposures by taking socioeconomic conditions into account has been identified as a policy priority area in Europe.

This review aims to identify and discuss environmental inequalities among children and adolescents in Europe.

### Review methods/data

A systematic literature search of various data bases was conducted. Further sources for information were reports by WHO, the European Union (EU) and other organizations and drafts of topical review papers prepared in 2009 as working documents for the WHO expert meeting.

Inclusion criteria for publications were: data from Europe published since 2000, age group 0–18 years, socioeconomic factors considered as influencing factors, not merely as confounder.

Results were summarized according to the conceptual model that socioeconomic factors may impact on environmental health by the pathways exposure variation and effect modification.

### Results

Most of the available evidence shows that a low socioeconomic position is associated with increased exposure of children/adolescents to inadequate housing and residential conditions and less opportunities for physical activity. At community level, hazardous waste sites and illegal waste disposal are disproportionately located in more-disadvantaged areas. Socially disadvantaged children are more likely to be exposed to mainly traffic-related air pollution, noise, lead and environmental tobacco smoke. Scientific data on the impact of socioeconomic factors on water pollution/sanitation and on occupational exposures/working conditions of children and adolescents in Europe are lacking. There is clear evidence that children from low socioeconomic positions and from less affluent areas tend to sustain or die from injury to a greater extent than others.

For most topics and exposures reviewed here, there were no studies investigating the modification of the exposure–response function by socioeconomic factors.

Due to a variety of methodological approaches and studies on one hand, and lack of data for many topics and countries on the other, it was not possible to quantify the magnitude of environmental inequalities among children and adolescents in Europe.

### Conclusions

Though patterns of environmental inequalities may vary across populations and countries, the overall pattern based on the available fragmentary data is that children living in adverse social circumstances suffer from multiple and cumulative



exposures, are more susceptible to a variety of environmental toxicants and often lack environmental resources or access to quality health care to reduce the health consequences of environmental threats. Action is needed along the entire causal pathway of the social divide in environmental hazards with priority being given to policy measures aiming to remove socially determined differences in environmental conditions.

## Introduction

At the start of the 21st century, all European countries are faced with substantial inequalities<sup>1</sup> in health within their populations. People with lower levels of education, occupation and/or income tend to die at a younger age and have a higher prevalence of most types of health problems (2,3).

Health inequalities are one of the main challenges for public health throughout Europe, and there is a great potential for improving average population health by eliminating or reducing the health disadvantage of lower socioeconomic groups (4). It has become apparent in recent years that an increasing number of children are socially disadvantaged not only in poor societies, but also in rich countries in Europe, and that social inequalities are widening. Social and economic policies have a determining impact on whether a child can grow and develop to his or her full potential and live a flourishing life, or whether his or her life will be blighted (5).

The precise ways in which the social determinants of health operate are an area of considerable research interest. While the general relationship between social factors and health is well established, the relationship is not precisely understood in causal terms (6). It can be assumed that the pathways of influence are likely to be complex. In a common framework of interpretation, socioeconomic factors are regarded as distal causes, with their effects mediated by more proximal causes such as material living conditions, psychosocial factors, health-related behaviour and access to health and social services (7).

During the past decade, the impact of socioeconomic inequalities in the living environment and in exposure to environmental pollution has increasingly been recognized as a major contributing factor in the production of health inequalities (8–10). Basically, socioeconomic factors may affect environmental health in two ways (7,11).

First, exposure to environmental burdens (environmental “bads”), as well as access to environmental benefits and resources (“goods”), may differ according to socioeconomic position (**exposure variation/exposure differential**). Disadvantaged communities often face greater likelihood of exposure to ambient hazards. From a global perspective, the concept of exposure variation can apply to communities where those at a perceived disadvantage – whether due to their socioeconomic position, gender, ethnicity, immigration status, lack of land ownership, geographic isolation, political power or other characteristics – puts them at disproportionate risk of being exposed to environmental hazards.

Second, given a certain level of harmful environmental exposure, socioeconomic factors may modify the health effects by influencing individuals’ vulnerability (**effect modification/susceptibility differential**). Factors such as nutrition, existing medical conditions and access to health care, to transportation or to resources (such as fresh foods) have been suggested as vulnerability factors that link social conditions with environmental hazards. These vulnerability factors characterize differential preparedness and differential abilities to recover from exposure to environmental hazards. Psychosocial stress has been proposed to be a key component. When not counterbalanced by resources, place-based and individual-level stressors may lead to increased vulnerability to environmental exposures (12,13).

WHO has further expanded this conceptual model by distinguishing within the pathway “exposure variation” between socioeconomic variation in environment conditions, and socioeconomic differences in exposure (1). In this framework model of the influence and effects of environmental inequalities, socioeconomic differences in exposure may occur due to mechanisms of education and health awareness. For example, having a gas heater at home does not necessarily lead to relevant exposure if operated correctly. Another example is that living in an urban area with high levels of air pollutants does not necessarily mean greater exposure to these air pollutants. Forastiere et al. (14) argued for the situation in Rome

<sup>1</sup> In this review, the term “inequalities” is used for mere description of socioeconomic differences in environment and health between groups of people without any further valuation (1).

that, though people with a higher socioeconomic position lived more often in areas with higher air pollution, their exposure may not be higher because they were more likely to have second houses outside the city and spend less time in their urban neighbourhood.

This basic conceptual model of the relationship between socioeconomic position, environmental quality and health is assumed to be valid globally. It has to be underlined that environmental inequalities have several dimensions: inequalities among population groups within a country or urban area, inequalities across countries and inequalities between generations (15).

Awareness of the importance of children's environmental health has been increasing during past years. The study of the burden of disease attributable to environmental factors among children and adolescents in Europe showed that large proportions of deaths and DALYs are attributable to the selected environmental factors of outdoor and indoor air pollution, inadequate water and sanitation, lead exposure and injuries, with pronounced differences between European subregions (16).

Consequently, protecting children from undesirable environmental exposures has been identified as a policy priority area in the Declaration (17) and CEHAPE (18) adopted at the Fourth Ministerial Conference on Environment and Health held in Budapest in 2004. As stated in the CEHAPE, "children's exposure to environmental hazards is influenced not only by the state of the physical environment but also by socioeconomic conditions and individual and group behaviour" (18). The CEHAPE therefore recommends poverty reduction in terms of policies addressing the multidimensional aspects of poverty among children as one effective action for protecting children's health.

The joint report of the European Environment Agency and the WHO Regional Office for Europe, a review of evidence on children's health and environment published in 2002, pointed to the growing evidence throughout Europe that the most disadvantaged groups, with children and pregnant women among them, suffer from the worst environmental conditions (15). It seems to be a common pattern that poor children are confronted with widespread environmental inequalities in terms of accumulation of multiple environmental risks (19). The cumulative risk of exposure due to substandard housing and insufficient physical structure and infrastructure of the immediate environment can contribute both directly and indirectly to a variety of adverse health outcomes (20). However, major gaps still remain in the knowledge of the magnitude and distribution of the environmental burden of disease and of environmental inequalities among the young (21).

Based on the assumption that environmental factors and socioeconomic factors are inextricably intertwined, the impact of socioeconomic factors on environmental exposures and children's health in Europe has recently been reviewed within the EU-funded network PINCHE (Policy Interpretation Network on Children's Health and Environment) (7,11). PINCHE focused on the four themes of indoor and outdoor air pollution, carcinogens, neurotoxicants and noise. Key results were that there was a lack of information to evaluate and quantify the effect of socioeconomic factors on environmental exposures and children's health in Europe, especially eastern Europe. The common pattern based on the available fragmentary data was that in most cases, there is evidence of an inverse social gradient, with increased exposures and health disturbances in children of lower socioeconomic position. For a child, living in circumstances of low socioeconomic position is a proxy for multiple environmental exposures.

## **The unique vulnerability of children and adolescents**

"Children" is a term commonly used to describe individuals from birth until puberty, while "adolescence" is considered to be from puberty to age 18 or 20. But there are many different developmental stages over this period of time, and these differences must be recognized in evaluating vulnerability.

Exposure during the development of an organ system is likely to result in more harm and less reversible harm than comparable exposure later in life (22,23). While growth and development occurs over this full age range, it occurs more rapidly during the embryofetal period and in the early years of life, and because organ systems are developing more rapidly at this period the vulnerability is greater than in older adolescents.

Several factors must be considered when approaching the issue of social inequalities with regard to children.

The first is that children, by virtue of the fact that their organs and systems are still developing, are more vulnerable in general than are adults to environmental exposures (windows of vulnerability (15)). As a consequence, they suffer from health consequences that have no counterpart in adult life.

Second, children are more frequently exposed than adults to a variety of environmental toxicants. As is well known, very young children breath more air, drink more water and eat more food per unit of body weight older child or adults, and consequently the intake of toxicants from the same environment can be higher in young children (24). Young children also tend to have a living area closer to the ground or floor, resulting in a somewhat different exposure to some air pollutants or to contaminated soil.

Third, children's metabolic pathways, especially in fetal life and in the first months after birth, are immature. Children's ability to metabolize, detoxify and excrete environmental agents therefore differs from that of adults (25).

Fourth, early exposure gives sufficient time for long-latency agents to produce adverse health effect (this is typically the case for cancer (26)), or to produce early modifications that lead later to health disturbances such as respiratory disease (27) or hypertension (28,29).

Finally, children are less aware of the risks and have less control over their environment than adults.

Consequently, social inequalities impart a disproportionate elevation in hazard to disadvantaged population groups at all ages, but again this is particularly true for children from poor households and disadvantaged communities. The peculiar vulnerability of children to environmental agents acts by multiplying the effects of social inequalities.

## Aims

The starting point of this review is the results of previous reviews indicating major gaps in knowledge, especially a lack of information to evaluate and quantify the effect of socioeconomic factors on environmental exposures and children's health in Europe (see, for example, 7,30). This review therefore aims to identify and discuss social inequalities in children's environment and health in Europe by re-evaluating the current evidence base for environmental inequalities among children and adolescents in Europe.

Key issues are housing/built environment, air pollution, water pollution, waste, and unintentional injuries.

Though this review concentrates on the period from birth until adulthood, it is acknowledged that prenatal development is also an important critical window for exposures (31).

Specifically, the aims are to:

- summarize the evidence on the aforementioned key issues from peer-reviewed publications, international reports and the drafts of topical review papers prepared in 2009 for a WHO expert meeting;
- summarize the evidence on diverse socioeconomic indicators;
- summarize the evidence on the magnitude of environmental inequalities among children and adolescents;
- identify mechanisms through which social inequalities in environmental exposures and health effects develop;
- identify the most affected social groups;
- identify specific settings in which unequal distributions of environmental risks occur; and
- discuss the policy implications using a public health approach.

## Review methods/data sources

The literature for this review was retrieved from three sources:

1. a systematic literature search of reviews and original articles published in peer-reviewed journals;
2. international reports by WHO, EU and other organizations; and
3. the drafts of topical review papers prepared in 2009 for the WHO expert meeting on “Environment and health risks: the influence and effects of social inequities”.

### Systematic literature search

A systematic literature search was conducted in May 2009 in the Medline database, in Science Citation Index, Current Contents, SocINDEX and PsychINDEX. In the Medline database the search was conducted with the MeSH Terms “socioeconomic factors” AND “environmental pollution” OR “housing” OR “accidents” OR “lead”. Furthermore, the keywords “sanitation”, “waste”, “environmental justice” and “social justice” were searched in all fields. To exclude articles regarding adults, the search was always conducted with the MeSH Terms “child”, “child, preschool”, “infant” and “adolescent”.

Current Contents, Science Citation Index and PsychINDEX were searched with the keywords “child” AND “socioeconomic” OR “social” AND “environment”.

SocINDEX was searched with the keywords “child” AND “environmental pollution” OR “environmental justice” OR “environmental exposure”.

The focus of the literature search was therefore on the two basic mechanisms of exposure variation and effect modification by socioeconomic position. It was specifically searched neither for social inequalities in children’s health nor for policy papers or intervention studies.

Gender inequalities in environment and health are discussed in another review prepared for a WHO expert meeting (32).

### Screening of abstracts

Abstracts were further evaluated by using the following inclusion criteria:

- original studies conducted in Europe (including countries of the former USSR and Israel) or reviews;
- English language, published since 2000;
- age group 0–18 years (children and adolescents);
- socioeconomic differences in children’s environmental exposures or environmental health at an individual or area level described in the abstract (the mere inclusion of indicators of socioeconomic position as potential confounder in analyses or the description of the sociodemographic characteristics of the study population was not sufficient); and
- exposures: outdoor and indoor air pollution, including environmental tobacco smoke, lead, noise, housing/built environment (also impact of built environment on physical activity), water pollution, waste and other environmental exposures, and unintentional injuries (such as road traffic accidents, poisoning, drowning, injuries due to fire or falls).

In total, 674 abstracts were eligible for further evaluation after the first screening of the publications identified by the initial systematic literature search. After evaluation of the abstracts, 134 publications remained for further analysis.

An overview of the literature search and the results is given in Appendix A.

## Reports

Major reports published by WHO, the European Environment Agency (EEA) or other institutions since 2000 were collected in May 2009, based on a search of the relevant homepages of these institutions.

Inclusion criteria for reports were:

- published since 2000;
- thematic focus on children's (environmental) health in Europe or health inequalities or environmental conditions/exposures; and
- published in English.

An exception was made by inclusion of the report *Socioeconomic factors and environmental exposures in Germany* (30) in order not to exclude all the evidence published in German only.

A list of all reports considered for this review is given at Appendix B.

## Topical review papers

Drafts of topical review papers prepared in 2009 as working documents for the expert meeting were obtained from WHO in July 2009. These review papers covered the topics of housing and residential location (33), ambient air quality (34), waste management (35), unintentional injuries (36) and working environment (37).

Evidence of social inequalities in children's environments and health given in these review papers was extracted.

## **Summary of empirical evidence on social inequalities in children's environmental conditions in Europe**

The following sections are structured according to the two basic mechanisms of exposure variation by socioeconomic factors (exposure differential) and effect modification by socioeconomic factors (susceptibility differential).

### **Housing and built environment as an overall topic**

Housing and built environment are cross-cutting issues consisting of aspects such as quality of housing (such as temperature, ventilation, dampness, moulds, vermin), indoor air pollution (due to heating and cooking), outdoor air quality, noise exposure, water quality, flooding, proximity to waste sites, lack of green space, road safety and crime, community cohesion, access to facilities and factors encouraging physical activity. Poor housing conditions are strongly correlated with disadvantaged socioeconomic positions and housing is therefore often used as a proxy for the socioeconomic position (38).

The built environment and housing conditions can have a significant impact on health and health inequalities. According to the CSDH, "communities and neighbourhoods that ensure access to basic goods, that are socially cohesive, that are designed to promote good physical and psychological well-being and that are protective of the natural environment are essential for health equity" (5).

### Exposure variation

Most of the studies on housing in several countries demonstrated that poor and less affluent population groups are most exposed to environmental risks within the private home (including biological and chemical contamination, temperature problems, sanitary equipment) as well as within the residential context (closeness to polluted areas, lack of urban amenities and public safety, neighbourhood incivilities such as litter) (33). Deteriorating housing conditions were observed, especially in eastern Europe.

Specific data on children for some of these housing issues are given elsewhere in this review and have been summarized in the report for the EU project PINCHE (7).

A recent review of the evidence on environmental inequalities in Germany confirmed this overall pattern of more adverse housing conditions in socially disadvantaged areas (30). For example, single-oven heating, crowding, damp housing and living near roads with heavy traffic were associated with a lower socioeconomic position in several cross-sectional studies in school beginners (39–41).

Social differences were repeatedly reported for biological indoor pollutants such as allergens and endotoxins in house dust, but the results are mixed. While exposure of children to the cat allergen Fel d 1 seems to be higher in families with a low socioeconomic position, exposure to the dust mite allergen Der f 1 seems to be more common in families with a high socioeconomic position (30,42). The dust mite allergen Der p 1 is known to be positively correlated with dampness in homes. Since studies from several countries indicated that dampness in homes is more common in lower socioeconomic positions, social differences of exposure to Der p 1 are likely, too.

In the United States there is evidence that homes in high-poverty areas and families with a low income or with a low maternal education are more likely to have high levels of cockroach, rat and mice allergens but lower levels of dust mite allergens (7). However, the housing conditions in Europe vary widely between the countries and from those in the United States.

Data from Germany indicated that parents with a lower socioeconomic position felt impaired more often by a lack of accessible green space in their living environment in both urban and rural settings (41).

The evidence from industrialized countries (not further specified for children) suggests that opportunities for physical activity are often determined by individual socioeconomic status and by the socioeconomic determinants in the neighbourhood in which people live. Socially disadvantaged people and those who live in neighbourhoods of lower socioeconomic status (disadvantaged areas) may have limited opportunities for physical activity (43).

A study in the Netherlands showed that children's physical activity was associated with certain modifiable factors of the built environment such as the proportion of green space, residential density and general rating of activity-friendliness of the neighbourhood (44).

Fear of traffic can be a powerful deterrent to parents in allowing their children to walk or cycle to school or play outdoors, especially in disadvantaged areas, because poorer children are more likely to live in urban areas with poor road safety and high-speed traffic (45). Characteristics of the built environment such as heavy traffic in residential areas and living in segregated marginalized neighbourhoods shorten the radius within which children can be active and reduce the activities in their living space. Resources like parks, green areas and free playing areas which encourage physical activity and so indirectly influence health behaviour and status are rare in sociostructurally disadvantaged residential areas; even when they are available, quality is usually low (46).

Ellaway et al. (47) showed that in Glasgow, United Kingdom (Scotland), more play areas per total population as well as per child were found in disadvantaged districts as measured by the Carstairs index (containing crowding, unemployment, social class and car ownership). This result contrasts with data on sporting facilities in Glasgow. However, it is not clear whether the playgrounds in disadvantaged areas are sufficient to compensate for a probable lack of private gardens in the more affluent areas. Also, the quality of the playgrounds was not assessed in depth.

A recent review on built environment and health inequalities in the United Kingdom argued that “a main issue is the lack of space for children to play as they get older with a concentration on environmental problems in the surrounding areas and a sense of insecurity on streets, in parks and play areas” (48).

There is some evidence in Europe that ethnically marginalized children tend to live, play and go to school in more environmentally hazardous areas. This has been described especially for central and eastern Europe (49,50), but also, for example, for five camps of Roma people in Italy in terms of conditions such as overcrowding, stagnant water in the camp, use



of wood-burning stoves and insufficient sanitation (lack of access to water and toilets) (51).

Fairburn & Braubach (33) summarized the evidence on housing inequalities among children by giving the following three key messages:

1. The main cause of inequality of housing and residential location affecting children is related to the social status, and mostly the income and the economic resources of the households ... .
2. In most of the cases, low social and economic resources of their families are associated with increased children's exposure to inadequate housing and residential conditions (such as noise, indoor and outdoor air pollution, crowding and, to some extent, lack of access to green spaces). In less developed countries, water and sanitation concerns become fundamental as well. However, there are some examples showing that the burden of unequal distributions is not by default to the disadvantage of the poor population subgroups, as some exposures (especially in relation to indoor contamination) tend to be more frequent for high-income households. Nevertheless, the overwhelming proportion of relatively increased exposures is definitely faced by the poor.
3. Almost all described exposure situations relate to the building and the neighbourhood, where children are affected as all other household members although – depending on behaviour and time spent at home – some variation in exposure can be possible.

#### Effect modification

No studies were identified that investigated the modification of the exposure–response function in terms of housing/residential location and health outcomes by socioeconomic factors among children and adolescents in Europe.

#### **Indoor air quality: the case of environmental tobacco smoke**

##### Exposure variation

The evidence on social inequalities in children's exposure to environmental tobacco smoke (ETS) in Europe published until 2004 has been summarized within the EU project PINCHE (7). It consistently indicates across several countries that social disadvantage is associated with a higher, or rather more frequent, prenatal and postnatal exposure of children to ETS.

More recent studies further support this finding. A study of 245 schoolchildren in Liverpool, United Kingdom (England) showed that low SES of the household was a risk factor for childhood ETS exposure (52). Low parental educational status was associated with a higher prevalence of children's ETS exposure at home in a study with 1737 preschool children in Tyrol, Austria (53).

In Germany, ETS exposure is more frequent among socially disadvantaged children (review of the evidence published until 2007 and including results of the German Environmental Survey 2003–2006 (GerES IV) for Children (30)). Two recent studies provided more data: in a cross-sectional study of 968 preschool children living in a restricted area of North Rhine-Westphalia, Germany, Hoffmann et al. (54) found that more children from underprivileged social groups, characterized by low parental educational attainment, foreign nationality or immigration background, unemployment and relative poverty, were exposed to ETS. Low parental education, unemployment, low household equivalent income, non-German nationality and single-parent family were independently associated with children's ETS exposure at home in two surveys of 12 422 preschool children conducted in 2004–2006 in three urban and three rural areas in Bavaria, Germany (55).

Many studies reviewed here used questionnaire data and parental reports on smoking habits in the child's home, which may be biased. However, studies in several European countries using human biomonitoring to assess exposure more objectively (such as measurement of cotinine) confirmed that social inequalities in children's exposure to ETS are widespread.

##### Effect modification

No studies were identified that investigated the modification of the exposure–response function in terms of ETS exposure and ETS-related health outcomes by socioeconomic factors among children and adolescents in Europe.

## **Water/sanitation**

### Exposure variation

The WHO report *Children's health and environment* (56) summarized that:

Biologically contaminated water causes a range of waterborne diseases. A variety of known viruses, bacteria and parasites can contaminate drinking-water and cause gastrointestinal diseases in infants and young children. Mortality and morbidity due to waterborne gastrointestinal diseases – mainly those that cause diarrhoea – are still high in countries and communities where a substantial proportion of the population lacks access to clean water and proper sanitation. This is the case in many countries in the European Region, particularly in south-eastern Europe, the Caucasus and central Asia, and for a significant number of disadvantaged minority groups in other countries in the Region.

The search for the keyword “sanitation” gave mainly papers on the fluoridation of water and children’s dental health which were not included in this review. No literature was found that studied the topics “water and sanitation” in connection with socioeconomic position in a general population in Europe. Only one study has been identified on health problems in small disadvantaged minority groups, like Roma children living in camps in Italy, with lack of water and insufficient sanitation (51).

### Effect modification

For the topic water and sanitation, there are no studies on effect modification by socioeconomic positions.

## **Waste**

### Exposure variation

As with the topic water and sanitation, the systematic literature search identified no studies. Reports (21,57) and Martuzzi et al. (35) summarized from European data that disadvantaged population groups are more likely to live near waste sites and waste incinerators. At community level, hazardous sites and illegal waste disposal are disproportionately located in more disadvantaged areas. Although there are no specific data, it seems likely that this is also true for children.

According to the topical review paper by Martuzzi et al. (35), the evidence:

... indicates that there is a tendency in poorer, less educated, disadvantaged people or ethnical minorities (highly correlated characteristics) to live closer and be more exposed to waste treatment facilities of any kind; and, in addition, that when adverse health effects due to such proximity are detected, these are compounded (usually multiplicatively) with the effects, also adverse, of social disadvantage.

Ethnic minority groups like Roma communities in central and eastern Europe have been shown to live more often on or near waste sites and floodplains and suffer from lack of provision of basic utilities, including clean running water (50,58).

### Effect modification

Effect modification (that is, interaction between socioeconomic factors and waste exposure) has not been tested and reported (35). The question of whether disadvantaged people, besides being disproportionately exposed to waste-related environmental risk, are also more vulnerable to its impacts, therefore cannot be answered at the present time.

## **Chemicals: the case of lead**

The protection of children against toxic chemicals in the environment is a major public health challenge (25), but scientific evidence on the relationship of socioeconomic position and exposure to chemicals is scarce in Europe. Only a preliminary section on lead is therefore included in this review.



### Exposure variation

Only a few studies on lead exposure and health outcomes in children, such as cognitive ability and development, in east and central Europe could be reviewed within the PINCHE project (7). One reason for this may be that environmental lead poisoning is probably not an issue in western European countries any more, meaning there is a lack of data on environmental lead exposure. Another reason may be that data on lead exposure have been published in the national language only; this may be the case in France, for example.

Lead exposure may still be of concern in some central and eastern European countries due to a poorer maintained environment, worse housing conditions and a lower socioeconomic position, and may pose higher public health concerns than in western countries. For example, a study in Ukraine demonstrated significantly increased blood-lead levels in children of fathers who worked in manual labour jobs. Risk factors for high blood-lead levels were father's occupation and maternal smoking indoors (59).

Overall, reviews of recent data in Europe showed that children from families living in adverse housing conditions or with a lower socioeconomic position have higher blood-lead levels (7,30). In accordance with this, the European Environment and Health Information System fact sheet on blood-lead levels in children (60) mentions poor housing quality and a poor socioeconomic position as among the determinants of higher blood-lead levels in children. However, single studies or certain populations may give conflicting results: for example, a study in Swedish adolescents found no social differences in serum- and blood-lead levels (61).

### Effect modification

Bellinger (62) stated in a review that children growing up in disadvantaged circumstances showed lead-associated developmental deficits at lower blood- or tooth-lead levels than more advantaged children. The deficits were also of greater magnitude in disadvantaged children and the children were less able to compensate or recover from lead-associated neurodevelopmental deficits. Reasons for this effect modification might be co-exposures to other chemicals, genetic and epigenetic processes, nutrition, stress and stimulation by the social environment.

## **Noise**

### Exposure variation

Apart from the literature already reviewed within the PINCHE project (7) and the recent review for Germany (30), no further published studies were identified by the systematic search for this review.

In accordance with the fact that socially disadvantaged families tend to live near busy roads, noise annoyance due to traffic is often higher in people with a lower socioeconomic position (30). The German Environmental Survey 2003–2006 (GerES IV) for Children demonstrated that socially disadvantaged children aged 8–10 years felt annoyed more often by road traffic noise than children in higher socioeconomic positions (63).

In addition to social inequalities in noise annoyance, there are also social inequalities in exposure to noise. A recent study of children living in Munich, Germany showed an association between relative poverty and high traffic noise exposure when estimated by noise maps (64). The report on noise from the Transport, Health and Environment Pan-European Programme (THE PEP) stated that low-income groups in the Netherlands had to deal with more than average high-noise exposure (above 65 dB(A)) and lived less than average in quiet areas (below 50 dB(A)) (65).

A few papers have been published on noise exposure, annoyance and school performance in schoolchildren around Heathrow Airport in west London, United Kingdom (England) (7,66,67). The samples of children were matched by social deprivation, but descriptive results showed that children from high-noise schools were more likely to be non-white and to speak a language other than English as their first language at home. The proportions of children from manual social class households and disadvantaged households were also slightly higher in the high-noise schools.

## Effect modification

Stansfeld et al. (68) pointed out that health effects of environmental or domestic noise may be influenced by socioeconomic factors like deprivation, housing conditions and relationships with neighbours.

The RANCH study on road traffic and aircraft noise exposure and children's cognition and health in schools around airports in the Netherlands, Spain and the United Kingdom gave mixed results for effect modification. On the one hand, there was no effect modification by socioeconomic position concerning the association of aircraft noise exposure at school and impairment in reading comprehension (69,70). On the other, van Kempen et al. (71) reported higher annoyance due to aircraft and road traffic noise at school in children of mothers with higher educational status and the effect of road traffic noise on cognitive tests on episodic memory was stronger for children living in crowded homes (69).

## **Air pollution**

### Exposure variation

WHO air quality guidelines state in the chapter on environmental equity (72) that:

... there is emerging evidence of inequities among the population in adverse health effects due to air pollution, as well as of links between the spatial distribution of pollution sources and the presence of certain population subgroups. ... Data are still limited, but some evidence suggests that people who live, attend school and/or work near local sources such as traffic may ... tend to be of lower socioeconomic position than the general population. Greater relative impacts of air pollution on mortality risk associated with long-term exposure have been seen for persons of lower socioeconomic position, while evidence is mixed for such differences in acute effects on mortality and hospital admissions.

A report on children's environment and health strategy for the United Kingdom indicated that there are inequalities in the distribution of air pollution, with the most disadvantaged areas in England, Scotland and Northern Ireland generally experiencing higher pollutant concentrations. It was supposed that this would be largely due to most disadvantaged communities being in urban areas, which typically experience higher levels of air pollution (73).

For children, recent reviews of data in Europe concluded that children in lower socioeconomic positions live more often in areas with decreased air quality and near streets with heavy traffic (7,30).

Deguen & Zmirou-Navier (34) stated in their review of ambient air quality that children may represent a particularly exposed group and that the exposure contrasts might even be greater among children than among adults. One reason is that outdoor air pollution tends to be more misclassified for the adult population than for children. Another reason is that schools are generally located where the children live, so the air pollution level at school is close to the home level. However, current evidence on social inequalities in children's exposure to air pollutants in Europe is still scarce.

Chaix et al. (74) showed in a spatial scale study located in Malmö, Sweden, a gradient in the exposure of children to nitrogen dioxide (NO<sub>2</sub>) at home and at school: the highest levels were found in children living in low-income areas or residences, and the lowest in high-income areas or residences.

A study in three districts in Moscow, the Russian Federation, demonstrated that children living in a highly polluted area were more disadvantaged (measured by household income and maternal education) than children in a district with low air pollution (75). The main sources of pollution in the highly polluted district were a large oil refinery, heavy traffic and indoor pollution due to ETS and cooking with gas. Children in the highly polluted area also spent more time playing outside.

In Germany, social differences in terms of higher exposure to (mainly) traffic-related air pollution have repeatedly been shown for children (30). Repeated cross-sectional studies in Bavaria, Germany, revealed that children living in poverty in both urban and rural settings were more likely to be exposed to traffic-related air pollution (41). In a study of an industrial "hotspot" area in North Rhine-Westphalia, Germany, Hoffmann et al. (54) found a higher exposure to total suspended particulate matter (TSP) in children living in lower socioeconomic positions, characterized by foreign nationality or immigration background,

low parental education and vocational training, unemployment and poverty.

### Effect modification

Several studies in European countries have been published on the effect of socioeconomic position on the air pollution–health relationship in adults (34). Though studies on different air pollutants, exposure levels and locations suggest disproportionate health impacts for children (34), to our knowledge there is no study explicitly investigating effect modification of socioeconomic position on the relationship between air pollution and health among children in Europe.

One study in Strasbourg, France, included children and adults. Laurent et al. (76) found no clear relationship between area-based socioeconomic position and small-area modelled air pollution (NO<sub>2</sub>, ozone and particulate matter with a diameter ≤ 10 μm (PM<sub>10</sub>)). Children aged 0–19 years lived more often in disadvantaged areas compared to adults aged 20–39. The sales of short-acting beta-antagonist drugs as an indicator for asthma attacks were associated with higher concentrations of atmospheric pollutants but not with socioeconomic position in multivariate analyses. Socioeconomic position did not modify the effect of air pollution on asthma.

Based on data from a study in Mexico on infant mortality (one to twelve months old) and ambient PM<sub>10</sub> levels on days before death, Romieu et al. (77) suggested that both micronutrient deficiencies and concurrent illnesses might decrease immune response and render children of low socioeconomic position more vulnerable to the adverse effects of air pollution.

### **Unintentional injuries**

Social inequalities in unintentional injuries in children (including road traffic accidents, poisoning, drowning and injuries due to fire or falls) have been extensively reviewed in the recent WHO report *Socioeconomic differences in injury risks. A review of findings and a discussion of potential countermeasures* (78) and were summarized for children in the topical review paper (36). The authors emphasized that childhood injuries are one of the major causes of premature death and disability in the WHO European Region (36).

Most of the studies on socioeconomic position and unintentional injuries in children identified by the systematic literature search have already been evaluated in these reviews. This paper therefore does not repeatedly describe single studies, but instead cites the main conclusions of the review on children by Laflamme et al. (36).

The authors summarized the current state of knowledge regarding socioeconomic differences in unintentional injuries among children as (36):

Traffic-related injuries are by far the most studied injury cause, followed by falls and recreational injuries. The studies, though numerous, come from a few high income countries and the evidence at hand is therefore mainly representative of some types of governments, economies, and forms of social stratification. These studies very often show that children from low socioeconomic status and from less affluent areas tend to sustain – or die from – injury to a greater extent than others. This applies to most causes of injury and for several settings (e.g., home, work, transport). Whilst little is known regarding the nature of the mechanisms lying behind those differences, a variety of individual and contextual ones might come into play. These may vary by cause of injury, sex and age group of the child and the setting in which the injury occurred.

Socioeconomic inequalities in injury occurrence and consequences may be due to:

1. differing opportunities for safety
2. differing opportunities to avoid risk
3. differing access to/use of medical care (36).

Likewise, Towner (79) suggested a number of ways in which socioeconomic factors may affect injury risks:

- lack of money (parents may not be able to buy safety equipment, for instance);
- increased exposure to hazardous environments (such as lack of a garden or facilities for safe play);
- inability of parents/carers to supervise children (for example, single-parent families);
- children's attitudes and behaviours (risk-taking); and
- access to information and services.

Laflamme et al. (36:11–13) formulated the specific key messages on children:

**1. There are disparities in several environments – traffic is studied more often.**

Although there is an abundant literature on socioeconomic differences in childhood injuries, the whole injury panorama is unevenly covered. Injuries sustained in the road traffic environment have been extensively covered – and the bulk of the evidence indicates that children from less affluent backgrounds are at greater risk as pedestrians, cyclists, and car riders at all ages. Disparities in those injuries occurring in and around the home (e.g., falls, burns, and poisonings), often sustained among younger children, are far less researched, but there is supportive evidence that they too may be over-represented among children from less affluent background.

**2. Lower status – greater risks.**

Socioeconomic differences in childhood injuries appear to be common, both when all injuries are aggregated and when specific causes or circumstances are considered. Differences arise not only as regards injury mortality but also various severity measures (e.g., hospitalisation, emergency department visits, long bone fractures, head injuries).

**3. Greater severity – greater disparities.**

Studies indicate that the more severe the injury, the greater the socioeconomic differences. In other words, children from households with low socioeconomic status and from less affluent areas tend to die by injury or get severely injuries to a greater extent than others. This has been observed for most causes of injury (e.g., traffic, poisoning, burns) and also for several settings (e.g., home, work, transport).

**4. Variation with age or with setting?**

Not only does the injury panorama vary with age of the child but this may also be the case with the magnitude of the socioeconomic disparities. ... For instance, for some injury causes – and settings – socioeconomic disparities increased with increasing age (e.g., road traffic injuries as car riders and drivers in Sweden). For other causes and in other settings, disparities were relatively constant (e.g., in Trent; admission for fall-related injury and injury of high severity). ...

**5. Few countries contribute evidence.**

The evidence is mainly representative of some types of countries (governments and economies) and does not encompass many forms of social stratification. Within Europe, the bulk of it stems from high-income countries and, most often, countries from the North.

**6. One description does not fit all.**

Despite considerable socioeconomic disparities in injuries of various kinds, it ought to be underlined that not all children from lower socioeconomic status or deprived areas get injured. And not all injured children come from a deprived family or environment. ...

**7. Gender-related socioeconomic disparities under-researched.**

A vast majority of the studies reviewed treated boys and girls in an aggregated manner. It is very likely that, as explained by some authors, although there are considerable gender differences in the risk for children and adolescent to sustain an injury, there are no obvious reasons why socioeconomic affiliation would have different impact of the risk distribution of boys than girls. It is possible that the age of the child matters in this respect but empirical evidence on this is lacking.

### Exposure variation

Laflamme et al. (36:14) described the exposure variation in this way:

One likely explanation for the safety divide is that the higher injury rates for children – and older people – from less affluent areas or families are merely reflection of rather systematic differences in living, commuting and working conditions (compositional differences). ... There are strong reasons to believe that – over and above family attributes – the environment in which children from less affluent families and areas live and develop is intrinsically more hazardous than the one where their affluent counterpart do. ...

In addition to differential environment conditions, Laflamme et al. (36:14) continue:

... [the] concept of differential exposure refers to being unequally exposed to various extraneous sources of danger that can be found in one's environment, such as living, playing, commuting and learning circumstances. When exposure is high, the likelihood of injuries occurring is increased due to one or several of the following mechanisms: more elements of the surroundings can be harmful, the consequences of making mistakes may be more immediately injurious, and injury avoidance is not a primary and conscious aim of all instances (in particular but not exclusively in the very young). Exposure is not only to be measured in the number of hazards but also in the duration of exposure.

### Effect modification

Laflamme et al. (36:15) described the effect modification in this way:

The concept of differential susceptibility links the existence of safety differences between people to their social affiliation. Theoretically, related (dis)advantages may be regarded as either inherited (i.e., genetic predisposition) or under the influence of class attributes (e.g., educational, material, and influential assets).

In the public health sector, this mechanism is often attributed to differences in knowledge and practice and therefore efforts are deployed to provide “people at risk” with information likely to change their safety practice. Although some studies indicate this might be the case, there is an interesting body of knowledge on childhood injuries, mainly in the home, suggesting that the problems faced by people from deprived groups may not be exclusively – or above all – attributable to deficiencies in knowledge and practice.

Affordability, readability and power of influence have been documented as substantial barriers to the uptake of safe practice in economically and socially deprived groups.

### **Occupational setting/working conditions**

Neither the review paper by Brenner on social inequities in working environment and work-related health risks (37) nor the review paper on unintentional injuries by Laflamme et al. (36) gave any data on the relationship between socioeconomic position and occupational exposures in children or adolescents in Europe. No relevant studies were identified by the systematic literature search.

### **Excursion: critical windows of development and the relevance of prenatal exposure**

As specified above, prenatal environmental conditions and exposures were not a topic of this review, which was *a priori* confined to the age group 0–18 years. Nevertheless, the prenatal period is a critical window for exposure and an important factor for children's health. This excursion therefore gives a few examples to illustrate the interplay between socioeconomic position, prenatal environmental exposures and health.

As described above, smoking in general and during pregnancy in particular is more common in mothers living in lower socioeconomic circumstances. Outdoor air pollution is also, in most cases, higher in lower socioeconomic areas. It is therefore likely that the prenatal exposure to ETS and air pollutants affects poorer children more commonly and more severely. In

addition, children who are already exposed prenatally are probably more vulnerable to environmental exposures in the first months and years of life, meaning multiple exposures cumulate over a lifetime.

A few studies on socioeconomic factors, prenatal exposure to ambient air pollution, ETS, polychlorinated biphenyls (PCBs) and dioxins and their health effects on children (including low birthweight and impaired cognitive and motor abilities) were identified in the PINCHE project (7). Prenatal exposure to ETS and air pollution is associated with decreased birthweight, especially among children from lower socioeconomic backgrounds. Asthma and allergic sensitization were also correlated with ETS exposure or prenatal smoking.

In contrast, studies have found that children living in higher socioeconomic circumstances were more exposed to PCBs and dioxins prenatally and during the first months of life (7). The positive association with PCBs/dioxins in maternal blood or milk during pregnancy or shortly after the birth of the child may be due to older age of mothers with a strong educational background and decreasing PCBs concentrations in food and outdoor air in the last decades.

However, consideration of the impact of socioeconomic factors as distal causes on environmental health and the related mechanisms of exposure variation and effect modification is not widespread in this area. For example, the WHO report on the effects of air pollution on children's health and development (80) includes a chapter on intrauterine growth retardation, premature birth, low birthweight and birth defects. Socioeconomic characteristics are merely dealt with as potential confounding factors in the relationship between air pollution and birth outcomes, instead of as distal causes. It is therefore stated that though the socioeconomic characteristics of people living in more-polluted areas can be less favourable than those of people living in less-polluted areas, it is unlikely that the social composition of the study populations confounded the relationship between air pollution and birth outcomes.

The study by Ponce et al. (81) in Los Angeles, United States, which investigated preterm birth risk within a framework reflecting both the social and physical environments, stands as a counterexample. Traffic-related air pollution exposure disproportionately affected low SES neighbourhoods in winter. Furthermore, the effect of traffic-related air pollution on preterm birth risk was most pronounced in low SES neighbourhoods. The susceptibility to preterm birth among vulnerable groups therefore varied by neighbourhood economic deprivation.

## Discussion

### Estimation of relative impact/magnitude of inequalities

At several levels of compiling and evaluating the evidence for this review, insufficient information and bias may have led to an impairment of its significance.

1. Not all recent publications with data on social inequalities in children's environment and health in Europe might have been identified by the systematic literature search. The result of a literature search depends on the assignment of key words and MeSH terms. Furthermore, were excluded articles with the mere statement in the abstract that analyses were adjusted for social factor. We might have lost some information on results which were described in the papers though not summarized in the abstract. In addition, the relative impact of socioeconomic factors cannot be assessed if only effect-estimates adjusted for socioeconomic position are reported. In environmental epidemiologic studies, socioeconomic indicators are mostly regarded as potential confounders and are used for adjustment in statistical analyses rather than for reporting associations with environmental exposures and health. This phenomenon has been described previously (82).
2. There is certainly a language bias because this paper concentrates on studies, reviews and reports published in English and German. Studies published in national languages, especially in countries from eastern Europe, might have been missed.
3. There may be also a publication bias if only studies showing inequalities were published and retrieved in the systematic search.
4. Bias might have already been introduced due to study design: selection bias by socioeconomic position is quite common in epidemiologic studies. There may be an underestimation of the extent of social inequalities in environmental exposures if socially disadvantaged people tend to take part less often. Otherwise, information bias due to underreporting of adverse



environmental conditions by socially disadvantaged people may occur. If people with a higher socioeconomic position report adverse environmental conditions more often or already feel annoyed at a lower exposure level compared to disadvantaged people, then there will be an underestimation of the extent of environmental inequalities.

5. The main obstacle for quantifying the magnitude of social inequalities in environmental conditions is the diversity of concepts and methods to define the socioeconomic position on one hand, and of estimating exposure on the other. Differences between European countries in the conceptualization of socioeconomic position and in educational systems were a particular constraint in quantifying results. Moreover, there is no widely approved method of defining the socioeconomic position of children and adolescents within and across countries. It has to be borne in mind that, as Kelly et al. (6:76) state, the “choice of whether to use absolute or relative measures can affect the assessment of whether a health inequity exists and its magnitude”. Concerning exposure estimates, in studies on air pollution, for example, exposure is either assessed by direct measurement, by modelling using, for instance, traffic counts, or by questionnaire, focusing on issues such proximity of the next main street with high traffic. Exposure to air pollutants of different socioeconomic groups may vary considerably between areas.

Choice of indicators of socioeconomic position, method of exposure assessment and size and choice of a study area may therefore affect the magnitude and even direction of associations observed (83–86).

In conclusion, due to the variety of methodological approaches and studies on the one hand and lack of data for many topics and countries/European regions on the other, it was not possible to make an overall assessment and to quantify the magnitude of environmental inequalities among children and adolescents in Europe.

In accordance with the evaluation, only some of the working documents gave examples for the relative impact/magnitude of inequalities from single studies, but no concluding results. For example, Swedish children were exposed at their residence to  $13.5 \mu\text{g}/\text{m}^3 \text{NO}_2$  (highest neighbourhood income class) versus  $21.8 \mu\text{g}/\text{m}^3 \text{NO}_2$  (lowest neighbourhood income class) (74). Concerning pedestrian injuries, children in disadvantaged areas in the United Kingdom had up to a four times higher risk than children in more affluent areas (36).

This review summarizes the overall evidence (from rather fragmentary data) for common patterns of environmental inequalities among children and adolescents in Europe. However, it has to be kept in mind that the available evidence suggests that patterns of social inequalities vary across populations and countries and that there is therefore a need for some caution in making claims of inequality and avoiding overgeneralization.

For the interpretation of evidence, it has to be considered that not all observed socioeconomic differences in environmental conditions and exposures may have a health impact on their own; socioeconomic differences may be only effective in situations of multiple exposures. Furthermore, the aspect of salutogenic impacts of the environment on children’s health and how environmental resources may counterbalance environmental threats has not been comprehensively studied in the context of social inequalities.

### **Settings relevant for children**

Three settings are especially important for children: the home with its immediate surrounding area, the school or kindergarten environment, and the wider community setting.

Most studies were conducted in the home environment of children. There are only a few publications dealing with the school setting, such as the Heathrow Airport study (66,67) and the study of ambient air pollution at schools in Malmö, Sweden (74).

An example for a community setting is a study in three cities in Ukraine with high exposure to lead (59). Another example for a “hotspot” setting is the study in three highly industrialized districts in the Ruhr Area, Germany (54).

The settings are characterized by multiple (several distinct exposures) and cumulative (single exposure repeated many times) environmental impacts on children.

## Policy implications

As was discussed above, the available information (with the notable exception of information on injuries) is not sufficient to provide quantitative estimates of the dimensions of environmental inequalities among children and adolescents in the European Region. Nevertheless, this review provides compelling evidence of the importance of socioeconomic factors in determining differential health outcomes in children as a result of environmental exposure. The need for action to address environmental inequity,<sup>2</sup> particularly among children, was recognized by the 53 Member States of the WHO European Region at the Fourth Ministerial Conference on Environment and Health held in 2004.

This section builds on the body of evidence provided by the present review and on existing literature on equity in health and offers to policy-makers and public health experts a policy framework to address environmental inequity among children and adolescents.

### Addressing the main causal pathways of environmental inequity among children and adolescents

Actions to address environmental inequity among children may be considered under four main policy approaches, according to their primary aim:

1. policies aimed at reducing socially determined differences in environmental conditions in settings where children live;
2. policies aimed at reducing socially determined differences in individual children's exposure to hazardous environments;
3. policies aimed at reducing socially determined differences in children's susceptibility to specific environmental pollutants and risk factors; and
4. policies aimed at reducing socially determined differences in access to quality diagnostic, treatment and rehabilitation services for children who suffer the health consequences of being exposed to hazardous environments.

#### Reducing socially determined environmental divide in settings where children live

The first policy approach addresses the environmental conditions that often characterize disadvantaged communities, such as the presence of highly pollutant industries, lack of water and sanitation infrastructure, dangerous traffic conditions, lack of safe playgrounds and close vicinity to hazardous waste sites. Actions are aimed at controlling the sources of pollution and environmental risk, which vary across countries and geographic areas: for instance, in the industrial areas of the most developed countries, they usually include heavy road traffic or soil contamination by persistent organic pollutants (POPs) such as PCBs and dioxins; in rural areas, they may include soil and water contamination by pesticides; and in the developing countries of the European Region, they are most likely to include the use of unsafe heating systems and inadequate water and sanitation infrastructure (16).

Controlling the sources of environmental hazard typically requires action at legislative and administrative level, including the development and enforcement of legislation, adequate budgetary allocations, cross-sectoral collaboration and dialogue with those responsible for the pollution or the unsafe environmental conditions (87). An important advocacy role can be played by health professionals and nongovernmental organizations (NGOs).

Due to the amount of the financial investments usually required to modify environmental conditions and the likely existence of conflicting interests within the same communities (such as those of industrial and agricultural workers), actions of this kind encounter several obstacles. Yet, once change is achieved in the environment, it produces sustainable effects for the whole community.

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<sup>2</sup>The term "inequities" is used in the section on policy implications to refer to those inequalities that are avoidable or can be redressed and are assumed to be unjust (1).



National and local authorities in many countries of Europe have achieved experience in addressing environmental issues relevant for children over the last decade (88). The step forward now will be to adopt an equity lens by giving priority to the communities at highest environmental risk which, as it has been previously shown, often coincide with the most socially disadvantaged ones.

#### Reducing socially determined differences in individual children's exposure to hazardous environments

The second policy approach addresses specific exposure patterns, several of which are typical of, if not exclusive to, developing organisms, including during their embryofetal period. It aims at improving information and building awareness within communities and households so that children's exposure to environmental toxicants and risks is reduced. This is achieved by modifying practices and behaviours of both parents and their children with respect to injury prevention, dietary habits, physical activity and exposure to toxicants.

Since behaviours and practices are strongly influenced by social determinants such as household income, access to information, educational level and cultural and religious background (87,89), reducing the social divide requires action through the education sector, the media and, most important, through work within and with the involved communities. Action in this field may be quite effective, even in the short term, but needs continuous efforts to maintain its effect. It should therefore be combined with action to modify and control the sources of environmental risk.

#### Reducing socially determined differences in children's susceptibility to specific environmental pollutants and risk factors

The third policy approach is aimed at reducing children's susceptibility to the action of hazardous substances and settings to which they may be exposed. This can be achieved by, for example, improving infant and child nutrition, starting from pregnancy, as well as by improving early childhood development through appropriate stimulation and play.

As parents and other caregivers are the fundamental mediators of child nutrition and development (56,90), action will essentially be aimed at improving parental knowledge, practice and skills regarding child nutrition and early development and to provide material and social support when necessary.

Examples of action to reduce the consequences of hazardous exposure are ensuring an adequate intake of calcium to decrease lead absorption, avoiding prenatal and postnatal exposure to ETS to reduce susceptibility to acute and chronic respiratory conditions in settings characterized by high air pollution, and promotion of reading aloud to children to counteract the effects of social neglect and exposure to neurotoxicants (91). These actions are clearly remedial and should not imply that little or no action is taken to address effectively the source of risk, or to decrease exposure. They are acceptable within a strategy that aims to remove the environmental conditions that create the hazard to child health and development.

#### Reducing socially determined differences in access to quality diagnostic, treatment and rehabilitation services for children exposed to hazardous environments

The fourth policy approach aims to improve the capacity of the health system to ensure adequate diagnosis and treatment of medical conditions that may arise as a consequence of hazardous environmental exposures, such as injuries, gastrointestinal and respiratory disorders, developmental delays, acute and chronic intoxication, cancer and other health problems (15). Since risk can be reduced but rarely eliminated, it is important that at-risk children can promptly access quality health services without any kind of financial or normative obstacle, including for migrant children, non-accompanied children and refugees. Professionals, both in the education and health sector, should be adequately trained in prompt recognition of early signs, as well as in diagnostic and treatment protocols.

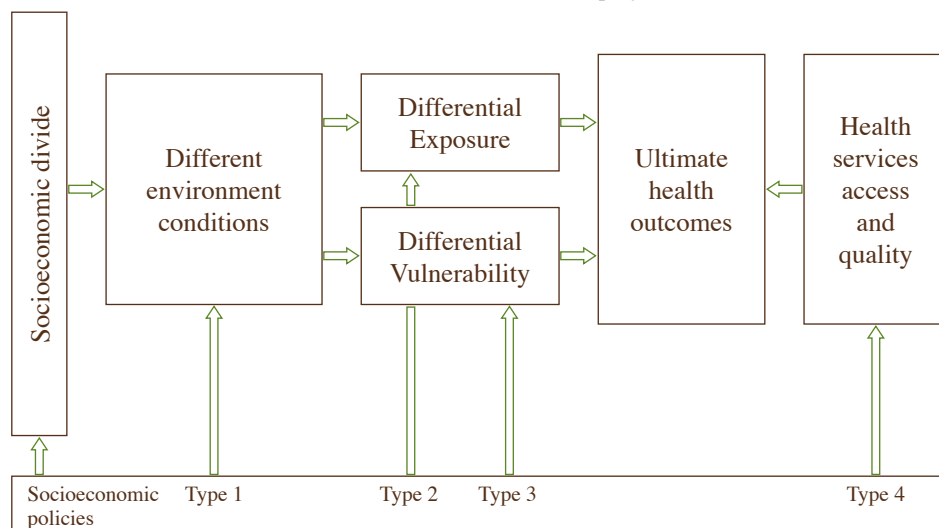
Action is needed along the whole causal pathway of the social divide in environmental hazards, with the priority being action aimed at removing socially determined differences in environmental conditions.

These four policy approaches should be seen as a continuum along the causal pathways of environmental inequity, from the distal socioeconomic causes, to the increased susceptibility and exposure that characterize socially disadvantaged human

beings and children in particular, to the proximal factors related to access and quality of care (Fig. 1).

**Fig. 1**

Policy approaches to address the main causal pathways of environmental inequity (modified from (5))



Type 1 actions, by acting upstream in the causal pathway of environmental risk, generally achieve a stable and sustainable risk reduction and therefore have the greatest long-term preventative potential. Type 2 and type 3 actions have a more limited scope and should not be seen as stand-alone measures. Yet, the potential of nutrition and early child development policies to reduce the susceptibility and effects of exposure to unsafe and unhealthy environments cannot be neglected. Type 4 actions are clearly remedial rather than preventative, although they may still be quite important in saving lives and preventing disabilities in the case of injuries and severe intoxication. Examples of type 1–4 actions addressing the four priority goals of the CEHAPE are provided in Table 1. The table also provides a generic (the responsible authorities may not be the same across the 53 countries included in the WHO European Region) indication of what kind of authorities could be responsible for developing and implementing the relevant policies and interventions.

### **The need for upstream progressive policies to reduce the social divide, starting from the earliest years**

In addition to actions specifically aimed at reducing the social divide in environmental risk, policy-makers should always consider the need for progressive, redistributive social and economic policies (left column in Fig. 1) to improve household income, parental education and welfare systems. Acting in this direction will reduce the social divide both in its magnitude and its consequences (92).

When designing these broad policies, government authorities should remember that children deserve special attention not only because they are at increased risk, but also because the fight against poverty and social inequity should start from investments early in life (5,93). Children living in areas of high environmental risk and belonging to disadvantaged communities should therefore be given priority by national governments and local administrative authorities. International agencies have a specific mission in providing technical and financial support to governments that show commitment in this direction, with particular emphasis on those countries whose children are at higher environmental and health risk (56).

### **The importance of a child-focused equity lens in environment information systems and in information, education and communication activities**

There are two further areas that health policy-makers should pay great attention to if an equity approach to children’s environmental health is to be adopted.

The first and most important is to set up an environment information system with a focus on equity and with child-specific sources of data and indicators. Such a system should allow identification and monitoring of differential exposure across the population groups through monitoring of emissions, concentration of pollutants in various media and by direct biomonitoring of the exposed population, including children and pregnant women (94,95). This information is key to effective action: first, to identify the communities and areas at highest risk; and second, to evaluate the effects of interventions.

In addition, social inequalities in health must be monitored and measured on a national and global scale and public health research must be focused on the socioeconomic determinants of health. This also includes training of policy-makers and health practitioners (5).

**Table 1**

Addressing environmental inequity among children and adolescents in the CEHAPE priority areas: examples of four policy approaches and relevant responsible authorities

POLICY APPROACH	ACTION (EXAMPLES)	RESPONSIBLE AUTHORITIES
<b>RPG: INDOOR AIR POLLUTION</b>		
Reducing sources of pollution in disadvantaged communities and households	<ul style="list-style-type: none"> <li>■ Plan urban development to minimize exposure to pollutant industries and heavy road traffic</li> <li>■ Provision of financial incentives for improved heating systems and safer fuels at household level</li> </ul>	<ul style="list-style-type: none"> <li>■ Local administrative authorities</li> <li>■ National and local legislating bodies</li> </ul>
Reducing exposure at individual level	<ul style="list-style-type: none"> <li>■ Information, education and communication at community and household level on ways to reduce exposure in children with special emphasis on poor communities (such as keeping children and pregnant mothers away from smoke)</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health and environment authorities</li> <li>■ Health professionals</li> </ul>
Reducing susceptibility to pollutants' effects	<ul style="list-style-type: none"> <li>■ Avoidance of prenatal exposure to ETS, fine particulate matter and polycyclic aromatic hydrocarbons (PAHs)</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local legislating bodies</li> <li>■ National and local health and environment authorities</li> <li>■ Health professionals</li> </ul>
Reducing health consequences	<ul style="list-style-type: none"> <li>■ Quality health services for respiratory diseases</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health authorities</li> <li>■ Health professionals</li> </ul>
<b>RPG: WATER AND SANITATION</b>		
Reducing sources of pollution in disadvantaged communities and households	<ul style="list-style-type: none"> <li>■ Improved water and sanitation facilities in poor communities (houses, schools and daycare centres)</li> <li>■ Financial incentives to improve water and sanitation facilities in private houses</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local administrative authorities</li> <li>■ National and local legislators</li> </ul>
Reducing exposure at individual level	<ul style="list-style-type: none"> <li>■ Information, education and communication on ways to reduce exposure in children (such as washing hands, etc.), with special emphasis on poor communities</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health and environment authorities</li> <li>■ Health professionals</li> </ul>
Reducing susceptibility to pollutants' effects	<ul style="list-style-type: none"> <li>■ Improve infant and young child nutrition</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health authorities</li> <li>■ Health professionals</li> </ul>
Reducing health consequences	<ul style="list-style-type: none"> <li>■ Quality health services for diarrhoeal diseases</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health authorities</li> </ul>

<b>POLICY APPROACH</b>	<b>ACTION (EXAMPLES)</b>	<b>RESPONSIBLE AUTHORITIES</b>
<b>RPG: CHEMICALS</b>		
Reducing sources of pollution	<ul style="list-style-type: none"> <li>■ Ban lead from gasoline, implement ban on PCBs and other POPs</li> </ul>	<ul style="list-style-type: none"> <li>■ International agreements</li> <li>■ National legislators</li> </ul>
Reducing exposure at individual level	<ul style="list-style-type: none"> <li>■ Information, education and communication on ways to reduce exposure in children (such as monitoring PCB content of soil and food and advising accordingly), with special emphasis on poor communities</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health and environment authorities</li> </ul>
Reducing susceptibility to pollutants' effects	<ul style="list-style-type: none"> <li>■ Improve early child development by appropriate parental practices to reduce susceptibility to adverse neurodevelopmental effects caused by postnatal exposure to neurotoxicants</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health and education authorities</li> <li>■ Health professionals</li> </ul>
Reducing health consequences	<ul style="list-style-type: none"> <li>■ Train health professionals in early recognition of signs and symptoms of lead intoxication</li> <li>■ Implement biomonitoring in at-risk populations</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health and environment authorities</li> </ul>
<b>RPG: PHYSICAL ACTIVITY</b>		
Reducing adverse environmental conditions	<ul style="list-style-type: none"> <li>■ Improve availability of playgrounds and safe walking or cycling paths to school</li> </ul>	<ul style="list-style-type: none"> <li>■ Local administrative authorities</li> </ul>
Reducing exposure at individual level	<ul style="list-style-type: none"> <li>■ Promote physical activity and reduce time of exposure to TV and computer screens</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health authorities</li> <li>■ Health professionals</li> </ul>
Reducing susceptibility to risk factors	<ul style="list-style-type: none"> <li>■ Improve infant and young child nutrition</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health authorities</li> <li>■ Health professionals</li> </ul>
Reducing consequences	<ul style="list-style-type: none"> <li>■ Train health professionals and school personnel in promotion of physical activity and infant and young child nutrition</li> <li>■ Improve therapy of obesity and its health consequences</li> </ul>	<ul style="list-style-type: none"> <li>■ National and local health authorities</li> <li>■ Health professionals</li> </ul>

The second is an information, education, communication (IEC) strategy and ad hoc equity-minded initiatives. The information asymmetry and the educational divide play an important role in determining environmental inequity. Information campaigns may be effective, yet may also increase the differences along the social gradient if their contents, methods and language are not designed to effectively reach the most disadvantaged communities (96).

Selectively addressing diseases that disproportionately affect poorer people is a strategy that has been suggested to reduce inequities in health (93,97). To be applicable to environmental issues, though, this strategy requires a reasonably precise estimate of the differential burden across population and age groups. As previously discussed in this paper, for many important issues we are not yet able to produce this kind of information. The only available information is the estimates produced by the Environmental Burden of Disease Study among children and adolescents (16). The study provides clear evidence that there is an important differential across European countries with respect to the burden of diarrhoeal disease, respiratory diseases and mild mental retardation due to lead. This reinforces the need for the international agencies to give priority to countries with the highest environment-related burden of disease and for the governments of these countries to improve data collection to focus their action according to risk.

These two areas represent a challenge for public health experts and researchers, since there is a need to improve information systems as well as the way available information is used, including risk communication to involved communities. Effective communication efforts should take into account specific difficulties in reaching out to the most disadvantaged communities, and research is needed to develop and evaluate innovative ways to do this. Risk communication to communities should also be able to offer a balanced view of the risks and benefits of action and inaction on the various issues, so that actions are prioritized according to cost–effectiveness and cost–opportunity criteria, and to the precautionary approach when appropriate (15). Further research and careful evaluation of experiences is needed in this area.

## Conclusion

This review offers a concise summary of evidence on environmental inequalities among children and adolescents in Europe. Though scientific evidence on this topic has increased in recent years and attention to the issue of environmental injustice has grown, there are still numerous research and knowledge gaps which lead to fragmentary evidence.

Using the data at hand, quantification of the magnitude of environmental inequalities among children and adolescents in Europe was not possible. The main reasons for this were the variety of methodological approaches for defining socioeconomic positions and for measuring exposure on one hand, and lack of data for many topics and countries on the other.

Based on the available fragmentary evidence, the main finding is that there is a common pattern in that children living in adverse social circumstances suffer from multiple and cumulative exposures, are more susceptible to a variety of environmental toxicants and often lack environmental resources/goods and other resources (such as access to quality health care) to counterbalance environmental threats and reduce their health consequences.

This challenge requires a broad and active engagement, not only of the public health and health care systems, but also of many other policy areas.

As was stated above, environmental inequalities have several dimensions: inequalities among population groups within a country or urban area, inequalities across countries, and inequalities between generations (15). Addressing the first dimension of inequalities is essentially, although not exclusively, a responsibility of national and local governments and authorities. Addressing the second dimension needs also the engagement of the international community and its regional institutions, such as the European Commission and the European Parliament. Addressing the third dimension should be everybody's responsibility at all levels of society, with a particular emphasis on international agencies such as WHO and mechanisms such as the Group of Eight and ministerial conferences on environment and health called to set standards and make commitments. Today's children and the future generations should not pay the price of our neglect of the environment.

## Key messages

### Policy implications

- The need for action to address environmental inequity, particularly among children most at risk as a consequence of the social divide, both within and across countries, has been widely recognized.
- Four types of policy approaches need to be considered, each addressing a specific causal pathway of the social divide in environmental hazards:
  - reducing the socially determined environmental divide in settings where children live;
  - reducing socially determined differences in children's exposure to hazardous environments;
  - reducing socially determined differences in children's susceptibility to specific environmental pollutants and risk factors; and
  - reducing socially determined differences in health consequences of children's exposure to hazardous environments.
- These specific actions should be combined with upstream progressive policies to reduce the social divide, starting from the earliest years.
- It is important to incorporate a child-focused equity lens in environment information systems and in IEC activities.

### Research implications

- The need to fill the knowledge gaps on social inequalities in children's environments and health throughout Europe has been widely acknowledged.
- Several research approaches need to be considered:
  - using a variety of measures of socioeconomic position to be able to compare data across countries;
  - using similar methodological approaches and study designs to be able to quantify the magnitude of environmental inequities among children and adolescents in Europe;
  - assessing the interaction between socioeconomic position, multiple and cumulative environmental hazards, and community stressors;
  - applying a multilevel approach to improve understanding of the complex, multi-factoral causation of environmental health disparities; and
  - applying a community-based participatory research strategy to identify environmental justice issues.
- Research on social inequalities in exposure and susceptibility to hazardous environments should be complemented with research on social inequalities in environmental salutogenic resources.
- It is important to integrate socioeconomic indicators in environmental health monitoring systems and to develop indicators of environmental inequities.

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## Appendix A. Search strategy and number of publications identified by the initial systematic literature search

Database	Results: number of papers			
Search term	<i>initial</i>	<i>published since year 2000</i>	<i>without duplicates, only Europe (after first scan of title and abstracts)</i>	<i>after application of further exclusion criteria</i>
<b>Medline (MeSH term)</b>				
socioeconomic factors AND environmental pollution AND child OR child, preschool OR infant OR adolescent	1687	877	364	54
socioeconomic factors AND accidents AND child OR child, preschool OR infant OR adolescent	1290	636	293	54
social justice AND environmental exposure AND child OR child, preschool OR infant OR adolescent	19	17	1	1
social justice AND environment AND child OR child, preschool OR infant OR adolescent	18	15	2	2
environmental justice (all fields) AND child OR child, preschool OR infant OR adolescent	214	150		8
<b>PsychINFO:</b>				
environment AND socioeconomic WHERE age group IS NOT adulthood	15			1
environmental justice WHERE age group IS NOT adulthood	17			0
<b>SocINDEX</b>				
child AND environmental pollution	6			1
child AND environmental exposure	40			0
child AND environmental justice	23			0
<b>Current contents connect CCC, Social science citation index + science citation index + arts &amp; humanities</b>				
child AND environment AND social	861			
search within categories: pediatrics OR public, environmental & occupational health OR environmental sciences & ecology OR geography	127			13
<b>Summary</b>				<b>134</b>

## Appendix B. Reports published since 2000 considered in this review

<i>Report</i>	<i>Authors/institution and year of publishing</i>	<i>URL</i>
<b>(1) Special reports on socioeconomic inequalities in children's environment and health</b>		
PINCHE project: Final report WP5 Socioeconomic Factors.	Bolte & Kohlhuber, 2005, Public Health Services Gelderland Midden	<a href="http://www.pinche.hvdgm.nl/resource/pdf/documents/final/PINCHE_WP5_final_181105.pdf">http://www.pinche.hvdgm.nl/resource/pdf/documents/final/PINCHE_WP5_final_181105.pdf</a>
Socioeconomic factors and environmental exposures in Germany – current state of knowledge and analysis of selected environmental pollutants. Project part A: Systematic compilation of the current state of knowledge in Germany.	Bolte & Kohlhuber, 2008, Federal Environmental Agency	<a href="http://www.umweltdaten.de/publikationen/fpdf-l/3663.pdf">http://www.umweltdaten.de/publikationen/fpdf-l/3663.pdf</a>
<b>(2) Reports on children's environment and health</b>		
A Children's Environment and Health Strategy for the UK.	Health Protection Agency, 2009	<a href="http://www.hpa.org.uk/cehape">http://www.hpa.org.uk/cehape</a>
Children's health and environment. Developing action plans.	WHO Regional Office for Europe, 2005	<a href="http://www.euro.who.int/__data/assets/pdf_file/0009/98253/E86888.pdf">http://www.euro.who.int/__data/assets/pdf_file/0009/98253/E86888.pdf</a>
Inheriting the World: The Atlas of Children's Health and the Environment.	WHO, 2004	<a href="http://www.who.int/ceh/publications/en/atlas.pdf">http://www.who.int/ceh/publications/en/atlas.pdf</a>
Burden of disease attributable to selected environmental factors and injuries among Europe's children and adolescents. Environmental Burden of Disease Series, No. 8	WHO, 2004	<a href="http://www.who.int/quantifying_ehimpacts/publications/en/ebd8web.pdf">http://www.who.int/quantifying_ehimpacts/publications/en/ebd8web.pdf</a>
Children's health and environment: A review of evidence. Environmental issue report No 29	European Environment Agency & WHO Regional Office for Europe, 2002	<a href="http://www.euro.who.int/__data/assets/pdf_file/0007/98251/E75518.pdf">http://www.euro.who.int/__data/assets/pdf_file/0007/98251/E75518.pdf</a>
Children's health and the environment in Europe: A baseline assessment.	WHO Regional Office for Europe, 2007	<a href="http://www.euro.who.int/__data/assets/pdf_file/0009/96750/E90767.pdf">http://www.euro.who.int/__data/assets/pdf_file/0009/96750/E90767.pdf</a>
Health and Environment Primer.	HEAL, 2007	<a href="http://www.env-health.org/IMG/pdf/Health_and_Environment_Primer_2007_FINAL_MARCH_4_2008.pdf">http://www.env-health.org/IMG/pdf/Health_and_Environment_Primer_2007_FINAL_MARCH_4_2008.pdf</a>
<b>(3) Reports on children's health in Europe</b>		
The European health report 2005. Public health action for healthier children and populations.	WHO, 2005	<a href="http://www.euro.who.int/__data/assets/pdf_file/0004/82435/E87325.pdf">http://www.euro.who.int/__data/assets/pdf_file/0004/82435/E87325.pdf</a>
<b>(4) Reports on health inequalities in Europe</b>		
Health Inequalities. Third Report of Session 2008–09.	The Stationery Office, 2009	<a href="http://www.publications.parliament.uk/pa/cm200809/cmselect/cmhealth/286/286.pdf">http://www.publications.parliament.uk/pa/cm200809/cmselect/cmhealth/286/286.pdf</a>
Closing the gap in a generation. Health equity through action on the social determinants of health.	WHO, 2008	<a href="http://whqlibdoc.who.int/publications/2008/9789241563703_eng.pdf">http://whqlibdoc.who.int/publications/2008/9789241563703_eng.pdf</a>
The social determinants of health: Developing an evidence base for political action.	Measurement and Evidence Knowledge Network, 2007	<a href="http://www.who.int/social_determinants/resources/mekn_final_report_102007.pdf">http://www.who.int/social_determinants/resources/mekn_final_report_102007.pdf</a>
<b>(5) Reports on built environment, urban setting &amp; health (e.g. physical activity, obesity)</b>		
Our cities, our health, our future: Acting on social determinants for health equity in urban settings.	Knowledge Network on Urban Settings, 2007	<a href="http://www.ucl.ac.uk/gheg/whocsdh/knsreports/knsus">http://www.ucl.ac.uk/gheg/whocsdh/knsreports/knsus</a>
Promoting physical activity and active living in urban environments. The role of local governments.	WHO Regional Office for Europe, 2006	<a href="http://www.euro.who.int/__data/assets/pdf_file/0009/98424/E89498.pdf">http://www.euro.who.int/__data/assets/pdf_file/0009/98424/E89498.pdf</a>

<i>Report</i>	<i>Authors/institution and year of publishing</i>	<i>URL</i>
<b>(5) Reports on built environment, urban setting &amp; health (e.g. physical activity, obesity)</b>		
Tackling obesity by creating healthy residential environments.	WHO Regional Office for Europe, 2007	<a href="http://www.euro.who.int/__data/assets/pdf_file/0012/98697/E90593.pdf">http://www.euro.who.int/__data/assets/pdf_file/0012/98697/E90593.pdf</a>
Physical activity and health in Europe: evidence for action.	WHO Regional Office for Europe, 2006	<a href="http://www.euro.who.int/__data/assets/pdf_file/0011/87545/E89490.pdf">http://www.euro.who.int/__data/assets/pdf_file/0011/87545/E89490.pdf</a>
Children and physical activity: a systematic review of barriers and facilitators.	EPPI-Centre, 2003	<a href="http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=mvkDhy1VBKc%3d&amp;tabid=245&amp;mid=1081&amp;language=en-US">http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=mvkDhy1VBKc%3d&amp;tabid=245&amp;mid=1081&amp;language=en-US</a>
<b>(6) Reports on transport &amp; health effects (including e.g. air pollution, noise)</b>		
Transport-related Health Effects with a Particular Focus on Children [THE PEP].	BMLFUW, 2004	<a href="http://www.euro.who.int/en/what-we-do/health-topics/environmental-health/Transport-and-health">http://www.euro.who.int/en/what-we-do/health-topics/environmental-health/Transport-and-health</a>
Health effects and risks of transport systems: the HEARTS project.	WHO Regional Office for Europe, 2006	<a href="http://www.euro.who.int/document/E88772.pdf">http://www.euro.who.int/document/E88772.pdf</a> <a href="http://www.euro.who.int/__data/assets/pdf_file/0013/91102/E88772.pdf">http://www.euro.who.int/__data/assets/pdf_file/0013/91102/E88772.pdf</a>
<b>(7) Reports on air pollution</b>		
Effects of air pollution on children's health and development.	WHO Regional Office for Europe, 2005	<a href="http://www.euro.who.int/__data/assets/pdf_file/0010/74728/E86575.pdf">http://www.euro.who.int/__data/assets/pdf_file/0010/74728/E86575.pdf</a>
<b>(8) Reports on injuries</b>		
European report on child injury prevention.	WHO Regional Office for Europe, 2008	<a href="http://www.euro.who.int/__data/assets/pdf_file/0003/83757/E92049.pdf">http://www.euro.who.int/__data/assets/pdf_file/0003/83757/E92049.pdf</a>
Socioeconomic differences in injury risks. A review of findings and a discussion of potential countermeasures.	WHO Regional Office for Europe, 2009	<a href="http://www.euro.who.int/__data/assets/pdf_file/0012/111036/E91823.pdf">http://www.euro.who.int/__data/assets/pdf_file/0012/111036/E91823.pdf</a>
Addressing the socioeconomic safety divide: a policy briefing.	WHO Regional Office for Europe, 2009	<a href="http://www.euro.who.int/__data/assets/pdf_file/0004/96457/E92197.pdf">http://www.euro.who.int/__data/assets/pdf_file/0004/96457/E92197.pdf</a>
<b>(9) Reports on chemicals</b>		
Blood lead levels in children.	WHO Regional Office for Europe, 2007	<a href="http://www.euro.who.int/__data/assets/pdf_file/0004/97447/ENHIS_Factsheet_4_5.pdf">http://www.euro.who.int/__data/assets/pdf_file/0004/97447/ENHIS_Factsheet_4_5.pdf</a>
<b>(10) Reports on water</b>		
Water and health in Europe.	EEA & WHO Regional Office for Europe, 2002	<a href="http://www.euro.who.int/__data/assets/pdf_file/0007/98449/E76521.pdf">http://www.euro.who.int/__data/assets/pdf_file/0007/98449/E76521.pdf</a>
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## Armenia: linking adolescent health behaviour and physical activity with socioeconomic, environmental and education factors

Sergey Sargsyan,<sup>1</sup> Nune Bakunts,<sup>2</sup> Ara Babloyan,<sup>1</sup> Marina Melkumova,<sup>1</sup> Eva Movsesyan,<sup>1</sup> Naira Gharakhanyan,<sup>3</sup> Nune Pashayan,<sup>4</sup> Anahit Muradyan,<sup>5</sup> Anahit Alexandryan<sup>6</sup>

<sup>1</sup>Arabkir Joint Medical Center–Institute of Child and Adolescent Health

<sup>2</sup>State Hygiene and Anti-epidemic Inspectorate, Ministry of Health

<sup>3</sup>Children of Armenia Foundation

<sup>4</sup>Ministry of Health

<sup>5</sup>Ministry of Education and Science

<sup>6</sup>Ministry of Environmental Protection

### Executive summary

Analysis of the general health statistics of Armenia shows an obvious correlation between low physical activity, sedentary behaviours and unhealthy eating habits in childhood and adolescence with high morbidity and mortality from noncommunicable diseases in adulthood.

Lack of opportunities for physical activity, sedentary behaviours and inadequate facilities to support physical activity in communities and education institutions are among the health risk factors faced by Armenian children and adolescents. Data from a pilot HBSC survey show that the physical activity levels of most adolescents in Armenia are inadequate; indeed, they are among the poorest in Europe. Many schools do not have adequate facilities to support physical activity for students. Most Armenian adolescents watch at least three hours of television every day, and while most rural inhabitants do not use computers routinely, many adolescents living in the capital city of Yerevan play computer games and search the Internet daily; as a consequence, students' vision problems increase by up to five times during the school years.

A crowded curriculum and heavy study commitments for students preparing to enter university also contribute to decreasing levels of physical activity. At least one in three children living in Yerevan spends 4–5 additional hours in academic preparation daily, which, when combined with the commitments of the conventional school day, means 10 hours are being spent each day on learning activity. All these factors have led to low physical activity becoming the norm for many adolescents.

Armenian youth also face environmental challenges. The pilot HBSC survey reports inadequate sanitary and hygiene conditions in schools, and some schools do not provide adequate heating in winter (a circumstance reported by half of the interviewed pupils).

Comparison of data from different groups shows a growing polarization within society, although children from all socioeconomic groups face dangers and specific health risks. Some 12% of interviewed children noted that they sometimes went hungry due to lack of food at home; at the same time, many children living in Yerevan reported consuming relatively expensive fast foods daily. Many children living in villages were involved in physically vigorous farm work, while children in urban settings did not engage in physical activity due to the development of habitual sedentary behaviours.

Pilot HBSC survey data and those from other relevant surveys provide a rationale for interventions in child and adolescent health and development. The Ministry of Health has set out relevant actions through the newly developed child and adolescent health strategy and other policies. The Ministry of Education and Science has introduced healthy lifestyle lessons into the secondary school curriculum. The government and donor organizations have launched programmes on improving school conditions, with the result that many schools have now been fully renovated and sports facilities have been revitalized to provide opportunities for thousands of children. These, however, are only the first steps. Many policies aimed at improving the environments and lifestyles of Armenian children still have to be implemented, and the current financial crisis and expected budget deficits may delay the implementation of many plans.

Overall, the Armenian experience reinforces the importance of recognizing the close correlations between children's and adolescents' health and health-behaviour indicators and socioeconomic, environmental and education factors. The case study stresses a need for strong intersectoral collaboration.



## Socioeconomic context

Armenia is a small country located in Transcaucasia, bordering with Georgia, Turkey, the Islamic Republic of Iran and Azerbaijan. According to the latest census data (2006), the population is about 3.2 million.

After gaining independence in 1991, the national economy went into severe recession because of disruption to traditional ties with other countries and the pressure of transforming to a market-style economy. The economy was also damaged by the conflict over Nagorno Karabagh and the resulting economic blockade.

These factors resulted in massive unemployment and a dramatic worsening of living conditions. Public health and education expenditure in Armenia decreased sharply. Consequently, there was a growth in the negative influences of environmental factors detrimental to the population's health.

The average annual growth rate of the economy since 2000 has been 8.7%, mainly due to the inflow of capital from foreign countries (especially the Russian Federation) and following expansion of domestic services (1). However, public expenditure has not been sufficient, even in the relatively prosperous mid-2000s. Total health expenditure in 2007, for instance, was US\$ 270 per person, which is approximately a tenth of that in western Europe and six times less than the average European indicator (2).

The 1990s and early 2000s were marked by enlarging socioeconomic inequalities within the country. Even in relatively prosperous years such as 2004, more than 50% of children under 5 years lived in poor families (3). There is a growing discrepancy in socioeconomic developments between the capital city of Yerevan and the rest of country, but new investment in the economy and relevant policies introduced by the Government have resulted in the poverty level in Armenia being reduced: the poverty level in 2006, for instance, was 26.5 % against 34.6% in 2004, while the extreme poverty level was 4.1% against 6.4%.

The situation has changed dramatically since the advent of the current world economic crisis. In the early phase of the crisis, low debt and rising savings protected the economy from negative consequences, but the rapidly deteriorating external environment began to have an effect in Armenia from the fourth quarter of 2008. A marked slowdown in revenue and capital inflows is now being seen, and economic recession is expected to be more than 10% in 2009. Unemployment has risen in recent months and the budget for 2009 is being revised in the light of changing conditions, with revenue being projected to fall by 6% in 2009 relative to 2008.

Rising unemployment and falling income as a result of the crisis are likely to reverse some of the gains in reducing socioeconomic inequalities achieved before 2008. Simulations of the impact of the crisis suggest the overall poverty incidence could increase by about 5.2% between 2008 and 2010. The increase in the poverty gap would be pronounced, with those who are already poor becoming even poorer (1).

## Environment, health status and behaviours of children and adolescents

Many efforts were made in the past to increase children's and adolescents' physical activity levels and engage them in sports. Armenia's rapid transition into an open society, alongside the above-mentioned economic developments, strongly affected the health, social status and behaviour of most Armenians, including young people. A range of changes in health behaviours were seen, with alterations in relations with peers, eating habits and attitudes towards (and opportunities for) engaging in physical activity and sports. These factors created a number of risks to health, including those caused by environmental influences.

The current lifestyle patterns and behaviours of adolescents in Armenia have therefore arisen as a consequence of many factors, some of them controversial. Generally, the rapid transition period in Armenia has led adolescents to be more disposed to experimentation and risky behaviours.

To understand the roots of the problems and tendencies, existing statistics and health indicators of children and adolescents have to be thoroughly analysed. Assessment of the health status of school-aged children and adolescents in Armenia is, however, hampered by the same difficulties experienced by other countries: regular statistics do not include children aged 6–10 years or adolescents and young people of 10–19 years. Consequently, the main source of information on health in adolescence is surveys which have mainly concentrated on reproductive health issues.

The most informative and comprehensive study carried out in Armenia is a pilot survey undertaken in 2005/2006 by the Institute of Child and Adolescent Health, with support from the United Nations Children's Fund (UNICEF) (4). The survey was based on the HBSC study methodology and consisted of a 122-item questionnaire adapted to local norms (especially in the area of sexual health) with additional questions on some health priorities relevant to Armenia. The survey used a multi-stage cluster design with weightings to ensure representativeness and was undertaken in 60 high schools (20 in Yerevan, 20 in smaller cities and 20 located in villages). In total, 1206 adolescents (average age 15 years) were interviewed (all interviews were conducted anonymously). Data were analysed through a data base tailored for the survey, using criteria to assure statistical significance.

### **Environmental factors**

Environmental factors that have an impact on the health of children and adolescents in Armenia include limited access to safe water, outdoor pollution (particularly in Yerevan), indoor pollution due to lack of safe energy sources and the prevalence of smoking, and unsafe and inadequate child nutrition with deficiencies in dietary microelements. There are poor sanitary and hygiene conditions (water and sewerage) and inadequate heating and lighting in kindergartens and schools. There is also a lack of safe places for children to play and take part in physical activity, especially in cities, and specific environmental risk factors related to child labour.

Environmental factors affect the health of all children, but those from vulnerable families face greater exposure to hazards; this was reflected to some extent in the results of the pilot HBSC survey (4). Many communities do not have appropriate buildings for education institutions. A significant number have no heating system, with classes being heated through electric devices and various types of stove. As a result, heating is available only in some parts of the building (classrooms and group rooms), while in other spaces (such as bathrooms, corridors and sport halls), the air temperature is below the defined lower limit. This leads to a situation in which only 50% of survey respondents thought that the temperature in their school was satisfactory. Others reported that their schools were kept at a temperature that is below the required minimum. Poor sanitary conditions were also noted by many of the interviewed children, and a number of schools were found to lack adequate facilities for physical activity and sports.

### **General health status and nutrition**

The survey of the Child Health Care Association in 2005 showed that around 20% of school-age children suffered from allergic conditions such as asthma. Examinations carried out in one of the poor rural regions showed that at least one of the following diseases or conditions was present in almost 60% of school-aged children: allergy, chronic ear, nose and throat conditions, dental caries, chronic cough, urinary tract infections, gastroduodenal diseases, scoliosis, vision problems and neurological and mental disorders. The overall health status of school-aged children therefore gives cause for concern. On the one hand, prevalence of these conditions is evidence of environmental influences. On the other, many of these conditions are easily preventable or are manageable if treated early and appropriately, but this has not tended to happen, mainly due to the low quality of, and difficulty in gaining access to, proper health services.

The negative impact of environmental factors on child health was confirmed by the results of routine medical check-ups of school-aged children. For example, data from check-ups performed in schools showed a large prevalence of vision problems in children of different ages. Vision failure was detected in 10% of 3-year-old children, 28% of 7-year-olds and around 45% of 14-year-olds. The incidence of functional disorders and chronic diseases in children diagnosed during check-ups emphasizes the need to strengthen activities aimed at preventing or reducing environmental hazards.

Among the children interviewed within the pilot HBSC survey, 48.2% of adolescents thought they were in good health and 22.2% thought they were in perfect health. Approximately one third of respondents, however, described their own health as

neither “perfect” nor “good”, characterizing it as “satisfactory” or “bad”. Some 18.2% of adolescent females and 9.5% of males were not happy with their weight and believed they were overweight. Thirty per cent of children (the vast majority of whom lived in Yerevan) claimed to prefer eating fast food, 18.5% had carbonated soft drinks several times a day and 76% ate more than one portion of sweet foodstuffs per day. These data correspond to those from the Armenian demographic and health survey (ADHS) held in 2005. According to the ADHS, approximately 4 in 10 women weighed more than they should. Among them, 27% were overweight and 16% were obese. In females aged 15–19 years, the prevalence of obesity was 2% (5).

In contrast, 12.6% of surveyed schoolchildren claimed that they sometimes went hungry because there was no food at home, a common occurrence in rural communities; 0.5% of respondents felt hungry every day.

Overall, these data confirm the existence of socioeconomic inequalities in the population and the high prevalence of poor eating habits and lack of physical activity among many children, adolescents and adults. However, correlations between food intake and physical activity are still not clear, and this issue should be explored more closely in future studies.

### Physical activity

According to the official school curriculum approved by the Ministry of Education and Science of Armenia, physical education should be provided from the first through to the twelfth grade; this is compulsory for all schools in Armenia. The curriculum requires that at least three classes of physical education of 30–45 minutes each (depending on grade) must be offered. The physical education must include different sports, including athletics and ball games. There are approved norms for assessment of the physical capacity of schoolchildren at different ages.

Implementation of this curriculum commitment is hampered, however, by lack of proper facilities and appropriately prepared teaching staff. Another key problem is the lack of heating in schools, which makes indoor activities during cold seasons practically impossible. This is a particular problem in many mountainous regions of the country, where the cold seasons last for up to six months; in the absence of artificial heating, indoor sports facilities can only be used in four or five months of the year. Many schools in villages at least have enough outdoor space for activities and playing, but many of those in cities, especially in Yerevan, lack outdoor spaces, which also affects the proper organization of lessons. Overall, physical education in schools in Armenia is not being delivered at a consistent level.

These tendencies are clearly reflected in the pilot HBSC survey data. Approximately 41% of male students and 46% of females reported attending physical education classes two days per week, with rural regions having more consistent access to school-based physical activity than urban (Table 1).

**Table 1**

Frequency of school-based physical activity by location

<i>During this school year, how often did you attend physical education classes per week?</i>	Yerevan		Urban		Rural	
	Number	Percentage	Number	Percentage	Number	Percentage
0 days	57	13.1	52	13.9	26	6.6
1 day	48	11.0	27	7.2	13	3.3
2 days	156	35.9	168	44.8	210	53.2
3 days	18	4.1	11	2.9	17	4.3
4 days	8	1.8	8	2.1	8	2.0
5 days	132	30.3	101	26.9	95	24.0
No response	16	3.8	8	2.2	26	6.6
Total	435	100	375	100	395	100

Some 22% of males and 31.5% of females surveyed had not engaged in any form of physical activity during the seven days prior to the survey; however, the same percentage (22%) of male students had engaged in physical activity during the seven previous days (Table 2).

**Table 2**

Frequency of physical activity by gender

<i>During the past seven days, how often did you exercise?</i>	Boys		Girls	
	Number	Percentage	Number	Percentage
0 days	102	22.8	239	31.5
1 days	44	9.8	113	14.9
2 days	77	17.2	141	18.6
3 days	54	12.0	81	10.7
4 days	23	5.1	42	5.5
5 days	22	4.9	27	3.5
6 days	16	3.6	7	0.9
7 days	99	22.2	73	9.8
No response	11	2.4	35	4.6
Total	448	100	758	100

When asked about engaging in sports, approximately 31% of male students and 44% of female students had not engaged in any sports during the past 12 months (Table 3).

**Table 3**

Frequency of engaging in sports by gender

<i>During the past 12 months, how many types of sports did you play?</i>	Boys		Girls	
	Number	Percentage	Number	Percentage
None	138	30.8	333	43.9
1	152	33.9	225	29.6
2	77	17.2	86	11.3
3 or more	67	15.0	73	9.6
No response	14	3.1	41	5.6
Total	448	100	758	100

One of the explanations for low levels of physical activity is that children in many cases do not have enough time to engage in sports. With this in mind, some of the following questions are useful in enabling an understanding of the habits and behaviours of children and adolescents in Armenia.

Students were surveyed on the amount of time they spent each day on homework. Just over 32% of boys and 22.3% of girls usually studied at home for between one and two hours a day. The difference between boys and girls who did homework for three to four hours a day was very small (30.1% and 31.1% respectively). The gender divide was more pronounced among students who studied at home for five hours per day or more, which applied to 15% of male students and 36.7% of females (Table 4).

The divide between time spent on homework in urban and rural areas was somewhat more pronounced than the gender divide. While one third of young people in urban areas appeared to spend at least five hours on their homework per day to prepare for their university examinations, less than one fifth of rural students did likewise. Overall, it would seem that rural high school

**Table 4**

Time spent on homework by gender

<i>How many hours per day do you usually spend on homework or additional study?</i>	Boys		Girls	
	Number	Percentage	Number	Percentage
0	61	13.6	5	0.7
0.5 hours	50	11.2	22	2.9
1–2 hours	146	32.6	169	22.3
3–4 hours	110	24.5	242	31.9
5 hours or more	67	15.0	279	36.8
No response	14	3.1	41	5.4
Total	448	100	758	100

students spent slightly less time on their homework, which may have something to do with competing responsibilities at home, such as having to contribute to field or farm work (which subsequently leads to taking part in more physical activity) (Table 5).

**Table 5**

Time spent on homework by location

<i>How many hours a day do you usually spend on homework?</i>	Yerevan		Urban		Rural	
	Number	Percentage	Number	Percentage	Number	Percentage
0	22	5.1	22	5.9	22	5.6
0.5 hours	18	4.1	22	5.9	31	7.8
1–2 hours	94	21.5	110	29.3	111	28.3
3–4 hours	131	30.1	98	26.1	123	31.1
5 hours or more	153	35.4	117	31.2	76	19.2
No response	17	3.8	6	1.6	32	8.1
Total	435	100	375	100	395	100

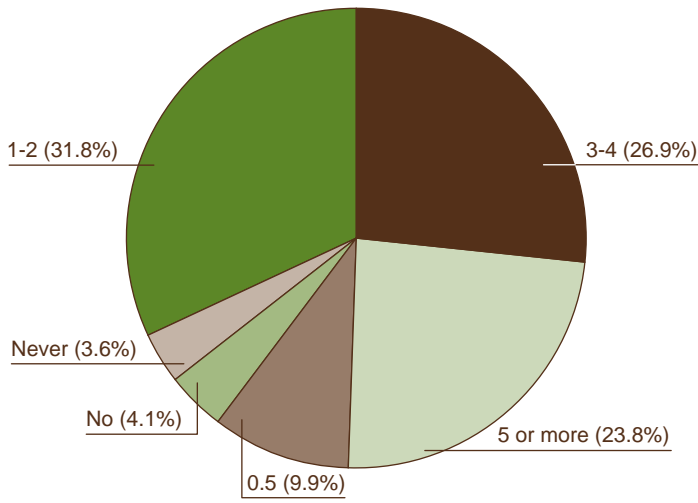
Time spent on physical activities was also closely linked with sedentary behaviours. Watching television (TV) and using computers have increased rapidly over the past decade in Armenia to the point where they represent popular, sedentary, leisure-time activities that may have replaced physical activity. Watching TV and videos, using a computer and spending time on homework were assessed to identify the proportion of time each day young people spent engaged in sedentary activities. Some 29.5% of boys and 20.4% of girls watched TV more than 5 hours a day, and 29.2% of male and 20.4% of female students regularly watched 3–4 hours of television per day (Fig. 1).

Daily computer use varied greatly depending on gender and location. Some 6.5% of male and 1.7% of female students surveyed spent five hours or more using a computer every day, while 48.9% of males and 62.6% of females had never used a computer. In rural areas, up to 70% of young people had never used a computer. Overall, approximately 16.5% of all students used computers for a half an hour per day (Fig. 2).

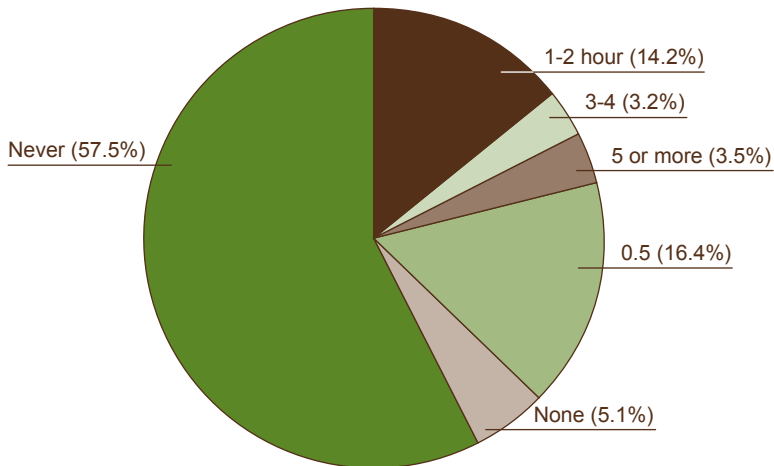
One of the key issues is that many Armenian students are not properly educated on the benefits of physical activity. Interviews conducted among third-grade students by some authors of this study revealed that only 3.2% of the students were properly informed about the positive influence of physical activity. In the pilot HBSC survey, around 40% of students surveyed said that the benefits of physical fitness were never described to them at school (Table 6). Interestingly, students in Yerevan rated lower than those in rural areas, where significantly more students said they had learned about the benefits of physical fitness at school.

**Fig. 1**

Hours per day adolescents spend watching TV

**Fig. 2**

Hours spent per day in computer use

**Table 6**

Exposure to school-based lessons on physical activity by location

<i>During this school year, were you taught in any of your classes about the benefits of physical activity?</i>	Yerevan		Urban		Rural	
	Number	Percentage	Number	Percentage	Number	Percentage
Yes	169	38.8	141	37.6	172	43.5
No	185	42.6	175	46.7	160	40.6
I don't remember	43	9.9	34	9.0	33	8.3
No response	38	8.7	25	6.7	30	7.6
Total	435	100	375	100	395	100

## Child labour

According to UNICEF's child labour survey in Armenia (6), 4.7% of children aged 7–18 years are engaged in hired labour. The number of working children is higher in poorer rural areas, with a figure of 3% in Yerevan. Just under 40% of working children are involved in farming and cattle breeding. Approximately 30% are left out of the education system; around 17% have a full-time occupation, and 24% miss lessons through work.

Among the reasons given for children attempting to earn money were “taking care of the family”, “helping the family”, and “having their own money”. Just over 78% of children estimated their health as “good”, while 4.5% identified labour as a cause of health problems. Parents of working children noted work-related injuries in 60% of cases.

## Conclusions

The pilot HBSC survey and other relevant surveys highlight existing problems and the main areas in which interventions are needed. Studies demonstrate the unsatisfactory health status of adolescents, with environmental factors firmly among the risk factors identified.

In general, adolescents have unhealthy lifestyles due to their eating habits and lack of physical activity. Engagement in sports and physical activities is particularly affected by:

- the development of poor habits in relation to physical activity;
- lack of education about the benefits of physical activity;
- sedentary behaviours, including excessive time spent watching TV, using computers and searching the Internet, especially among urban populations;
- time spent on homework and studying for university examinations;
- poor organization of physical activity and sports education in schools;
- lack of facilities for sports; and
- involvement of some children and adolescents from poorer social groups in labour.

Overall, there is clear evidence to support strong links between educational, environmental and socioeconomic factors and health outcomes in children and adolescents.

## Policies and interventions

### Child and adolescent health

The main priority in child and adolescent health in the early years following independence was improving child survival. This was achieved through introducing WHO initiatives such as programmes on promotion of breastfeeding and control of acute respiratory infections and diarrhoeal diseases in young children throughout the country. These efforts led to reductions in child mortality caused by diarrhoea and pneumonia and decreases in morbidity from vaccine-preventable diseases. A main lesson, learned in the 1990s, was that rational implementation of effective policies can lead to significant results, even in critical situations.

The health issues of school-aged children and adolescents were not considered public health priorities at this time. Only since the early 2000s has school and adolescent health been recognized as a priority and placed on the agenda of the public health and partners' sectors. This new approach was typified when the Ministry of Health, working in close collaboration with UNICEF, developed the concept of “youth-friendly services”.



The Arabkir Joint Medical Centre–Institute of Child and Adolescent Health and partners (which include NGOs) promoted the concept of youth-friendly services by implementing a range of activities aimed at increasing capacity within the health sector for child and adolescent health and raising awareness among adolescents, professionals and the public. Different models of youth-friendly services have been employed, and these have been incorporated into existing health units at different levels. A package of national standards was developed, legislation was revised and proposals have been forwarded for inclusion in the new health law currently under construction. A range of educational materials have been created, and adolescent sexual development guidelines and the mental and psychological examination questionnaire have been included in state standards.

In the next stage, and after a comprehensive review and analysis of school and adolescent health issues, the *National strategy on child and adolescent health for 2009–2015* (7), developed in close collaboration with WHO and partners from education, environment, justice and other sectors, was submitted for governmental approval, with approval being granted in September 2009.

The strategy's goals are:

- implementation of a school-age children and adolescent healthy growth and development surveillance system at primary health care level;
- expansion and continuous improvement of adolescent-friendly services at secondary and tertiary health care levels;
- improvement of medical and counselling activities at education institutions;
- creation of favourable conditions at schools for healthy growth and development of children within the scope of the “Schools for health” programme;
- continuous promotion of healthy lifestyle principles among school-aged children and adolescents;
- encouragement for youth involvement and ownership of health by children and adolescents; and
- improvement of parents' and the public's awareness of health issues for school-aged children and adolescents.

Relevant activities are also planned for prevention of injuries, with a strong emphasis on educational activities.

### **Environmental health**

Significant efforts are being made in Armenia to develop a policy framework for environmental protection. Actions and approaches in line with the CEHAPE (8), are included in legislation, policy papers and public and international programmes. Other relevant acts include the “National environmental action plan”, or “NEAP2”, approved in 2008, which addresses a wide range of environmental issues, including land, bioresources, underground resources, hazardous substances and waste. It also addresses intersectoral environmental issues impacting on economic, legislative, monitoring, impact assessment, education and research processes.

The sustainable development programme (9) was adopted for rural water supply and sanitation in Armenia by facilitating a national policy dialogue, and a country profile on road safety and a national profile on chemical management were prepared and adopted in February 2009.

### **Education sector**

Attempts have been made to introduce “life skills” or “healthy lifestyles” lessons into the school curriculum since the 1990s, but training programmes have not always been either adequate or coordinated. This has resulted in a “scattered” approach to education on health and healthy lifestyles and the lack of a common approach.

Healthy lifestyle topics are being presented to students in grades 1–7 of secondary schools through a course in life skills and to those in grades 8–9 through a pilot course on healthy lifestyles. This programme was implemented by UNICEF in about 380 Armenian schools, which is approximately one quarter of the total number of schools in the country. A government

decree of January 2008 determined that 14 compulsory academic hours per annum are to be assigned to the course on healthy lifestyles delivered to students in grades 8–9. The 28-hours training programme includes issues such as HIV/AIDS prevention and safe behaviours.

The Government, working with NGOs, has been making strenuous efforts over the last few years to improve the situation in the education sector. The “Programme for capital repairs and improvements in schools of the Republic of Armenia” was approved in 2002 and provides the basis for annual calculations of resources required for renovation of buildings (10). Overall, 276 education institutions were renovated in 2008 at a cost of more than 15 billion Armenian drams (provided either by the Ministry of Urban Development or local government), which is the equivalent of around US\$ 50 million at 2008 rates. Many schools had heating systems installed through projects supported by public and NGO funding. Armenian diaspora organizations such as the Lincy Foundation have also launched activities targeted at improving school conditions.

## Sports

The law on child and adolescent sports imposes mandatory requirements on the standard of sports facilities and the delivery of physical education classes. The National Olympic Committee has worked hard to promote sports activities among young people through a range of activities, and the President of Armenia has launched a series of competitions to identify the best sporting families, best sports facilities and best sporting community in an attempt to promote sports and healthy lifestyles. The Government had allocated funds for NGO-run initiatives targeted at raising public awareness of healthy lifestyles and has issued regulations on the involvement of children with health problems in regular physical education. The outcomes of many of the activities in this field still need to be assessed.

## Experiences of NGOs

Pilot approaches to improving environmental conditions for children and adults in one of the poorest regions of Armenia were approved by the Children of Armenia Fund (COAF) (<http://www.coafkids.org/>). With support from some humanitarian and international organizations, COAF has been implementing the “Model cluster participatory integrated rural development programme” in six cluster villages of Armavir Marz since February 2006. The programme has health, social, education and economic development components.

Because the programme has been implemented in an area with a socially vulnerable population, many efforts have been made to improve access to information, raise public awareness, promote food safety and improve attitudes and practices in relation to environmental and behavioural issues. This is being accomplished through improving rural infrastructure, promoting community health education (including initiatives designed to reduce or stop tobacco use, promote healthier eating and encourage adoption of a healthier lifestyle), launching school health initiatives and offering psychosocial support. In addition, a special system of waste management has been introduced, under which farmers have been educated in the best and ecologically safest agricultural practices. Water supply systems have also been improved.

An intersectoral approach to improving the health status of the population has been adopted. In the health sector, efforts have been targeted on improving the quality of (and access to) health care through:

- renovating and modernizing clinics;
- providing relevant up-to-date medical equipment for existing outpatient facilities;
- establishing sustainable systems of continuous medical education for health care staff and providing opportunities for professional development;
- establishing links and improving referrals to the facilities from higher levels of health care;
- initiating outreach medical services for the population where relevant; and
- promoting mass health screening.

In the education sector, kindergartens and schools have been fully renovated with improvement to hygienic conditions and provision of facilities for sports and other indoor and outdoor physical activities. School psychosocial services have been established for students and after-school activities have been expanded.

Pilot projects have shown significant positive results, including improvements in:

- utilization of health services
- health status of the population
- educational levels of students
- employment levels, with reductions in work migration.

The COAF initiative stands as an example of a successful model that tackles socio-environmental inequalities at community level. Experiences of integrated cluster development are highly valued by the Government of Armenia, and the model has been recommended for further expansion.

## Lessons learnt

Environmental problems and adolescent health issues are challenges for many countries. They are particularly challenging for Armenia, which has a low level of public expenditure but a wide range of problems. However, the interventions that have been implemented show that activities targeted at improving child and adolescent health, particularly when focused on prevention of negative environmental influences, can work. Delay in developing strong policies and responding to challenges will result in increases in negative consequences and will make solving problems a more difficult, and more costly, process in the future. This is especially the case in relation to high rates of noncommunicable disease morbidity and mortality in adulthood which arise as a result of low physical activity, sedentary behaviours and unhealthy eating habits in childhood and adolescence.

Review and analysis of the implemented activities highlight their achievements and their constraints. The pilot HBSC survey and other surveys provide information that is urgently needed to develop an understanding of the current status of adolescent and environmental health in Armenia. Many existing problems have been highlighted in recent years, and these have raised the awareness of policy-makers and led to the development of policies designed to address the problems. Government institutions, professionals and the public have started to recognize the nature of the problems and the importance of addressing them.

The efforts of different sectors are necessary to reduce negative environmental influences, and the benefits of this have been seen to some extent in Armenia. In the education sector, for example, healthy lifestyle lessons have been introduced to the basic curriculum and many school buildings have been renovated. The health sector is in the process of establishing adolescent-friendly health services, which will improve access to services for young people and facilitate early screening; proper counselling will also be made more affordable. Government and NGOs (national and international) are working to improve the environment for Armenian children, and pilot interventions from NGOs are developing models that could have very positive impacts in communities.

Regardless of these achievements, a number of problems are still on the agenda. More efforts is needed to improve the state of schools and provide healthier environments for children. Promoting increases in physical activity among children and overcoming sedentary behaviours is proving a real challenge which is being faced though active promotion of physically active lifestyles and the provision of greater opportunities for physical activity and sport, but there is currently a lack of new models that show how to make healthy lifestyles more popular among adolescents. In addition, the negative impact on physical activity levels of children being overloaded with homework and study still has to be reflected within the curriculum.

The pilot HBSC survey has demonstrated that differences between urban and rural groups need to be addressed through interventions targeted at specific groups. For children in Yerevan, interventions must focus on the problem of lack of physical activity, while for those from rural settings, the focus needs to be on preventing negative consequences of farm work. Gender issues also need to be addressed: physical activity is especially low among girls.

The outcomes of many of the interventions introduced are not being formally measured. To assess the benefits of interventions, the health information system at national level and within WHO should be restructured to make it age-specific, reflecting the diverse needs and challenges faced by children of school-age, adolescents and older teenagers. It may only be possible to follow morbidity trends in these groups, a process that at the current time is extremely complicated, by doing this. In the meantime, regular implementation of the HBSC survey will be crucial.

The key problem facing Armenia remains lack of funding to support implementation of interventions in this field. Even before the recent world economic crisis, public expenditure in the country was very low. The situation post-crisis is now worse, and many plans face an uncertain future. The need for remodelling policies, identifying the most cost-effective interventions and coordinating the efforts of all involved sectors, is therefore of central importance.

Armenia is a country in transition, with an unstable and fragile economy. It is a country in which many organizations in the public sector are undergoing radical reform. Health, education, environmental and socioeconomic factors are very closely linked and the practical implementation of intersectoral approaches is crucially needed, perhaps more so in Armenia than in more industrialized and economically stable countries.

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# Germany: injury and physical activity in association with well-being in children and adolescents

Veronika Ottova,<sup>1</sup> Ute Winkler,<sup>2</sup> Martina Abel,<sup>3</sup> Bärbel-Maria Kurth,<sup>4</sup> Nora Wille,<sup>1</sup> Michael Erhart,<sup>1</sup> Ulrike Ravens-Sieberer<sup>1</sup>

<sup>1</sup>University Medical Centre Hamburg-Eppendorf, Hamburg

<sup>2</sup>Federal Ministry of Health, Berlin

<sup>3</sup>Safe Kids Germany, Bonn

<sup>4</sup>Robert Koch Institute, Berlin

## Executive summary

The primary objective of this case study is to highlight the process of translating evidence into action by describing how research results from surveys have influenced strategy development and policy-making.

The two surveys that are central to the case study are the HBSC survey and the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). KiGGS is a large survey of 17 641 children and young people aged 0–17 years which provides for the first time comprehensive information on health and health behaviour and detailed insights into environmental conditions and well-being of children and adolescents in Germany.

The results of these two surveys confirm that deaths due to unintentional injuries in Germany are generally decreasing in children under 15 years. Survey results also show that boys are significantly more likely to report an injury in the past 12 months. The majority of children are physically active, but differences are found between high- and low-affluence groups. The highest proportion of 3–10-year-old children who are physically active less than once a week is found among those from low SES backgrounds. This negative trend is most pronounced in children with a migratory background and/or those living in former East Germany. In terms of well-being, survey results confirm those of previous studies, which found that children with low SES generally report a lower health-related quality of life (HRQoL) than their peers with higher SES.

As a consequence of the surveys and their findings, the Federal Ministry of Health has developed a strategy paper for the advancement of children's health which will be highlighted here along with national policies and interventions aimed at tackling these health problems and reducing health inequalities. The strategy paper defines concrete measures and interventions in various areas of child health and describes how the health of socially disadvantaged children and those with a migratory background can be improved. Activities and national recommendations put forward by Safe Kids Germany, an association taking the lead in injury prevention in children, are also presented and discussed.

Overall, there are many promising ongoing activities in Germany, reflecting the subject's importance. Improvements can nevertheless be made in terms of coordination and cooperation at federal, state and regional levels and between stakeholders from political sectors and NGOs. Coordination of activities is especially important in Germany due to its federal structure, so networking and greater exchange among participants is both desirable and necessary.

## Background information

Information on injury, physical activity and well-being among children and adolescents in Germany is available from the HBSC survey and the KiGGS survey.

### HBSC survey 2006

Results from the HBSC 2006 survey for Germany showed that socially disadvantaged children reported worse self-rated health than their more-privileged peers. Overall, about 22.9% of German children reported two or more injuries within the previous 12 months. Interestingly, the proportion of children belonging to the more-privileged SES group<sup>3</sup> was higher

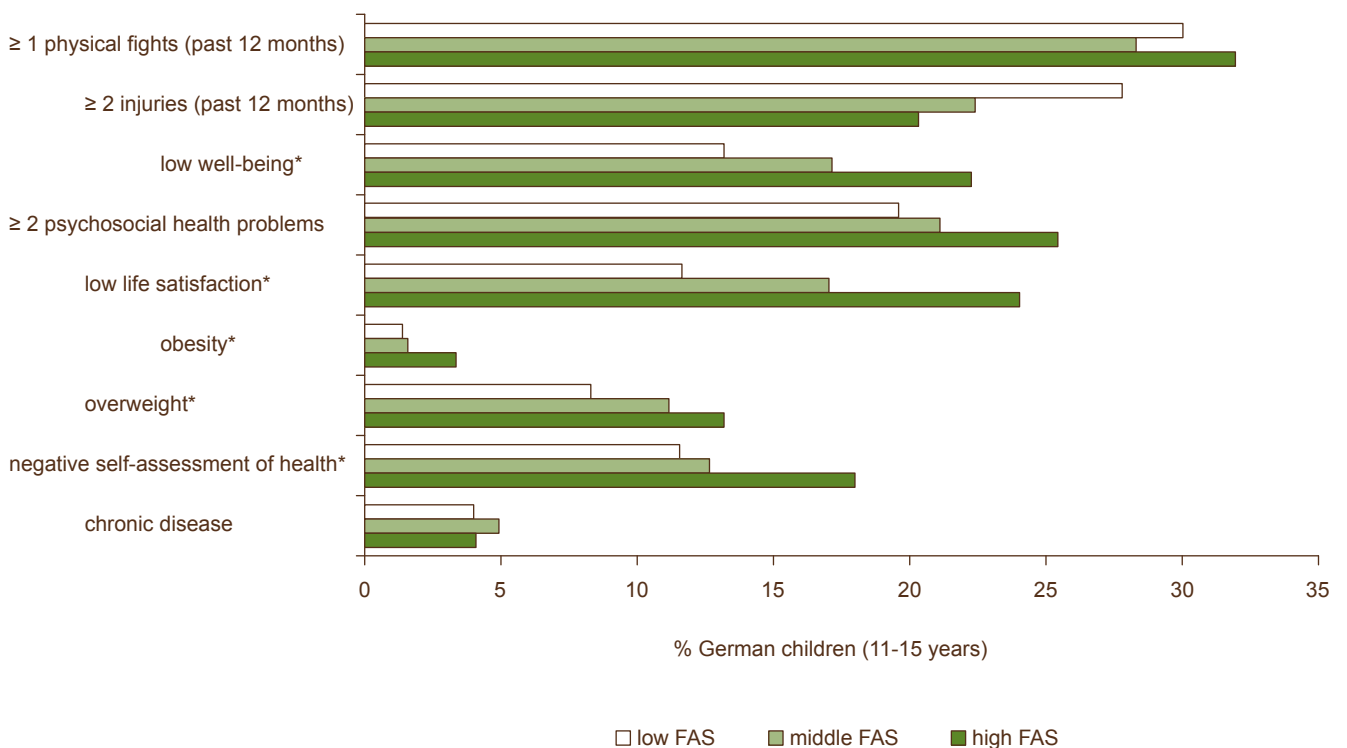
<sup>4</sup>SES was approximated by means of the FAS (1).

(27.8%) than those from the socially disadvantaged group (20.3%) (2). The effect of SES on substance consumption was also different from what would be expected: SES was found to play a role in alcohol consumption, but not in smoking or cannabis use. Furthermore, boys, particularly those from socially disadvantaged families, were found to be at greater risk for overweight.

Migrants are an important population group in Germany and the results show that they comprise a subgroup that is at increased risk of poor health and/or taking part in unhealthy behaviours. Children with a two-sided migration background<sup>4</sup> were more than twice as likely to have lower SES than children with no migration background (3). While migration status had no effect on injury prevalence, it did emerge as a risk factor for poor psychosocial health, psychosomatic complaints, life satisfaction and well-being and, particularly, for overweight. Fig. 1 shows the socioeconomic differences related to specific health conditions.

**Fig. 1**

Socioeconomic differences in health (HBS survey 2006, N = 7 274)



\* Statistically significant differences at the  $p < 0.001$  level.

Source: adapted from Ravens-Sieberer & Erhart (2).

Fig. 1 shows that pronounced socioeconomic differences are already visible in children. For instance, reporting two or more injuries, having a lower sense of well-being, having two or more psychosocial health problems, having reduced life satisfaction, being overweight or obese and making a negative self-assessment of health were found more frequently in children with low SES than in those with a middle or high SES. These results suggest that children of families who are socially disadvantaged are worse off in terms of their health than those with higher SES.

<sup>4</sup> Meaning if both parents migrated to Germany and/or did not have German citizenship, but also if only one parent was a migrant and the child was not born in Germany.



## KiGGS

The lack of comprehensive health information on children and adolescents in German Federal, allied to growing interest in studying children's well-being and the occurrence of psychosocial problems, persuaded the Ministry of Health to commission the Robert Koch Institute to design and conduct a nationwide representative study of children and adolescents (4).

KiGGS is a representative nationwide health survey of 0–17-year-olds, involving 17 641 children and adolescents in 167 randomly selected study locations throughout Germany between May 2003 and May 2006. Data were collected by means of paper and pencil questionnaires (parent and child), laboratory diagnostics (urine and blood tests), a general physical examination of the child and a computer-assisted personal interview with the physician (5).

The survey collected information on various health determinants, including sociodemographic information (such as SES), mental health (including quality of life), health behaviour (such as physical activity) and health status (including injury). While general information was obtained from all participants, detailed information on environmental aspects and mental health was collected through additional subsamples of children and adolescents.

Well-being was assessed in a subgroup of 2863 children and adolescents aged 7–17 years. Trained interviewers conducted standardized telephone interviews with one parent and the child, if the child was at least 11 years old. Additional paper and pencil questionnaires were also employed. The standardized questionnaires included a variety of standardized and International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD–10)-oriented instruments on mental health problems and their associated burden, depression, anxiety, attention deficit hyperactivity and conduct disorders. Factors related to mental health and well-being were also assessed (6).

### Injuries and physical activity

KiGGS gathered comprehensive data on injury occurrence in children and adolescents in Germany in all potential environments (home, child care facilities, leisure time, traffic) (7). The results show that deaths due to unintentional injuries have generally decreased in children under 15 years since 1990 (8). The only exception to this is children under 5 years, for whom the rate of hospital cases has strongly increased. The survey results also show that 15.9% of 16 327 children and adolescents have had an injury in the past 12 months (15.2% of these injuries were unintentional). Boys were significantly more frequently affected than girls (17.9% versus 14%) (8).

Just over 76% of boys and 75% of girls between 3 and 10 years were regularly physically active (at least once a week), with 43.1% (boys) and 36.2% (girls) being physically active three times or more per week (9).

The results show that in addition to gender differences, there were also notable differences between migrants and non-migrants and between social groups. The group with the lowest SES had the highest proportion of 3–10-year-old children who were physically active less than once a week (36.3% for boys, 40.4% for girls). This negative trend was most pronounced for those with a migratory background and/or those living in Eastern Germany. The potential for physical inactivity was higher in these subsamples: boys with the lowest SES had a three-times greater chance of being physically inactive than their peers in the highest SES group, and girls in the lowest SES group had a four-times higher chance for physical inactivity. This negative trend was also confirmed for both genders in children with a migratory background.

### Well-being

The results from this large epidemiological survey confirmed those from previous studies which found that children with low SES generally reported lower HRQoL than their peers with higher SES. Children and adolescents with different health status and migratory backgrounds differed in their HRQoL scores. According to parent reports (used in 7–10-year-olds), children with a migratory background had a lower HRQoL than peers without a migratory background. Self-reports (used in 11–17-year-olds) showed that children and young people with chronic conditions (such as chronic pain and asthma) reported a lower HRQoL than those without these conditions (10). The effect of migration and SES was the same in younger age groups.



Further analyses of these data showed a connection between well-being, injury and physical activity. A lower sense of well-being was associated with a higher rate of injury and lower rate of physical activity, regardless of age and gender (results not shown).

## Current national social and policy context

Despite the overall positive health situation of children and adolescents in Germany, opportunities to lead a healthy and burden-free life are unequally distributed. As the results above show, the risk of poorer health is particularly high for children in socially disadvantaged families, partly due to the lifestyles and living conditions of these families. Children growing up in such environments are more likely to be afflicted by traffic accidents, diseases, overweight and obesity problems and mental disorders (11). Parents with lower socioeconomic status live more frequently in areas with high traffic flows and near to industrial areas, both of which are associated with a higher risk of injuries, especially in urban areas (12–14).

Furthermore, children of single mothers are twice as likely to be involved in a traffic accident (as a pedestrian) than children who grow up in households with two parents (15). Since single-parent households are more common in eastern Germany (22% versus 16% in Germany), it is no surprise that injury rates are higher in the east. The overall risk of traffic-related injury is higher for children in the eastern Germany than in the western parts of Germany (16). Although these geographical differences in health status are diminishing, eastern Germany still has a higher rate of unemployment and single-parent households (14,17,18), placing migrant children at greater risk (19).

Based on this background and findings from KiGGS, the German Federal Government has declared the promotion of child health a priority issue. A set of child health goals were defined in a strategy paper and these are to be tackled by the year 2012 (11).

The paper contains pooled information from existing initiatives across several key areas of action:

- expanding prevention and health promotion activities
- promoting equal opportunities for health
- reducing existing health risks
- monitoring and conducting further basic research
- identifying risk and protective factors.

Reflecting observations from previous studies on the health of migrants, the strategy aims to place greater focus on this population group in the future by incorporating results from KiGGS into existing projects and interventions to optimize current approaches. More effort will be made to ensure implementation of federal government initiatives at state and regional level and to strengthen networking among stakeholders, including identifying activity areas and establishing goal-oriented cooperation across political sectors (11).

The strategy paper defines a number of activities and planned initiatives on children's health in Germany in relation to physical activity, injury, mental health and well-being and environmental health. Particular focus is placed on socially disadvantaged children and/or those with a migrant background with measures such as the promotion of healthy mental development of children and adolescents and initiatives concentrating on those with unfavourable health opportunities. A selection of activities from the strategy paper which focus on child injury, physical activity, mental health and environmental factors is shown in Table 1.

In addition to the strategy paper, Safe Kids Germany (Bundesarbeitsgemeinschaft Kindersicherheit e.V.), a German federal association focusing on injury prevention in children, has published national recommendations for injury prevention in children which were complemented by a symposium held in February 2008 in Bonn. The primary goal of the recommendations is the reduction of child injury by 20% by the year 2012 (20).

**Table 1**

Selection of activities from Federal Ministry of Health strategy paper (11)

<b>Creating sustainable improvement in nutrition and physical activity</b>
■ Improving the image of the bicycle and promotion of bicycle use
■ Focusing on children and adolescents through the campaign “Physical activity and health”
<b>Promoting healthy mental development in children and adolescents</b>
■ Exploring the possibility of incorporating mental health issues within child health examinations
■ Providing parents with information on healthy psychosocial development in their children
■ Developing a quality-assured and needs-oriented information system for the general population on attention deficit hyperactivity disorder
<b>Promoting health in socially disadvantaged children with unfavourable health opportunities, particularly migrant families</b>
■ Implementing measures set out in the national integration plan for families with a migratory background in relation to: prevention; promotion of intercultural competence in the provision of health care services; and further education in culturally sensitive care
■ Delivering on the commitment in the national integration plan to provide counselling services for migrant families from paediatricians, social paediatric centres and speech therapists
■ Implementing the national integration plan commitment to extend and systematize the distribution of letters to parents of migrant children encouraging them to support their child’s German language studies
<b>Strengthening cooperation in the area of equal health opportunities</b>
<b>Adding early primary prevention and mental health contents to child screening programmes</b>
<b>Prevention of child injury</b>
<b>Improvements in traffic safety</b>
<b>Reduction in exposure to allergens (allergenic substances)</b>

Safe Kids Germany is a member in the European Child Safety Alliance (ECSA) and Safe Kids Worldwide. The ECSA publishes the European Child Safety Alliance Report Cards,<sup>5</sup> which are developed for all members of the ECSA and which summarize a country’s performance in relation to the level of safety provided to children and adolescents by national policy. In the 2007 report card, Germany ranked in the upper-middle field (that is, 13<sup>th</sup> highest for males and 11<sup>th</sup> highest for females) out of a total of 18 countries (21). Two years later, in 2009, Germany moved up to the top third of countries evaluated (22), with traffic safety being one of the areas with the strongest improvement.

With regard to well-being, the German Federal Government aims to improve identification of psychosocial risk factors as a form of prevention of mental health problems. Additional measures include: low-threshold and timely access to psychiatric and psychotherapeutic services; extension of diagnostic and treatment options; and support for interdisciplinary regional networks for crisis intervention and treatment of mental health problems (23).

## Current policies and interventions

Based on these defined goals and aims of policy-makers, a number of existing and newly implemented interventions, many of which are aimed at injury prevention and the promotion of physical activity, can be highlighted. Well-being is not addressed as extensively, but efforts are being made to integrate aspects of mental health into, for example, child health examinations. Results have shown that many children with mental health problems are not adequately treated (11). By extending KiGGS, more information can be gathered on risk and protective factors, especially in relation to the specific target groups.

### Injury

One of the ongoing activities of Safe Kids Germany, which is supported by the Federal Ministry of Health, is a platform for the provision of information, cooperation, initiation and coordination of measures aimed at injury prevention in children. This platform includes the development of recommendations for improving child injury prevention in Germany (20) (see

<sup>5</sup>These report cards rank the country with regards to safety aspects and priority issues needing attention, and through the adoption, implementation and enforcement of good practices for the prevention of accidental injury or even death.

above) with several sources of information for parents and the launch of an online database in cooperation with BZgA. The online database, which was launched in 2003 (<http://www.bzga.de/kindersicherheit>) (24), contains extensive information on prevention measures, links to activities and providers and numerous downloads. More than 650 activities from approximately 400 providers are listed. Most of the listed items deal with children aged 5–10 years, but all age groups (from infants to teenagers) are covered. Information on child safety is available in the form of downloads and project presentations and through links to stakeholders who are active in the prevention of child injury.

Further activities focus on improving traffic safety. These have been quite successful in Germany. The number of children killed through traffic accidents could be reduced substantially by means of mandatory training on road safety in schools (a responsibility of the states) (20). Every June, Safe Kids Germany organizes a child safety day (Kindersicherheitstag) where information is made available on child injury prevention for all age groups. A different theme is selected each year. Specific lectures and events are presented by experts in the field, who offer a deeper insight into various areas of injury prevention (20).

The child safety day in June 2009 took the theme of “poisoning”. Particular focus was placed on children aged 1–6 years, and the aim was to sensitize parents and responsible persons about potential sources of poisoning, risks associated with these sources and effective poisoning prevention. Safety measures and practical tips were provided.

Safe Kids Germany also organizes temporary and permanent exhibitions on child safety topics. The new exhibition “Lernquadrat ‘Achtung giftig!’” [“Learning square ‘careful, poisonous!’”] complements the theme of this year’s child safety day and features many activities that raise awareness about poisonous substances. “Kinder im Haus!?” [“Children at home!?”] is a hands-on exhibition that addresses injuries occurring at home. Parents and adults have the opportunity to gain an insight into how their child views the house; in other words, they have the opportunity to view the home through the children’s eyes. Since 2007, the exhibition “Vier Säulen gegen Kinderunfälle” [“Four pillars against child injury”] has provided information on the main kinds of injury occurring at home and during free time: burns, falls, drowning and suffocation. Safe Kids Germany also conducts nationwide competitions and provides various information aids for people working in preschool and school settings.

Measures put forward by the Federal Government include:

- provision of extensive information for parents, children and young people on age-typical risk factors;
- stronger recognition of injury-prevention aspects of physical activity and sports;
- implementation of individually tailored programmes to enable children to handle risk situations;
- agreement with the industrial sector on technical injury prevention measures;
- development of safer bicycle paths; and
- creation of laws and regulations which will give municipalities more flexibility in establishing 30 km/hr speed zones

Safe Kids Germany’s recommendations on further development of the prevention of childhood accidents in Germany (20) provide a target-oriented approach to systematic child injury reduction. As was stated above, the main goal is to reduce child injury in Germany by 20% by the year 2012, but additional goals are also in place to ensure that the overall goal is attainable. These additional goals define aims in different societal spheres, such as in the family, in preschool, in schools, in the community and at district and city level, with the aim of making sustainable improvements in these areas. Strong cooperation at federal, state and regional levels between various institutions and stakeholders, including parent organizations, is necessary. Injury insurance companies are important partners in the implementation of these recommendations.

The German environment and health action programme (APUG) was initiated in 1999. It offers a sound platform for improving injury prevention and brings together stakeholders with federal ministries relevant in promoting and protecting the health of children and adolescents. The national action plan to enhance child orientation in Germany between 2005 and 2010 (23) is another important document in this context. It addresses issues relevant for improving conditions for children and aims to achieve greater child orientation in Germany. In terms of environmental health, the document highlights issues

such as providing education and information on the association between health and environment for parents, children and adolescents.

At the Fourth Ministerial Conference on Environment and Health in Budapest, Hungary in 2004, Germany made a commitment “to increase the emphasis on children and adolescents in environmental and health policy” (25). The German Federal Government is also planning and undertaking activities initiated by the CEHAPE (26) and is complementing them with initiatives at state level. RPGII of CEHAPE is devoted to accidents and injuries.

### Physical activity

In addition to injury prevention, Germany has also initiated a number of activities. Initiatives aimed at improving physical activity and addressing other related health issues are shown in Table 2.

**Table 2**

Initiatives focusing on physical activity in Germany

Initiative	Initiator
“Activity and health” campaign (“Germany’s getting fit. Why not join in?”)	Federal Ministry of Health
Conference on “Physical activity as part of everyday life – where people live and work”	German Forum on Disease Prevention and Health Promotion
Campaign “Feeling good”; brochure on evaluating the quality of programmes to prevent and treat overweight and obesity in children and adolescents	Federal Centre for Health Education
Various campaigns on nutrition behaviour and background conditions for health	German Federal Government

The German Federal Government is active in various European and international initiatives (25). It established the platform “Nutrition and physical activity” in September 2004 to promote physical activity and healthy nutrition and encourage people to actively fight overweight and obesity. There is also a “Healthy kindergartens and schools” working group that has been set up by the German Forum (23). Within Germany, the federal states are also active in developing and putting forward activities aimed at promoting an active lifestyle. A good example is the state of Saxony-Anhalt, which has supported numerous activities since 1998, almost all of which also consider the needs of socially disadvantaged population groups (27).

Child health constitutes an important research area in Germany. The aim is to continue to expand this field further in the future by further developing the child health strategy (27).

### Lessons learnt

This case study has highlighted current activities and initiatives in Germany aimed at injury prevention and the promotion of physical activity and well-being in children and adolescents. The case study shows that some measures are already being undertaken, but there is still improvement potential.

Due to the federal structure of Germany, societal sectors are separated, creating additional difficulties in the achievement of national goals. Cooperation, coordination and networking are therefore important features in working towards child injury prevention (20). Statewide activities that focus on promoting child safety are underway in Brandenburg, Lower Saxony and Schleswig-Holstein. Local networks in Berlin and Hamburg are very active in child injury prevention and in other federal states, such as North Rhine-Westphalia and Bavaria, established structures enable effective child injury prevention (20). Regional cooperation against child injury exists for Dortmund, Recklinghausen, Berlin, Rendsburg, Munich, Delmenhorst and Cologne, and recommendations for action, action plans and projects such as “safe communities” are being developed (28).

The findings from the KiGGS, HBSC and other surveys provide the fundamental basis for important political decisions on health and are indispensable parts of decision-making and priority-setting processes (27). Until now, data on child injury have not been continuously collected at population level (2). Available data are often limited to injuries occurring in public places like schools and to traffic-related injuries, where reporting is mandatory. Injuries occurring within the home and during free time are less well documented (7).

For this reason, further data on the occurrence of serious and/or fatal injuries are needed, and the potential association between the social position of the family and fatal injuries needs to be explored in greater depth. This has been reported for some countries, but has not yet been documented for Germany (7).

In relation to physical activity, KiGGS results show that most girls and boys are physically active, but there are notable differences with regards to gender, migration status and socioeconomic background. Such findings may provide a suitable starting point for intervention measures (25); they can point towards those population groups in greatest need and enable trends to be identified and monitored.

Because of the need to establish a solid database with extensive information on German children and adolescents (including those with a migrant background), the decision was made to extend KiGGS and to follow up the original cohort. The aim is to establish “health monitoring” for Germany (29) with the purpose of:

- observing and identifying trends and their change over time
- evaluating interventions and prevention measures
- contributing to resource- and quality-oriented needs strategies in health care (27).

To ensure efficient use of resources, existing data sources will be used and knowledge gaps will be filled. Representative health surveys which will consist of repeated cross-sectional surveys and longitudinal surveys will serve as the monitoring instrument. All age groups (0–80 years) will be covered and injuries and accidents will be a strong component of the monitoring, which will consist of interview and examination parts and detailed studies focusing on injury (27). The continuation of KiGGS will also provide a good basis for the evaluation of existing interventions and will serve as a quality-assurance instrument (20), supporting Germany’s efforts to achieve systematic and effective prevention of child injury (27).

Integration and involvement of families, especially those with migratory backgrounds and/or who come from a socially disadvantaged background, is immensely important. Furthermore, it would be desirable to increase the involvement of children and adolescents in decision-making processes. First steps in this direction have been made in the national action plan of the federal Ministry of Family Affairs, Senior Citizens, Women and Youth (23), in which children’s perspectives and opinions have been considered. The action plan was developed in partnership with children and adolescents and sets out measures that are to be implemented by 2010. A second wave of child participation took place between August 2005 and January 2006, with the aim of supporting children and adolescents to develop a report setting out their views and feedback on the action plan. This report serves as the first part of the implementation process of the national action plan.

Assessment of ongoing policies is still necessary to ensure that the targeted population groups are being reached effectively. The importance of evaluation of the different measures and interventions is recognized and is being considered in KiGGS, which will not only ensure health monitoring over time, but will also serve to evaluate the effectiveness and success of current interventions.

Currently, evaluation does not appear to assume a hugely significant role (30), despite its importance in quality assurance. A new working group whose focus is on quality improvement in child injury prevention has been established to improve this situation (30). Nevertheless, it would be advisable to review and assess existing data to improve efficiency. It would therefore be beneficial to merge the various data sources (hospital data, mortality data, work- and school-related injury data and survey data) (7) to enable deficits to be identified and the analysis of data on injury to be improved in the future.

Another necessary step is to promote regular physical activity in kindergartens and schools early, especially as this may have a preventive effect on the occurrence of certain injuries (7).



It is important that all these activities concentrate on reducing socio-environmentally determined health inequalities among children and adolescents. Population groups with migratory backgrounds should be the subject of particular attention. This may imply the development and implementation of more-targeted programmes not only for boys and girls, but also for migrants and those coming from lower socioeconomic backgrounds. Research findings show that socially disadvantaged families and migrants have a lower rate of attending preventive examinations for children (11). At the same time, less than 10% of the measures are gender-specific; only 5% specifically target socially disadvantaged population groups and 2% are aimed at reaching people whose first language is not German (30). Considering the high number of migrants and the low number of specific measures targeted at them, this is an aspect that should be improved in the future.

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## Hungary: a strategic approach to child injury prevention

Gabriella Páll,<sup>1</sup> Andrea Valek,<sup>1</sup> Dóra Várnai,<sup>1</sup> Ágnes Németh,<sup>1</sup> Anna Páldy,<sup>2</sup> Tibor Málnási,<sup>2</sup> Ildikó Almási,<sup>3</sup> Morag MacKay,<sup>4</sup> Attila Juhász,<sup>5</sup> Csilla Nagy<sup>5</sup>

<sup>1</sup> National Institute of Child Health, Budapest

<sup>2</sup> National Institute of Environmental Health, Budapest

<sup>3</sup> CEHAPE International Youth Representative, Hungary

<sup>4</sup> European Child Safety Alliance, Amsterdam, the Netherlands

<sup>5</sup> Regional Institute of Central Hungary of National Public Health and Medical Officer Service, Department of Health Promotion, Budapest

### Executive summary

As is the case with most European countries, the majority of fatalities among children and young people after the first year of life in Hungary arise as a result of injuries. There are over 300 deaths due to unintentional injury in the age group 0–24 years every year and around 24 000 injury-related hospitalizations. Injuries often result in long-term health care and rehabilitation needs and also lead to permanent health impairment, a decrease in the overall quality of life and reductions in work capability. The consequences not only affect the life of the individual concerned, but also influence the future of the family and present serious burdens to society.

Children and young people are exposed to accident risk to different extents. Toddlers (1–4 years), adolescents, boys, young people with higher risk-taking attitudes and those living in poverty are at greater risk of injury.

According to research results and international experience, it is possible to reduce significantly the number of serious injuries suffered by children and young people and to mitigate their consequences. WHO, the EU and the Fourth Ministerial Conference on Environment and Health in Budapest, Hungary in 2004 have urged European countries to prepare national action plans with a view to preventing injuries among children and young people, on the basis of an assessment of the present situation in their countries.

In Hungary, the national programme for infant and child health has provided an appropriate framework for strategic planning. The national action plan on child and youth safety has arisen as a result of cooperation among Hungarian experts working in various related areas. The document aims to promote the prevention of unintentional injuries among those under 24 years of age. It describes objectives for the next 10 years (2010–2019), defines actions for the first 3 years (2010–2012) and identifies methods through which results can be monitored and evaluated.

The programme's mission is to establish "a national partnership for the greater safety of children and youth". It seeks to more effectively prevent the incidence of unintentional injuries with the most serious outcomes without obstructing the healthy physical, mental, social and psychological development of children and youth. The goal is to reduce mortality due to injuries among people under 24 years by 30% in 10 years; if achieved, this target would result in a mortality rate from this cause in Hungary that is similar to that found in the European countries with the best results.

The action plan focuses on road traffic safety, safety at home and at child care institutions, safety during play, leisure and sports activities and on the coordination, monitoring and evaluation of domestic efforts aimed at injury prevention. The goals can only be achieved through joint efforts in the areas concerned, with the support of decision-makers and through cooperation among experts, involvement of children and young people and utilization of the resources and capabilities of non-profit-making organizations.

In this case study, we share our experience of the development and evaluation process of the national child and youth safety action plan.

## Background information

### Why focus on unintentional injury prevention?

As is the case in most European countries, the majority of fatalities among children and young people after the first year of life in Hungary arise as a result of external causes (unintentional injuries and violence). Unintentional injuries result in higher mortality rates among children and young people after the first year of life than all other diseases combined (1). In the age group 0–24 years, there are over 300 deaths due to accidents and around 24 000 injury-related hospitalizations in the country every year. Injuries often result in long-term health care and rehabilitation needs and also lead to permanent health impairment, decrease in the overall quality of life and in a reduction in work capability.

According to research results and international experience, it is possible to reduce significantly the number of serious accidents and mitigate their consequences. It has been demonstrated that mortality rates in countries with developed economies that have relatively low rates can witness even further reductions through investigating and analysing causes and correlations, improving data collection, establishing efficient prevention measures, introducing measures to make the environment safer, passing regulations, teaching and educating the population, improving accident and emergency care services and designing and implementing programmes consistently (2).

No improvement can be expected without commitment and coordinated injury prevention efforts. If no action is taken, a worsening of the present situation can be anticipated due to the processes of motorization, urbanization and the spread of poverty in the country (3).

Several international conventions and initiatives have been launched to promote the health, safety and well-being of children and young people, such as the United Nations Convention on the Rights of the Child (4), the Millennium Development Goals (5), the *A World Fit for Children resolution* (6), the CEHAPE (7), the *Communication from the Commission to the European Parliament and the Council on actions for a safer Europe* (8), the EU's road safety action programme (9), the WHO European strategy for child and adolescent health and development (10), and the child safety action plan (CSAP) for Europe project (11). These initiatives not only prove that international organizations are committed to the health of young people, but also demonstrate that there is international agreement regarding the most urgent tasks in the area.

### Inequities in injury risk

Children and young people are exposed to accident risk to different extents. Toddlers (1–4 years), adolescents, boys, young people with higher risk-taking attitudes and those living in poverty are at greater risk of injury.

#### Age

Injury risk is highest among toddlers (1–4 years), as they are not able to identify all possible risk factors, and young people, for whom social and behavioural factors significantly influence the injury risk (rule-breaking behaviour, increased risk-taking attitudes and risk behaviours). The numbers of children who die (Table 1) and who are hospitalized (Table 2) in Hungary due to unintentional injuries by age groups are discussed below.

#### Gender

Injury risk is higher among boys than girls in all age groups, with the gender difference becoming greater with age. The boy:girl ratio for fatal accidents in Hungary is 2:1 in the toddler years and 4:1 by young adulthood. The ratio for hospital admissions is 1.5:1–2:1 for all age groups.

**Table 1**

Death causes ranked by age groups: the figures represent the average annual number of those who died between 2005 and 2007 (rounded data)

Cause	Age (years)					
	0–4	5–9	10–14	15–19	20–24	0–24
Road traffic accidents	11	13	21	74	127	246
Drowning	5	2	7	11	8	33
Poisoning	2	0	2	4	12	20
Strangulation, choking	9	1	3	2	1	16
Falls	0	1	1	2	4	8
Burns	2	0	1	0	0	3

Source: Hungarian Central Statistical Office.

**Table 2**

Injuries ranking based on the average annual number of hospital admissions by age groups, 2005–2007 (rounded data)

Cause	Age (years)					
	0–4	5–9	10–14	15–19	20–24	0–24
Falls	3 855	3 920	4 878	3 727	3 024	19 404
Traffic accidents	326	887	1 587	2 040	2 377	7 217
Poisoning	1 508	279	271	282	94	2 436
Burns	582	146	121	91	89	1 029
Strangulation, choking	258	51	25	12	8	354
Near-drowning	16	2	3	3	1	25

Source: Hungarian National Health Insurance Fund.

### Socioeconomic status

Poverty, low education level and low SES usually increase the risk of injury. Children and young people with lower SES tend to grow up in crowded households and communities where safety is not a priority. Their means of transportation are often less safe, access to protective equipment is limited, they often lack parental supervision and they have less access to accident and emergency services.

According to country data from the HBSC 2006 survey, 5.9% of children in the highest SES category were injured three or more times in a year, but the rates for the middle and the lowest SES groups were 8.5% and 12.7% respectively. These data also suggest that burns, choking and accidents in the home are more frequent in families with lower family affluence while sports accidents and being injured as a motor vehicle driver are less frequent (12).

### Disability

The injury risk for children and young people living with mental disorders or sensory disabilities (especially those who are blind or have sight impairment) and those with physical disabilities is above the average of the healthy population (13), although precise national data on this issue are not available.

## **Current situation regarding childhood unintentional injuries in Hungary**

### About Hungary

Hungary is a republic with a territory of 93 000 km<sup>2</sup>. For administrative purposes, the country is divided into 19 counties and the capital city (Budapest) or 7 regions.

Following a change in the political system in 1989, a new independent democratic state was established with parliamentary democracy based on free elections and a multiparty structure. New legislation eliminated barriers to the development of a market economy.

Hungary faced temporary severe economic decline, unemployment and social polarization in the 1990s. Currently, Hungary is a member of the United Nations, WHO, the Council of Europe and the Organisation for Economic Co-operation and Development (OECD). It joined the EU in 2004.

#### Data sources and availability

Mortality and hospital admission data of injury types according to ICD codes by gender and age group are available, but data on the social distribution of mortality and morbidity are lacking. The HBSC survey allows an analysis of medically treated injuries for the 11–17 age group by SES (14), but there is no systematic data collection to support the study of influencing factors for unintentional injuries, including SES, for younger age groups. Systematic collection and evaluation of child injury data based on different data sources and a questionnaire-based survey on child safety to allow measurement of indicators required for monitoring the national child and youth safety action plan have been proposed.

#### Mortality rates for unintentional injuries

In Hungary, 5–37 children per 100 000 die annually from unintentional injuries. The mortality rate is lowest among young school-aged children and highest among young adults, adolescents and toddlers. Unintentional injuries result in higher mortality among infants and young people after the first year of life than all other causes, with road traffic accidents causing most casualties in each age group. Drowning ranks second and poisoning third in the 0–24 years age group, followed by strangulation/choking. Falls are fifth, then burns (Table 1).

#### Morbidity of unintentional injuries

Falls rank first as the cause of hospital admission in all age groups (with the exception of infants and toddlers), followed by road traffic accidents (Table 2). Poisoning ranks third in almost every age group, followed by burns and strangulation/choking. Although hospital treatment after near-drowning incidents is relatively rare, this condition often requires intense care and may result in long-term impairment.

#### **Influencing the policy-making process**

The CSAP initiative (11) assessed each participating country's performance with respect to national policy to support child safety. Hungary was ranked as eleventh out of the 24 participating countries, with an overall score of 36.5 out of the maximum 60 (15), suggesting that further action was warranted.

We edited a report on childhood injuries for decision-makers and stakeholders and, within the framework of the AdRisk projects, developed a questionnaire to enable them to investigate the level of interest in the development of a national child and youth safety action plan.

## **Current national social and policy context**

### **Inequity**

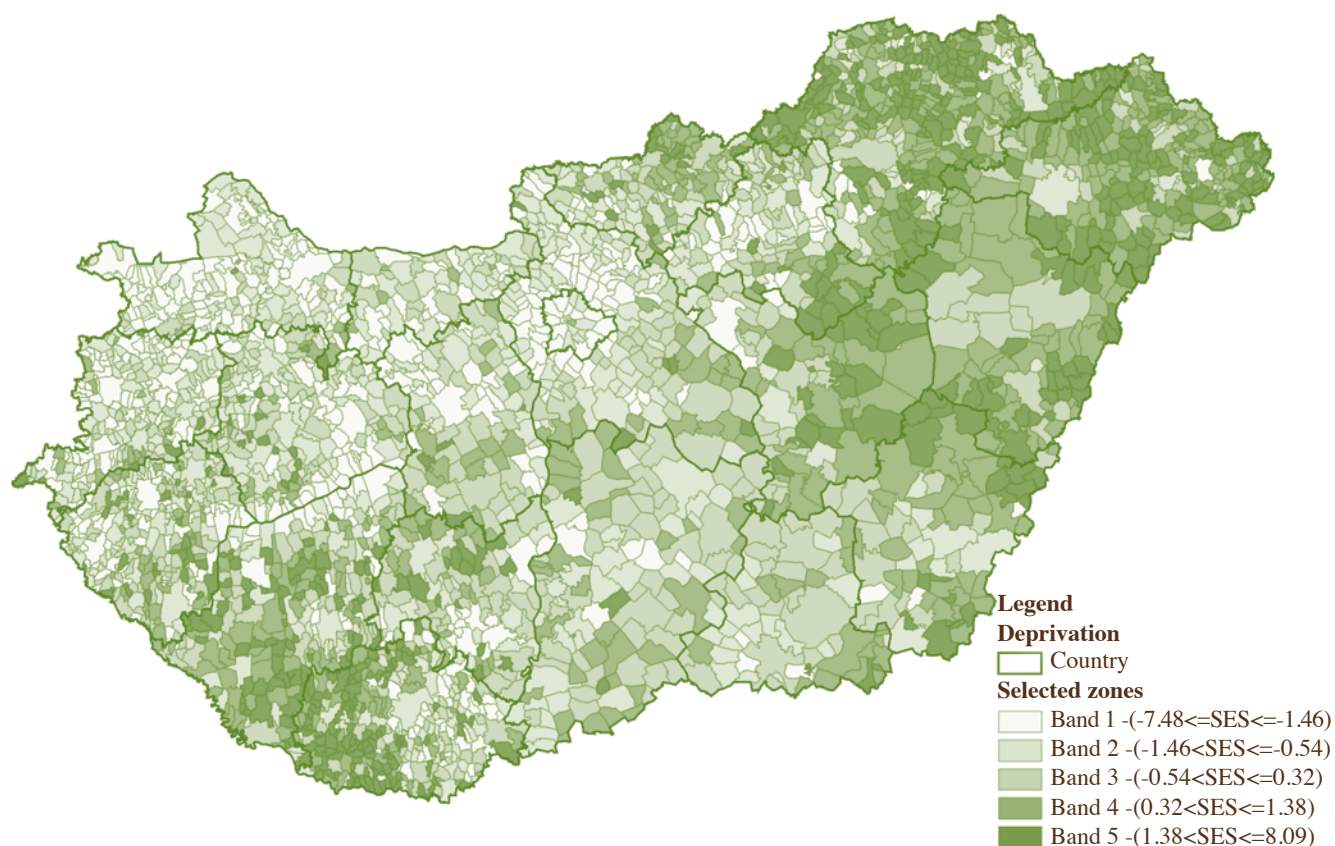
We performed an ecological comparison of mortality due to external causes of death in the 0–19 age group for the years 1998–2007 and the Hungarian Deprivation Index (DI) provided by the authors (16–18). This composite, multidimensional, municipality-level DI has been developed using international and national references. The index includes seven socioeconomic factors as indicators: income, educational qualification, unemployment, one-parent families, large families, density of housing, and car ownership.

The spatial inequality of mortality was defined by the “rapid inquiry facility” (RIF) diseases-mapping tool. The smoothed standardized mortality ratio (smoothed SMR) were calculated using the full hierarchical Bayesian methods (the Besag, York, Mollié (BYM) model (19)). The investigation of the relationship between deprivation and the spatial distribution of selected external causes of mortality in Hungary was carried out using the RIF risk analysis tool. The municipalities were grouped into deprivation quartiles in the risk analysis module and indirectly standardized mortality risks were calculated for each quartile. The indirect standardization compared the observed cases by gender and one-year age group with the expected number of events based on mortality rates in the country.

The least favoured areas were detected in the north-eastern–south-western direction of the axis of Hungary. Two large deprived areas were identified in the north–eastern and eastern parts and one in the south-western parts of the country. Two counties, Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg in the north-eastern part of Hungary, proved to be the most deprived and underdeveloped parts of the country (Fig.1). Further investigation indicated that the proportion of Roma population is higher in the more-deprived groups of municipalities than in less deprived groups (Fig. 2).

**Fig. 1**

The spatial distribution of deprivation index at municipality level, banded by quartile

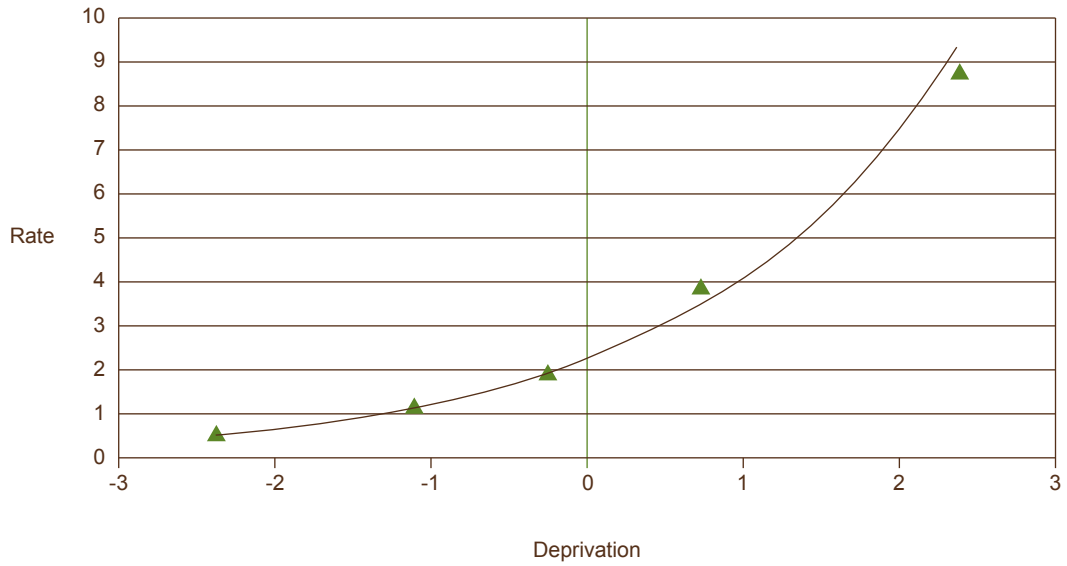


The results of the ecological study show significant correlation between the DI of municipalities and the mortality due to external causes in the 0–19 age group for both genders (Fig. 3 and 4). However, there was no statistical evidence to suggest the association between the rate of Roma population and the external causes of death in the target population.



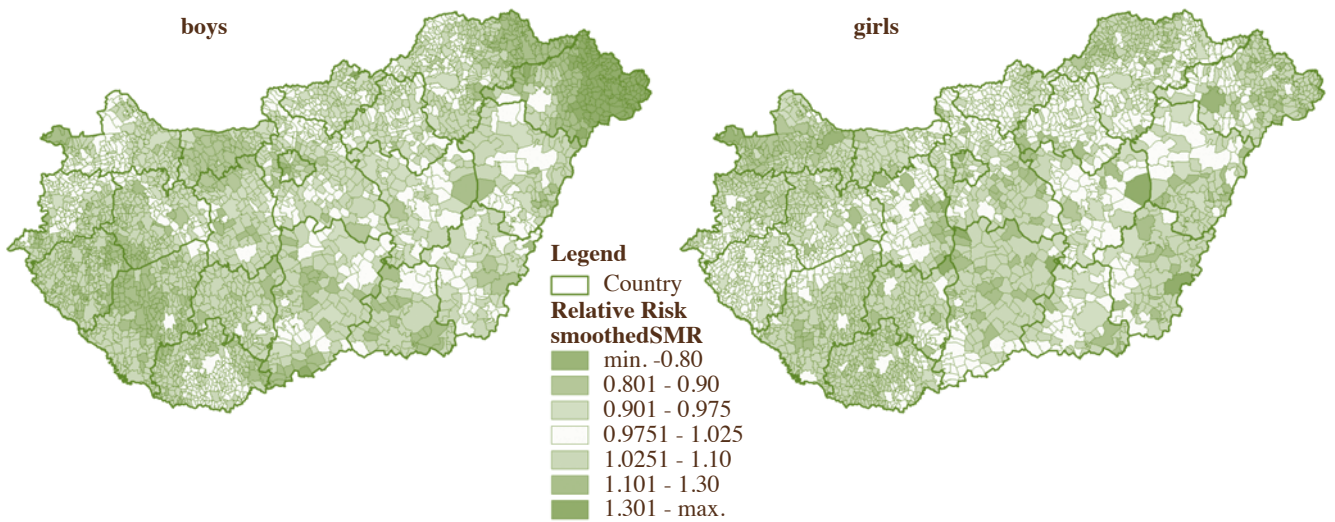
**Fig. 2**

Association between the deprivation index at municipality level and the proportion of Roma population in Hungary (1998–2007)



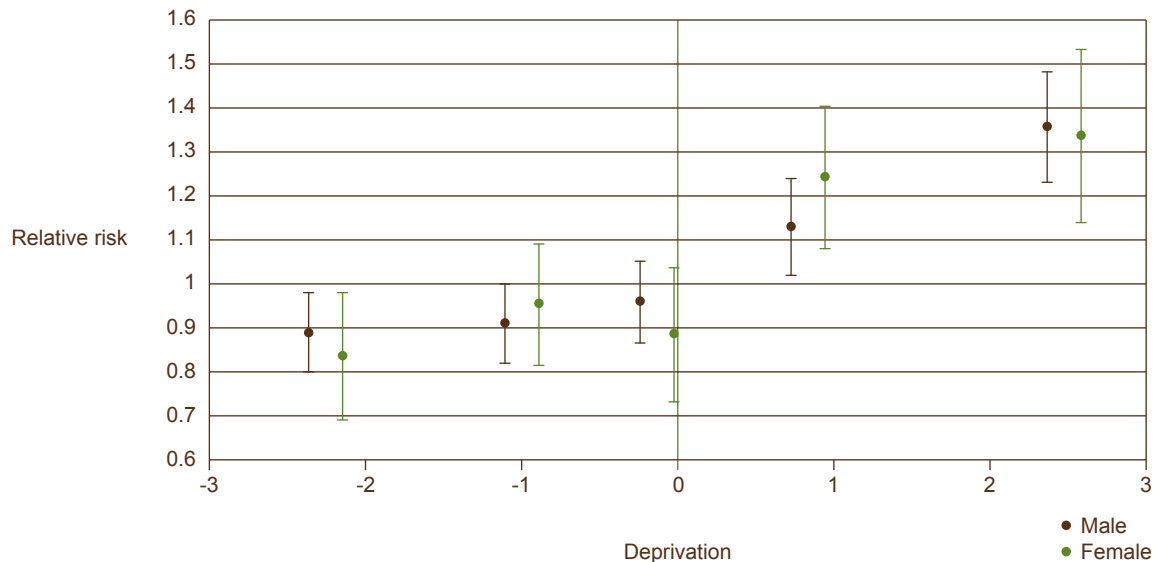
**Fig. 3**

Distribution of external causes of death in Hungary for 0–19-year-olds in boys and girls (1998–2007)



**Fig. 4**

Association between external causes of death in 0–19-year-olds and deprivation index at municipality level in Hungary (1998–2007)



### National policy documents affecting injury prevention

In Hungary, three major government-endorsed policy documents affect child injury prevention policy. The national programme for infant and child health, *Children, our common treasure* (20), served as the framework for the development of the national child and youth safety action plan, described below. The national injury prevention strategy (Bényi, unpublished, 2009) and the public road transport safety action programme 2008–2010 (21) were developed in parallel, with both considering children and young people as especially vulnerable populations.

#### The national programme for infant and child health

The national programme for infant and child health (20), adopted in 2005, is based on the assumption that adults' physical and mental capabilities and their ability to avoid disease and maintain health are rooted in the childhood years, as the "losses" suffered in this period cannot be restored later. This is definitely true with respect to the consequences of injuries suffered in the infant years or in childhood. The programme therefore defined injury prevention as the first task under the subsection "public health issues requiring multidisciplinary/multisectoral cooperation", emphasizing that it should be aligned with the national injury prevention strategy, which is under development.

#### The national injury prevention strategy

The national injury prevention strategy (Bényi, unpublished, 2009) has been commissioned by the ministry of health and is being developed in parallel with the national action plan on child and youth safety. It is expected that it will be formally adopted in 2009. The strategy emphasizes the increased risk to which children and young people are exposed and considers prevention as a priority objective.

#### Road safety action plan 2008–2010

The *Road safety action plan 2008–2010* (21) contains several measures that directly or indirectly aim to improve the safety of children and young people during travel. Measures planned in relation to infrastructure, regulations, inspection and support for injury-preventing efforts may also have a positive influence on the road traffic safety of children and young people.



## Policy development

In the first half of 2009, Hungary developed its national child and youth safety action plan. An intersectoral approach was used, with a special focus on youth involvement. Critical issues were identified and the development process was evaluated.

### Intersectoral action

The national child and youth safety action plan has been prepared in line with *Children, our common treasure (20)*. The project was coordinated by the National Institute of Child Health and supported by the ministry of health.

In the preparatory phase, mortality and morbidity data for injuries were analysed, national partners were identified and international examples of strategic planning were mapped.

Content is based on the conclusions of a multisectoral workshop organized by the National Institute of Child Health which was held on 23 February 2009. Eighteen experts on health, education, the environment and consumer protection, transportation, law enforcement and social sectors, as well as young people, attended the meeting, where the mission statement and ten-year objectives were established and five critical issues were identified. These were:

- road traffic safety
- home safety
- safety in child care institutions
- play, leisure and sports safety
- coordination, evaluation and monitoring.

A working group of three to seven experts was organized for each critical issue and proposed actions for the 2010–2012 period were developed, as were indicators for the evaluation of the programme. A number of institutes and organizations from various sectors then reviewed the draft action plan.

### Youth involvement

Youth involvement in the decision-making process in Hungary has increased in recent years. It was very important for the process of developing the national child and youth safety action plan, not only because children and young people are among the most vulnerable to unintentional injuries, but also because young people feel the need to have a voice when decisions are made about their future. Youth representatives of the National Conference of Student Unions and the CEHAPE international youth representative, whose nationality is Hungarian, were involved in the development of the action plan.

### Process evaluation

The process of the development of the Hungarian child and youth safety action plan document underwent an evaluation and a critical appraisal of the development process. A set of key questions for key informant interviews was developed by the evaluator and reviewed by the CSAP coordinator. The questions were revised and then approved at the Hungarian stakeholders' meeting on 23 February 2009.

A list of key stakeholders for the interviews was developed by the CSAP coordinator and discussed with the evaluator. Interviews were conducted in person on 13–14 May 2009. Interviews and the final document were analysed, strengths, weaknesses, opportunities and threats were identified and documented, and recommendations were developed.

## Lessons learnt

Hungary has employed a strategic approach to injury prevention that aims to address inequities and involve youth in the process.

*Children, our common treasure (20)* served as a strong foundation for the process of strategic planning, as it provided a government-endorsed mandate for the leading organization (National Institute of Child Health) and for collaborating sectors. Clear understanding of responsibilities and strong leadership from the lead agency was a prerequisite to success.

The CSAP initiative, coordinated by the ECSA, facilitated activity within the country and provided useful tools (such as action planning for child safety and a child safety good practice guide). Participation in this programme enabled us to access international experience and share information and knowledge with other countries.

Data on morbidity and mortality rates from injuries were available, but accessing them called for special effort. Data gaps on issues such as influencing factors for injuries in young children were identified. More work has to be done to fill these gaps in the implementation phase of the plan. This is critically important for monitoring progress on addressing the problem of social inequity.

Analysing available data on the current situation has to be the first step of strategic planning. Strategic planning relies not only on availability of data on the epidemiology of injuries, but also on definition of the responsibilities and mandate of the sectors and organizations affected and good knowledge about infrastructure and capacity to support activities. The level of engagement with organizations ensured that the expertise needed to develop a grounded, realistic plan was available.

The tight time scales defined for the development process were met; while some felt the time scales were too short, their achievement reflected well on the process, the lead organization and the CSAP coordinator.

The process has increased capacity for child injury prevention within Hungary by increasing levels of awareness and knowledge of child injury among key stakeholders, highlighting new opportunities for collaboration and cooperation and aligning efforts towards achievement of common goals to address specified targets within a national child safety action plan.

Although an evidence-based good practice approach was used to identify future actions within the planning process, it is likely that existing practice will not be affected unless individual organizations choose to re-examine their policies and practices in light of the good practice information.

Stakeholders are enthusiastic and have expressed a desire to continue to work together and to integrate components of the plan into their own business plans. This is an extremely positive outcome, but presents both opportunities and threats.

The child and youth safety action plan development process has resulted in some very positive outcomes with respect to stakeholder involvement. The challenge now is how to manage ongoing expectations. Several partners have expressed doubt that the plan will move forward and that implementation will occur in the current political and economic environment. Careful thought will need to be given to developing a communications strategy to enable us to move from the planning process toward implementation and ensure that the momentum gained through the planning process is not lost.

Maintaining the support of, and ensuring positive communication with, those involved will be important while government endorsement of the plan is sought. Effective distribution of the plan, along with a clear advocacy strategy, will increase the likelihood that government support will be forthcoming, but this will most likely require a follow-up meeting(s) with the stakeholder group to explore where points of influence might lie.

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# Ireland: the socio-environmental context of child well-being and the involvement of children in the development of a national set of well-being indicators

Anne-Marie Brooks,<sup>1</sup> Sinead Hanafin,<sup>1</sup> Noreen Kearns,<sup>2</sup> Michal Molcho,<sup>3</sup> Saoirse Nic Gabhainn,<sup>3</sup> Lisa Pursell<sup>3</sup>

<sup>1</sup>Office of the Minister for Children and Youth Affairs, Department of Health and Children, Government of Ireland

<sup>2</sup>Child and Family Research Centre, National University of Ireland, Galway

<sup>3</sup>Health Promotion Research Centre, National University of Ireland, Galway

## Executive summary

This case study from Ireland includes an exploration of the relationships between engaging in physical activity and perceptions of local area among children, highlighting the importance of local facilities, and the perceptions of children of such facilities in promoting physical activity. It sets this exploration in the context of recent policy and strategy development for children in Ireland, particularly that which focuses on the provision of appropriate play and leisure opportunities.

The focus of the case study is the involvement of children in developing indicators of well-being for children. During the process of indicator development, children provided clear indications that having “good places to go” was important to their well-being. Subsequently, this was adopted as an indicator of child well-being and will be reported on every two years, employing data taken from the HBSC surveys in Ireland.

Given the relationships between having good places to go and physical activity, future initiatives designed to improve access to recreational environments may also have a positive impact on physical activity levels. Social inequalities in physical activity and having good places to go will continue to be monitored and tackled as part of these initiatives.

## Evidence base and social context

Physical activity is a key determinant of good physical and psychosocial health and is of particular importance for young people, as many chronic diseases originate in childhood (1). Physical inactivity, in combination with unhealthy diets, is among the leading causes of the major noncommunicable diseases, including cardiovascular disease, type II diabetes and certain types of cancer, and contributes substantially to the global burden of disease, death and disability (2).

Overweight and obesity pose a global health challenge. In 2007, an estimated 22 million children under the age of 5 years were overweight throughout the world (2). The prevalence of obesity within Europe is increasing rapidly: recent projections estimate that 150 million adults and 15 million children will be obese by 2010. Both childhood obesity and the rate of increase in its prevalence have been growing steadily, the current rate being 10 times that of the 1970s (1).

It has been acknowledged within Ireland that rising rates of sedentary behaviours and obesity contribute to the poorer health status of those children who do not meet recommended physical activity levels (3,4). One in five children in Ireland in post-primary education in 2005 was overweight or obese (5), and the rates were higher than the international average for girls aged 13–15 years (3).

From an international perspective, physical activity levels among children in Ireland compare favourably with those in many other countries. Data extracted from the HBSC 2006 survey for international comparison showed that 59.2% of children aged 11–15 years reported being physically active for at least 60 minutes per day on more than four days a week, compared to an HBSC average of 42.6%. Overall, children in Ireland ranked first among the 41 participating countries (6). While previous HBSC surveys in Ireland showed a decrease in the frequency of children exercising four or more times a week between 1998 (53.5%) and 2002 (47%), the 2006 survey reported a return to a level similar to that of 1998 (53%) (7).

## Social and environmental determinants of physical activity

The 2002 and 2006 HBSC surveys in Ireland found no relationship between parental social class and reported levels of vigorous physical activity (7). However, both survey rounds revealed similar urban/rural, gender and age differences in physical activity, with age differences being particularly noticeable among girls (58% of 10–11-year-olds to 28% of 15–17-year-olds (7)). Similar findings with respect to girls were documented by the “Take PART” study conducted in North Dublin City and County (8) and in South Dublin and North Wicklow (9), in which a lower proportion of females met physical activity recommendations (moderately intensive for at least one hour per day (10)) than did boys (North Dublin: 38% versus 48%; and South Dublin/Wicklow: 30% versus 42%).

An international review of data of direct measures of physical activity in a range of settings and contexts, together with indirect measures such as sedentariness, fitness and attitudes, demonstrated that physical activity in clearly defined contexts such as active transport, school physical education and organized sports is declining in many countries. The review further concluded that young people would like to be active but are often constrained by external factors such as school policy or curricula, parental rules in relation to safety, convenience and physical environmental factors (11).

The report of the National Taskforce on Obesity in Ireland, published in 2005 (3), discussed the social and environmental determinants of physical activity. Social determinants include factors such as SES, education level, gender, family and peer group influences and individual perceptions of the benefits of physical activity, while environmental determinants include geographic location, time of year and proximity of facilities such as open spaces, parks and safe recreational areas (3).

In a similar vein, research for an Irish study conducted to examine the perception of young people aged 12–18 years on opportunities, barriers and supports for involvement in recreational activities found that there was a small but significant group of young people in Ireland (6% of those sampled) who were low in leisure motivation (that is, they participated very little in sports, hobbies or group activities) (12). It was noted that many early school-leavers fell into this category. Moreover, the study highlighted major structural barriers<sup>6</sup> that inhibited participation in recreation among young people, with lack of leisure facilities and activities ranking highest in the public consultation (12,13).

De Roiste & Dineen (12) found that a key determinant of children’s involvement in recreational activity was their perception of the physical environment where they lived. This included perceptions of the inadequacy of recreation provision and of difficulties in accessing leisure activities due to, for example, lack of public transport. These findings are complemented by those of O’Keeffe et al. (14), who examined the links between perception of local environment and physical activity among children in Ireland between 10 and 18 years. Significant associations were found between levels of physical activity and perceptions that it is safe to play, that one can trust people, that one can ask for a favour and that there are good places to go in the local area.

A 2006 review of the literature from the Irish National Heart Alliance (10) focused on the main elements of physical environments that influence physical activity and discussed key places for young people’s activity, classifying places according to the settings of neighbourhoods or communities, schools and dedicated facilities for physical activity. It considered neighbourhoods or communities in terms of being functional, safe, aesthetically pleasing and possessing mixed-use destinations. Schools were considered in terms of their location, facilities for active transport and their design to support physical activity. Facilities for physical activity (playground, parks, sports/recreational facilities) were considered in terms of their convenience, accessibility and low cost.

Findings from de Roiste & Dineen (12) on the value of the physical environment for physical activity in Ireland were supported by the findings of McGrath & Nic Gabhainn (15) in a study of perceptions of place among youth in Ireland. They reported that distinct patterns in children’s perception of opportunities for recreation were associated with their urban/rural location and farming/non-farming backgrounds. They revealed that girls, older children (14–17 years) and those from rural backgrounds were less likely (with odds ratios of 0.7, 0.5 and 0.5 respectively) to find good places to go within their local area.

<sup>6</sup> Structural barriers were defined as physical or material barriers that inhibited participation in recreation (13).

More recent Irish data (6) documented gender, age and social class differences in feeling there are good places to go. The percentage of children who reported that there were good places to go was higher among boys (45.4% of boys versus 39% of girls) and younger children (77.1% of 9-year-olds versus 33.3% of 15–17-year-olds) and those in lower social classes (45.2% of children with unskilled or semi-skilled parents versus 38.6% of children with professional parents). Differences by geographic area were also reported, with children in the Dublin region more likely to report that there were good places in their area to go (58.4%) compared to children in the western region of Ireland, who were the least likely to report this (33.4%). Data from the HBSC 2006 survey showed that 45.7% of children in Ireland aged 11–15 years reported that there were good places to go in their locality, compared to an HBSC average of 64.3%. Overall, children in Ireland ranked lowest among the seven countries that asked this question in 2006; in the HBSC 2002 survey, 15 countries used the measure and children in Ireland ranked fourteenth (45.3%) (6).

Documented inequalities in physical activity with respect to gender, urban/rural location and age differences and in perceptions of place in relation to gender, age and social class differences were further investigated for the current case study. Using data from the HBSC 2006 survey for Ireland, the relationships between reports of physical activity and those of having good places to go were examined with respect to the impact of gender, urban/rural location, SES and age on this relationship.

Analyses revealed significant links between perceptions of place and reported physical activity (Table 1). Children who reported that there were good places to go in their local area were 1.7 times more likely to also report meeting physical activity guidelines. These relationships were stable across urban and rural locations, genders, SES and age groups.

**Table 1**

Percentage reporting physical activity five or more days per week by reports of “good places to go”, by gender, location, socioeconomic status and age

Factors	Reported good places to go		Odds ratio (95% CI)	Mantel-Haenszel common odds (95% CI)	
	Yes (%)	No (%)			
<b>Overall</b>	2 556 (62.3)	2 790 (49.5)	1.7 (1.6–1.8)	–	
<b>Gender</b>	<b>Male</b>	1 535 (69.0)	1 586 (59.0)	1.5 (1.4–1.7)	1.6 (1.5–1.8)
	<b>Female</b>	1 018 (54.4)	1 201 (17.5)	1.7 (1.5–2.0)	
<b>Location</b>	<b>Urban</b>	1 374 (61.3)	919 (49.9)	1.6 (1.4–1.8)	1.7 (1.6–1.9)
	<b>Rural</b>	1 154 (63.4)	1 849 (49.0)	1.8 (1.6–2.0)	
<b>SES</b>	<b>SC 1–2</b>	704 (63.0)	896 (50.4)	1.7 (1.4–1.9)	1.7 (1.6–1.9)
	<b>SC 3–4</b>	1 047 (62.5)	1 123 (48.3)	1.8 (1.6–2.0)	
	<b>SC 5–6</b>	522 (61.8)	513 (50.0)	1.6 (1.3–1.9)	
<b>Age</b>	<b>10–11 years</b>	562 (77.9)	417 (71.9)	1.4 (1.1–1.8)	1.5 (1.3–1.6)
	<b>12–14 years</b>	1 379 (66.1)	1 426 (57.8)	1.4 (1.3–1.6)	
	<b>15–17 years</b>	579 (46.7)	906 (36.4)	1.5 (1.3–1.8)	

Note: SC = social class (1–2: higher and lower professional; 3–4: skilled white and blue collar; 5–6: semi- and unskilled).

The perception of having good places to go was fairly consistent in its relationship with physical activity across other predictors of physical activity. The odds that females were more likely to engage in physical exercise if they perceived they had good places to go was slightly higher than that for males, but not significantly so ( $X^2 = 1.82$ ;  $p = 0.17$ ). A slight increase in odds was found for children from rural compared to urban locations, but the difference was not significant ( $X^2 = 2.11$ ;  $p = 0.15$ ). Age showed a slight trend in odds, with older children more likely to exercise with good places to go, as did the middle socioeconomic groups, but as before, these were not significant differences ( $X^2 = 0.82$ ;  $p = 0.66$  and  $X^2 = 0.84$ ;  $p = 0.66$  respectively).

It can be concluded that children in Ireland rank relatively well against other European countries in terms of their self-reported levels of physical activity, but an important minority are not engaged in sufficient physical activity to maximize the potential health and social gain and to maintain health and well-being. In addition, significant differences in physical activity



have been documented between sociodemographic subgroups, particularly by gender, age and location (urban/rural). Key determinants of engaging in physical activity include the physical and social environment that young people live in; there are also significant associations between physical activity and the perception of good places to go in the local area. More recently, there have been documented social inequalities in reporting having good places to go in the local area, and children in Ireland rank poorly in comparison to their European peers on this issue.

## Policy context

The United Nations Convention on the Rights of the Child (16), ratified by Ireland in 1992, presents a set of rights and obligations on the part of Member States regarding children and young people. Particularly relevant to this case study are the convention's provisions on listening to children and providing them with the opportunity to express themselves and have their opinions taken into account (articles 3 and 12) (17). The convention also commits to a number of important social rights, such as the right to participate in leisure, recreational and cultural activities (Article 31) (18).

The policy context of this case study is framed by *The national children's strategy: our children – their lives* (19), a ten-year policy framework that highlights the built and natural environments as being highly important to children's lives. Objective D of the strategy states that “children will have access to play, sport, recreation and cultural activities to enrich their experience of childhood” (19).

The strategy addresses commitments made in the United Nations Convention on the Rights of the Child, including a commitment to develop national play and recreation policies. The three national goals of the strategy are:

1. children will have a voice in matters which affect them and their views will be given due weight in accordance with their age and maturity;
2. children's lives will be better understood; their lives will benefit from evaluation, research and information on their needs, rights and the effectiveness of services; and
3. children will receive quality supports and services to promote all aspects of their development.

The strategy identifies a range of initiatives that include: the publication of play and recreation policies; the enhancement of the design of accessible, safe, open-space provision; consideration of children's safety while engaging in open-space activities; and ensuring that children can engage in protecting and enhancing the environment.

Two important strategic developments followed the launch of the national children's strategy. First, in 2001, a National Children's Office<sup>7</sup> (NCO) was established to lead and oversee the implementation of the national children's strategy. The NCO was given primary responsibility for Goal 1 (children's participation) and Goal 2 (research).

Second, the programme for government (20) built on the commitments regarding play and recreation, stating that: “We will develop a national play and recreation policy which will aim to ensure that all children have access to at least a minimum standard of play and recreation facilities”.

Two key outputs of these developments targeted at younger and older children via play and recreation policies shall be briefly outlined. Regarding the former, the impetus for the development of the national play policy came from consultation with children during the development of the national children's strategy, when it came to light that a lack of play opportunities was the most frequently cited concern of children throughout the country (21). It was recognized that in contrast to other EU countries, including Belgium, the Netherlands, United Kingdom and Sweden, play was neglected at policy level in Ireland. A shortage of safe public play spaces, the lack of ring-fenced government funding for play, poorly developed public awareness of the value of play and no national strategy for play were highlighted (21).

<sup>7</sup>The NCO was integrated into the Office of the Minister for Children and Youth Affairs (OMCYA) in 2005 and is now located within the Department of Health and Children.



*Ready, steady, play!* A national play policy was published by the NCO in 2004 (21). The policy aimed to raise awareness of the importance of play and to contribute to the expansion of public play facilities. Eight core objectives were set out, providing a framework for the promotion of positive play opportunities aimed at younger children (aged up to 12 years):

1. give children a voice in the design and implementation of play policies and facilities;
2. raise awareness of the importance of play;
3. ensure that children's play needs are met through the development of a child-friendly environment;
4. maximize the range of public play opportunities available to all children, particularly children who are marginalized, disadvantaged or who have a disability;
5. improve the quality and safety of playgrounds and play areas;
6. ensure that relevant training and qualifications are available to persons offering play and related services to children;
7. develop a partnership approach in funding and developing play opportunities; and
8. improve information on, and evaluation and monitoring of, play provision for children in Ireland.

A two-strand approach was taken to the development of recreation policy for older children (aged 12–18 years). The first involved research by de Roiste & Dineen (12) (commissioned by the Office of the Minister for Children and Youth Affairs (OMCYA)) on young people's views of the opportunities, barriers and supports to recreation and leisure. Significant findings from the research included:

- girls reported more hobbies than boys, and boys reported more involvement in sport;
- young people who were low in leisure motivation were less likely to report having a hobby;
- young people in the higher socioeconomic groups reported more hobbies; and
- fewer hobbies were reported by older adolescents than younger.

The second concerned the production of a consultation document setting out the principles and objectives of the proposed policy (22). The report of the public consultation was published in 2006 (23).

Alongside these specific developments relating to physical and recreational policy, another salient strategic milestone was the publication of *Obesity: the policy challenges* by the National Taskforce on Obesity in 2005 (3). The Taskforce was established in response to the growing public health problem of overweight and obesity and its resultant societal challenges. The report contains over 90 recommendations across six broad sectors: high-level government; education; social and community; health; food, commodities, production and supply; and the physical environment.

The report's recommendations are about halting and reversing the prevalence of obesity, including creating the social and physical environment that makes it easier for children to be more active on a regular basis (3). Of particular relevance to this case study are the physical environment recommendations, which set out responsibilities for a wide range of actors, including government departments, local authorities, private and public workplaces and employers, and community development programmes.

Also of significance from a policy perspective was the publication by government of the national social partnership agreement *Towards 2016* (24) in 2006. The agreement provides an overarching framework for the social and economic development of Irish society between 2006 and 2015 and is built around a life-cycle social policy perspective. Focused on reducing inequality in the broad determinants of health, the goals of the policy agreement include priority actions in the areas of health and education outcomes, promoting recreation and physical activity and strengthening systems of support to children and their families. It explicitly recognizes the contribution of the HSBC survey in Ireland to monitoring progress and developing planned actions to meet national objectives.

In 2007, *Teenspace: national recreation policy for young people* (13) was published by the OMCYA. The policy aimed to

encompass organized activities for young people as well as more casual activities young people engage in during their free time. It notes that recreation can include reading, recreational sport, art, music in a group, “hanging out”, camping, surfing the Internet and many more activities. While the national recreation policy is for all young people aged between 12 and 18 years, it recognizes that young people are not a homogeneous group. It highlights a number of differences to be taken into account in developing recreational opportunities for young people, including differences between boys and girls, age groups, urban and rural dwellers and young people from minority groups (4).

Resulting from the public consultation process, seven objectives were agreed for the recreation policy. The objectives closely mirror those set out in the national play policy (21) and are as follows:

1. give young people a voice in the design, implementation and monitoring of recreation policies and facilities;
2. promote organized activities for young people and examine ways to motivate them to be involved;
3. ensure that the recreational needs of young people are met through the development of youth-friendly and safe environments;
4. maximize the range of recreational opportunities available for young people who are marginalized, disadvantaged or who have a disability;
5. promote relevant qualifications/standards in the provision of recreational activities;
6. pursue a partnership approach in developing and funding recreational opportunities across the statutory, community and voluntary sectors; and
7. improve information on, and evaluation and monitoring of recreational provision for, young people in Ireland.

Policy development for children in Ireland has therefore been substantially guided by obligations under the United Nations Convention on the Rights of the Child (16), as articulated in the national children’s strategy (19). Guided by research evidence and the views of children, substantial progress has been made recently towards addressing the dearth of leisure and physical play facilities for children. The next section illustrates how, taking these guiding principles, children’s views have been taken on board in furthering this agenda.

## Specific policies and interventions

The case study focuses on a policy development process undertaken to develop and implement the national set of well-being indicators for children in Ireland (4,6). As part of the commitments given originally in the 2000 national children’s strategy (19) and in recognition of responsibilities under the United Nations Convention on the Rights of the Child (16), the NCO led the process of indicator development, taking a “multi-stage incremental approach” (25). The participation of children proved central to the process and materially influenced the outcomes achieved.

To develop the set of well-being indicators, two background papers and two empirical studies were commissioned: the first reviewed existing approaches to child well-being and indicator development (26), and the second investigated the availability and quality of existing data sources within Ireland (27). Two separate but complementary studies were conducted to draw on expertise within the country, the first with adult experts and the second with children. A three-round Delphi study with a sample of key informants that included parents, policy-makers, researchers and service providers ( $n=69$ ) facilitated consensus to be reached on the key domains and indicators to be adopted; this process and the outcomes are described in more detail by Hanafin & Brooks (28) and Hanafin et al. (25).

Children’s perspectives were gathered via a three-stage participative research methodology (29) designed to be explicitly coherent with the goals of the Irish national children’s strategy (19) and to mirror the iterative consensus-building approach of the Delphi study. Drawing on the “draw and write” method (30) and the use of visual research methods, particularly photographs (31), schoolchildren were supplied with disposable cameras and invited to take photographs of things that “made them well” and “keep them well” and to annotate the developed photographs to relate how the object of the photograph achieved this. Children subsequently classified the photographs and developed schemata of well-being (32).

Classrooms were randomly selected to participate in the study, in which children participated by contributing and analysing some 5334 photographs taken by 266 children, using a three-stage process consisting of data generation (taking photographs), data analysis (categorizing photographs) and data synthesis and presentation (creating schemata). During the latter two phases, children worked in smaller groups (33 groups in total) within classrooms to collapse the developed photographs into categories of similar photographs using a version of the “snap” playing-card game. Subsequently, groups of children worked with the developed categories to create two-dimensional models of child well-being, labelled “schema”, by prioritizing categories, drawing causal and hierarchical links between categories and arranging the categories and links on large poster boards (29,32). The developed categories were considered as domains of well-being and possible specific indicators were deduced from the annotations given by the children to the photographs within the categories.

The parallel Delphi study with adult experts achieved consensus on a range of domains and indicators that were coherent for the most part with those emerging from the participative work with children. There were, however, some key differences, including a category that children had labelled “environment/places to go”. Nevertheless, the expert group of Delphi participants did recognize the relative importance of “environment/places to go” and agreed that it should be included in the final set of national well-being indicators (25,28). The children’s contribution was therefore honoured, in keeping with the national children’s strategy (19).

Further analysis of the children’s photographs, and their annotations, informed the task of identifying a specific indicator for the domain. The category included reference to the natural (such as lakes, mountains), created (flowerbeds and shrubbery, for instance), built (such as monuments and public buildings) and home (including own and others’ houses) environments. Ultimately, it was agreed to include the HBSC questionnaire item “there are good places to spend your free time in the area where you live” as an indicator of formal and informal supports given to young people in Ireland (25).

All the developed indicators, including the socio-environmental indicator “good places to go”, have now been reported twice at national level as part of the “state of the nation’s children” reports (4,6). These data illustrate the low rate of children in Ireland who report that there are “good places to go” (46%), with important social class, urban/rural and gender differences emerging (as described above).

The full set of nationally agreed indicators now form the basis for action on behalf of children and are used to inform local strategic development and monitor change over time at national and regional level. Progress on all indicators, including “good places to go”, will continue to be reported every two years in the “state of the nation’s children” series, and this will facilitate the monitoring of inequalities by gender, age, location and SES into the future.

Child well-being indicator sets can be used for many different purposes, including describing, monitoring, setting goals, assigning accountability, and evaluating (33–37). The publication of the “state of the nation’s children” report on a biennial basis in Ireland provides a basis for each of these purposes. The indicator set, however, also facilitates a shared vision of children’s lives, underpinned by policy, research and stakeholder experiences, across stakeholder groups. This has led to a more holistic understanding of children’s lives in Ireland and enables different stakeholders to situate their own particular interests around children’s lives within a broader context. This is especially useful for stakeholders for whom the main focus is a single issue or a single group of children.

In addition, the publication of the report has enabled the prioritization of key issues for development, including alcohol misuse among young people. This issue was highlighted in the first “state of the nation’s children” report in 2006 using an international comparison that identified children in Ireland, particularly girls, as having very high rates of binge drinking. A national consultation with young people on alcohol misuse was carried out as a direct consequence of highlighting this area. In the context of this case study, it is interesting to note that one of four dominant themes emerging in this consultation related to the availability of places for young people to go and specifically to the availability of youth cafes and other alcohol-free facilities for teenagers (38).

As well as benchmarking Ireland internationally, the report on the indicators also provides regional and local area comparisons, where data are available. While this is based mainly on census and administrative data, the HBSC Ireland data also make a significant contribution to highlighting regional differences. One local authority in Ireland has already adopted a number of the indicators in use in the national indicator set as a mechanism for monitoring local developments around children’s lives.

This allows them to benchmark the situation for children in their area against the national context and to provide a sense of where local priorities need to be. At present, a national data and research strategy on children's lives is being developed and the experience of reporting on the indicator set has provided very useful information for this process (39).

## Lessons learnt

A range of conditions was necessary to support the work described in this case study, all of which played an important role in its success. Most important was the national children's strategy (19), the national policy that identified the importance of children having a voice in matters that affect them, and that this supported the inclusion of children's views during the process of indicator development.

A policy on its own would not, however, have been sufficient. Structures put in place to support the implementation of the national children's strategy, which included the establishment of the NCO (now the OMCYA), were crucial. Indeed, rather than engaging external project management consultants, NCO staff spearheaded and led the development of the indicator set.

While having the national children's strategy was crucial, so too was the willingness of adult stakeholders to take on board the views expressed by children. This was evidenced by their reluctance to treat the data provided by children as "interesting but irrelevant" or to consider it to be of marginal value. In the process of executing national policy, the real potential of engaging directly with children became apparent, and that in itself acted as a powerful persuader of the value of changing the approach from doing things "for" children to doing things "with" children.

A further success factor relates to having existing data sets and structures for the repeated collection of data and creation of data sets, which enables a monitoring function to be established. In this context, the HBSC survey and studies with similar structures and functions, such as the Programme for International Student Assessment (PISA), have the potential to act as vital sources of national information and to provide the means for cross-national comparison. The HBSC in Ireland therefore facilitated the identification of appropriate indicators and provided a vehicle for the collection and reporting on indicators that had to be developed.

A number of key challenges nevertheless characterized the work described in this case study and would need to be considered by those interested in adopting a similar approach.

For children's views to be included in the evidence base, it was first necessary to reach agreement on taking an evidence-based approach to indicator development, and then to reach agreement on the inclusion of children as key stakeholders in that process. Once that was achieved, it was necessary to identify appropriate methods to involve children and to ensure that the methods adopted were truly participative, rather than tokenistic or consultative.

A further challenge involved the translation of the perspectives gathered from children into discrete, specific and measurable indicators, a part of the process that was conducted by adult experts. This required considerable appreciation of the strengths and limitations of existing data sources, knowledge of existing sets of possible indicators and commitment to the inclusion of children's views.

The future relevance of this case study may be assessed by the extent to which the indicators are used to improve children's lives. So far, evidence has been accumulating on the perceived value of the indicators as reported in the "state of the nation's children" reports (4,6) and the use of the data in prioritizing action for children's services. It will nevertheless be crucial to continue to assess and observe trends at regional and local level in comparison with those at national or international level, and to ensure that such data become an integrated component of decision-making, monitoring and evaluation processes for services designed to improve the lives of children living in Ireland.

More broadly, this case study has highlighted the value of evidence and appropriate data analysis in documenting and exploring patterns of inequality in health. Such information also provides the tools to benchmark subgroups of children against one another, highlighting issues to be prioritized and enabling the monitoring of progress towards goals, including greater equality between children. We have also widened our view of what might constitute "inequality" from a focus on the

socioeconomic (that excluded other dimensions of inequality) to a more holistic perspective that includes inequality not just on the basis of gender and age, but also on location (that is, urban/rural).

This case study presents a powerful example of national policy which takes the input of children seriously (in this case, the Irish national children's strategy) and which directed the development of a set of national indicators for child well-being. This context determined that the views of children were taken on board, even though they differed from those of adults. The availability of nationally representative HBSC data, with sufficient power to investigate sociodemographic patterns, enabled data on the agreed indicator to be collected and reported on more expediently and cost-effectively than might otherwise have been the case. More recently, we have seen an emerging impact on practice in regional and local areas, where the availability of "good places to go" for children must be prioritized.

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## Italy, Tuscany Region: the ideas of young for their health and the regional project “Di testa mia”

Mariano Giacchi,<sup>1</sup> Serena Consigli,<sup>2</sup> Katalin Majer,<sup>2</sup> Michele Martiello,<sup>1</sup> Benedetta Rotesi,<sup>2</sup> Alberto Zanobini,<sup>2</sup> Giuliana Gasparrini,<sup>3</sup> Emma Teresa Quaresima,<sup>4</sup> students who participated in the regional project “Di testa mia”<sup>5</sup>

<sup>1</sup>CREPS Department of Physiopathology, Experimental Medicine and Public Health, University of Siena

<sup>2</sup>General Direction of Right to Health, Tuscany Region

<sup>3</sup>Department for Environmental Research and Development, Ministry for the Environment, Land and Sea focal point, Rome

<sup>4</sup>Directorate General for Prevention, Ministry of Health focal point, Rome

<sup>5</sup>Contact via: <http://www.facebook.com/group.php?gid=78265962931&ref=ts>

### Executive summary

The regional project “Di testa mia” [“The ideas of Tuscan youth for their health”] offered an opportunity for young people to set out proposals to enhance their own health and well-being through adopting a peer-to-peer approach. Based on the HBSC study and Eurisko research data, five thematic areas were defined, which subsequently were used as items in an open competition for young people in 2008: love and sexuality; body and self-image; risks and entertainment; individuality and conformity; and networks and relationships.

The winning projects, which commenced in 2009, include one related to the theme of road injury prevention (“Have fun in a safe way”) and one to the physical environment and risk reduction (“Koinè”, which comes from a Greek word meaning “common language or community”). “Have fun in a safe way” is related to the broad thematic area of “risks and entertainment”, while “Koinè” is related to both “risks and entertainment” and “networks and relationships”.

The project “Have fun in a safe way” was selected as a winner because of its practical nature and its adoption of a peer-education approach. “Koinè” has as its main objective the redevelopment of an urban area in Grosseto as a youth cultural centre. The aims are to move young people away from boredom and risky activities towards an education in arts and culture and create an open dialogue with health care institutions.

The 2008 competition was open to young people aged 17–20 years living in Tuscany. They were invited to submit ideas for promoting protective health factors and tackling specific problems in relation to the five thematic areas. They had to produce not only ideas on how to communicate about healthy lifestyles, but also present proposals for improving existing prevention services for young people in the Tuscan health service.

It was recognized that there was a need to organize a health camp during the summer to support young people to develop their ideas and create projects with concrete actions under the supervision of experts and tutors. The camp week was the most significant aspect of the project “Di testa mia”. It brought together 40 young people, chosen by a commission, who introduced 18 fresh ideas about health. The young people, who demonstrated great involvement and responsibility, were divided into five groups based on the five thematic areas, each of which were supported by an expert and two tutors.

The five best projects, one for each thematic area, have now been developed through the Tuscany Regional Board Deliberation No. 29 of 22 January 2009 (1). In accordance with the Regional Board deliberation, the experience of the pilot regional project “Di testa mia” will be rolled out through the regional territory during 2009 and 2010 in collaboration with local health agencies.

### Background

Tuscany has had robust systems to collect epidemiological data on environmental risk factors and related health outcomes and on access to services for children and adolescents for some time. The regional health agency is heavily involved in collecting, analysing and interpreting data on differences in equity between population groups to support decision-makers in developing coherent policies and interventions aimed at reducing gaps.



A surveillance system aiming to address specific health promotion initiatives related to youth lifestyles at different ages was implemented in 2001. Initially, a nutritional surveillance system was started in primary school for children aged nine years, collecting data on nutritional status, eating behaviour, physical activity and sedentary patterns in different social contexts (family, school and community). The system was expanded in 2003 to include adolescents through the HBSC survey, which was conducted among a regional population sample of adolescents.

Data from the HBSC 2006 survey showed that 9.1% of 15-year-old children in Tuscany were physically active for at least 60 minutes every day over the previous week (compared to 11.5% in the Italian national sample); boys were on average active for 2.7 days and girls for 1.8 days (2,3).

The survey also showed that:

- 19.7% of 15-year-old children in Tuscany were overweight or obese (compared to 17.6% in the national sample);
- 50.9% reported having a medically attended injury at least once in the previous year (46.9% nationally);
- 25.3% reported having been drunk on two or more times (20.1% nationally); and
- 31.8% had used cannabis at least once (21.5% nationally) (2,3).

The prevalence of drug or alcohol use is very high in young subjects admitted to emergency departments following road traffic accidents (4).

HBSC data at national level indicated possible inequalities among 15-year-old children, with a statistically significant association found between lower family affluence (as measured by FAS) and “fair” or “poor” self-related health. These results were not replicated at regional level, however, where no significant association was found. Similarly, while the association between FAS and injury was significant at national level, it was not so at regional level.

No significant association with FAS was found for many health outcomes and risk behaviours at both national and regional levels, including moderate-to-vigorous physical activity and overweight and obesity, having been drunk on two or more occasions, lifetime cannabis use and cannabis use in the last 30 days (2,3). Some of the non-significant results could be due to the large numbers of non-respondents in the survey, particularly on sensitive issues.

The majority of studies carried out in Europe have not been able to show any variation by social class in risk behaviours and morbidity among adolescents (5–7). A recent review showed that compared to childhood and adulthood, there is no consistent pattern of health inequalities in adolescence (11–16 years), and that the inequalities which do exist are less pronounced in adolescence than in any other part of the life-course (8). Various models have been proposed to explain the observed relationship between SES and health in adolescence, such as latent differences (inequalities are already present but not yet measurable) and the “buffer” hypothesis (school, peers and youth culture “break” the traditional SES barriers and form a “buffer” for the young population against the health-damaging effects of SES) (9).

The positive general conditions within Tuscany and the low level of inequities found among young people do not, however, mean that existing inequities can be ignored. Community health services work to improve the health of the whole population and are committed to reducing existing inequities in health and preventing the onset of new ones.

Tuscany’s efforts to provide equitable access to health services and to reduce inequalities and social exclusion should be acknowledged. These are supported by results from HBSC and qualitative data from the Eurisko survey conducted in Tuscany, which provide the foundation for the development and implementation of regional policies aimed at promoting healthy lifestyles among adolescents.

## Social and policy context in the Region

### The social context

Data on socioeconomic conditions and dynamics in the Region in 2007 have been provided by the Rapporto CENSIS Toscana (10).

Tuscany has the lowest income-inequality level of the Italian regions. The Gini index, which measures the grade of income concentration, is 0.249, significantly lower than the national average of 0.313. Tuscany also has the lowest percentage of families in the lowest income quintile (8.1%), with 16.9% in the second, 23.4% in the intermediate and 25.7% and 25.8% respectively in the high quintiles.

Other socioeconomic indicators lend weight to the idea of Tuscany as a relatively equitable region. The relative poverty incidence is 4.6%, which is less than half the national average of 11.0% and is also lower than the average value of the central regions (6%). After Latium and Lombardy, Tuscany registered the highest increase in the number of people employed between 2001 and 2006 (+9%), against a national average of +6.4%.

There is a positive inclusion process for migrants. Migrants comprised 7% of the occupation index of the whole population and 30% of the new employment index in 2007. The percentage of migrant entrepreneurs almost doubled between 2001 and 2006 (from 6.2% to 12%), with 26.5% of these migrant entrepreneurs being under 30 years.

Public investment in research and development represents 0.79% of gross regional product (GRP), higher than the 0.58% at national level and 0.67% at European level.

Tuscany is renowned for its socially cohesive society, which is based on a high level of community participation and a well-developed network system of voluntary work, voluntary organizations and mutual aid societies. Almost a quarter of the citizenry (24.9%) are directly involved in political processes, compared to a national value of 12.3%. Around 37% of Tuscan citizens believe that politics could contribute to the big changes the country needs (against 18% nationally) and around 38% think that politics could strongly contribute to changes in their own life and that of their family (14% nationally).

Despite these positive conditions, Tuscany still faces problems in relation to gender inequalities, the need to improve the education system and increases in temporary employment, underemployment and unemployment among young people.

### The policy context

#### Statute of the Tuscany Region

The Statute of the Tuscany Region dedicates a relevant part (Title VIII) to citizens' participation. Article 72 guarantees active political mechanisms to promote community participation at all ages.

#### Students' Parliament of Tuscany

The Students' Parliament of Tuscany is an initiative promoted by the Presidency of the Regional Council in collaboration with the National Agency for the Development of School Autonomy and the Direction of the Regional School Office. It has been working since 2000 and is a real representative institution, in line with the participation principle stated in the Statute of the Tuscany Region.

The Parliament consists of 60 youth representatives. Its scope is to enhance the contribution of young people to the implementation of human and civil values which support social progress. More information can be obtained from the Parliament web site (<http://www.consiglio.regione.toscana.it/prs/>).

### Regional health plan

The regional health plan for 2008 to 2010 (11) defines an objective of developing projects for the well-being of young people which respect their real needs and enhance their opportunities to participate. The plan provides scientific evidence of how the health status of an individual is influenced and determined by numerous factors. The evidence shows how it is possible to tackle many illnesses and reduce their impact by acting on health determinants. It is therefore important to, on the one hand, enforce citizens' capacities for making conscious healthy lifestyle choices (empowerment) and promote healthy lifestyles and, on the other, to develop integrated intersectoral strategies involving the different actors in the system to share common objectives related to individual and community health.

### Framework cooperation agreement with WHO

The Tuscany Region has been developing strong collaboration with the WHO Regional Office for Europe through the framework cooperation agreement (FCA) since 2003 (renewed in 2008) (12).

From the outset of the FCA, the Region has adopted and developed many programmes and initiatives in line with WHO's policies on socioeconomic and environmental determinants of health. Such actions and activities have strengthened the region's capabilities for establishing, implementing, monitoring and assessing a robust public health strategy.

Thanks to the FCA, recent years have seen increased convergence between the Region's health care policies and the strategies and objectives of WHO. In addition, the Region's increased involvement within international networks and partnerships has enhanced its potential for growth and development in terms of provision of improved public health care.

The Italian Ministry of Health is supportive of the work being carried out under the FCA. The Tuscany Region has been given the mandate to coordinate all the Italian regions in their institutional relations with the national Government regarding health care services.

### **Promoting health at international level**

The WHO Regional Office for Europe adopted the European strategy for the prevention and control of noncommunicable diseases, *Gaining health* (13), in 2006. The strategy aims to:

- reduce the burden of premature death, disease and disability
- improve quality of life
- make healthy life expectancy more equitable within and between Member States in Europe.

The objectives of the strategy are to combine integrated action on risk factors and their underlying determinants across sectors with efforts to strengthen health systems toward improved prevention and control.

### Gaining health at national level

The Italian Ministry of Health adopted the national programme *Gaining health: making healthy choices easy* (14) in 2008. Its aim is to promote health as a collective resource by:

- adopting a comprehensive and integrated approach
- taking action on the leading causes of ill health
- effectively treating conditions.

The four main risk factor areas highlighted are nutrition, physical activity, tobacco and alcohol.

## Gaining health in Tuscany

The Tuscany Region responded to the national programme through the Tuscany Regional Board deliberation of 13 October 2008 (15). This aims to influence regional planning and support local integrated health plans to promote health in all policies. Particular attention is paid to the significance of the territorial context (socioeconomic, cultural and environmental) to better involve all sectors of society, with a special emphasis on the alliance with the school agency.

The programme is particularly aimed at improving youth health and well-being, with the focus on the promotion of healthy lifestyles across the Region at local level. Its implementation requires specific projects that are oriented to, and designed by, young people, reflecting their ideas, dreams and creativity. There is consequently a strong commitment to listening to young people directly and involving them in building the foundations for appropriate policies to promote their health.

Regional health services departments dedicated to disease prevention are being urged to adopt health promoting approaches, actively participating in specific projects targeted at young people under the programme.

## **The project “Di testa mia”**

The project “Di testa mia” aimed to stimulate young people in Tuscany to think about their health and well-being, behaviours, educational opportunities and social conditions, and to suggest feasible and effective actions to modify unhealthy lifestyles and environmental conditions and maximize assets at individual and community level.

### **Motivation behind the project**

Several surveys provided evidence of the inefficiencies associated with traditional ways of approaching young people and of acting on young people’s health. For instance, the Eurisko survey “Young people: risks, uncertainty, well-being”, conducted in 2008, used quantitative data from previous national surveys and qualitative data from focus groups of 15–20-year-olds in Tuscany, the former to define the general situation in relation to youth health and the latter to identify specific values, needs and attitudes towards health and optimal ways to communicate health messages. Results demonstrate that while adolescence is a period of great ferment, it is also a time in which elements of enthusiasm, openness and well-being are developing. Friendship, family, love and well-being were identified by young people as the most important values, and communication methods which accentuated positive aspects of healthy lifestyles rather than presenting prohibitive messages to disincline people from developing unhealthy behaviours were considered more effective for health interventions specifically directed at young people (Eurisko survey, unpublished data, 2008).

Based on HBSC and Eurisko data, and in line with Tuscany Region Statute on the principle of participation and the regional health plan for 2008 to 2010 relating to the development of projects on young people’s well-being, the Tuscany Region developed the regional project “Di testa mia” (“The ideas of Tuscan youth for their health”) (16,17).

“Di testa mia” is a youth-directed project connected to the theme of reducing inequities. The direct involvement of young people between 15 and 20 years is intended to reduce inequities in access to information on health issues between different social groups in settings such as schools and leisure time.

As part of the project, a competition for young people was launched in 2008. The competition is based on five thematic areas emerging from the HBSC and Eurisko data:

- love and sexuality (affection, contraception, pregnancy, sexually transmitted infections);
- body and self-image (nutrition, anorexia and bulimia, physical activity, self-perception and self-image);
- risks and entertainment (leisure activity, drug misuse, extreme games);
- individuality and conformity (initiative, self-esteem, differences, gender issues, stereotypes); and
- networks and relationships (friends, family, school, generational and relationship difficulties, bullying).

The focus of this case study is on two of the five winning projects developed by young people, which are closely related to the issues of injuries and physical environment. A more detailed and comprehensive pilot of the project will be carried out over 2009 and 2010 (1).

### **Objective, process and evaluation**

The main objective of the project was to make young people active participants in maintaining their well-being, focusing on their views as the central driver for health promotion policies and services (16).

Policies for promoting the health of young people should have as their starting point an understanding of their needs and should define a primary objective of promoting their awareness of choices in adopting healthy lifestyles. They also need to reflect evidence from the literature which shows that the family and networks of friends provide valuable protective factors for young people's health and can contribute positively to promoting their well-being (18).

The following main steps were defined for the project, which was mainly based on a peer-to-peer approach.

#### Launch of the competition "Ideas for well-being"

The 2008 competition was addressed to young people between 17 and 20 years living in Tuscany, who were invited to submit their ideas on the protective factors for health.

A dedicated web site (19), which was advertised through the media, was the principal information source for participation in the competition. Young people could find specific information on the whole process through the web site, including the invitation to participate, the registration form, information on partners of the project, the summer camp, the scientific committee, winners' prizes and details of the tutors and experts involved. A free regional phone number was also provided.

A regional communication campaign was launched, utilizing posters, advertising in targeted newspapers and on web sites with links to the project's web site, and through television channels such as MTV, All Music and local broadcasters. The campaign resulted in 5 million contacts with young people aged 17–20 years.

#### Selection of the tutors and training methods

Tutors were selected following interviews conducted by the Scuola Internazionale di Alta Formazione (SIAF) (International School of Higher Education) of the Scuola Superiore (High School) S. Anna of Pisa. The tutors selected were young people (without a specific target age, but with particular empathic capacity) who represented "elder sibling" figures and who signified help from the "adult world". Following training based on the five themes of the competition, the tutors worked with young people participating in the summer camp to help them develop their ideas for health into practical options for action.

#### Summer camp for health

Forty young people who had presented the best ideas in the competition were invited to a one-week summer camp in Volterra. The aim was to develop concrete projects from their ideas, with support from experts and tutors. The camp was developed in collaboration with the Scuola Superiore S. Anna of Pisa, and numerous partners contributed to its success and to the organization of specific activities.

The camp culminated in the selection of the five best projects delivered by the groups of young people, one for each thematic area.

#### Documentation and dissemination

The camp's work has been disseminated through multimedia outlets appropriate to the youth target audience and in

collaboration with youth-oriented mass media. A video made by the young people was broadcast on MTV and was also presented at the Tuscan Festival of Creativity, at which the award ceremony for the winning projects took place. The video is an important outcome of the camp as it demonstrates the philosophy of the project through conveying messages from the young to the young, in their language and in their style.

Information on the results of the camp and the winning projects has been published on the project web site.

The project's aims and main messages are circulating through the Facebook social networking web site via the young people who took part in the summer camp. For the adult public, a monograph in the regional series "Health and community" dedicated to the experience of "Di testa mia" has been published.

### Pilot projects

After the camp, the projects developed by the five groups were presented in public and subsequently evaluated by the evaluation committee. The main criteria governing the evaluation were related to the projects' innovation, feasibility and reproducibility in the regional territory.

The five winning projects will be adopted, implemented and financed by the regional health service of Tuscany, with the active involvement of young people. One ("Have fun in a safe way") is related to the issue of road injury prevention and another, "Koinè" (which comes from a Greek word meaning "common language or community"), focuses on the physical environment and risk reduction.

The "Have fun in a safe way" project will be implemented in the territory of Grosseto under the project leadership of the local health agency. It is based on peer-education methodology and aims to develop sensitive information on the links between alcohol/drug consumption and road injuries to be delivered to young people aged 15–20 years in bars and discothèques. Based on the conviction that peer-education methodology can improve the efficacy of health promotion interventions for young people, young "volunteers" were recruited and trained by the Grosseto local health agency. These young volunteers are the main implementers of the project.

The intention is to use rapid, simple and effective interventions to convince young people in the bars and discothèques that it is possible to have fun in a safe way. Volunteers equipped with information materials and gadgets created by themselves, as well as disposable breathalyzers, will approach their peers as they are leaving the premises and try to engage them in considering the impact of their behaviours and avoid taking risks on the road. The project will run for three years.

"Koinè" has as its main objective the redevelopment of an urban area in Grosseto to transform it into an alternative space in which young people can take part in constructive and educational activities, such as music, dance, theatre, cinema and training. The aims are to move young people away from boredom and risky activities towards an education in arts and culture and create an open dialogue with health care institutions. The new centre will be created in a reconstructed and redefined former abattoir in Grosseto, which is in a complete state of disrepair.

The idea underpinning the project is based on an understanding of the common needs of the youth of Grosseto, a town that offers few facilities or opportunities to cultivate their interests. They need a strong point of reference, a community centre in which they can express and develop themselves freely. Among the specific objectives of the project are exposure of young people to the arts in all their many forms (in collaboration with a cultural association), and the provision of a specific information and operational point of access to the local health agency (operated by specialist personnel). It will be possible for young people to access information on health-related issues and to use some services (such as getting a Pap test and blood tests). The informal, noninstitutional atmosphere of the centre should encourage young people to develop direct and informal contacts with the local hospital and health services.

In addition to the activities and information provided by the local health agency's information and operational point, strong efforts will be put into increasing young people's awareness of the risks related to free-time and entertainment activities, such as road injuries caused by alcohol and drug consumption. Awareness-raising promotional "shorts" will be shown in cinemas.

The project will run for two years.

#### Evaluation of the “Di testa mia” regional project

The project has been subject to an evaluation process, after which the five winning projects were supported by the Tuscany Regional Board (1).

### Lessons learnt

Studies presented by different countries at the WHO/HBSC Forum 2007 provided evidence of the need for targeted policies and interventions aimed at reducing inequities deriving from socioeconomic and environmental conditions. The regional project “Di testa mia” takes such inequities into account; indeed, some of the projects presented by the young people underline the importance of considering seriously the relationship between health and social inequities, and inclusion of disadvantaged youth was one of the selection criteria for participation in the competition.

Tuscan policy recognized children’s right to grow and live in healthy environments and be active participants in maintaining their health and well-being (20). The regional health sector was the main promoter of the “Di testa mia” project, in collaboration with many partners (including WHO, Scuola Superiore S. Anna of Pisa and SIAF, Innocenti Institute, Regional Mediateca of Tuscany, MTV and Slow Food). It therefore represented an interesting example of successful intersectoral collaboration.

Thanks to the regional project, a strong social network has been created among youth participants who are linked through Facebook.

It is important to emphasize that the experience of the Tuscan project “Di testa mia” is fully reproducible, and that it is a pilot project. Positive responses to the project have meant it has been possible to plan, in collaboration with local health agencies, its introduction throughout the whole regional territory during 2009 and 2010 (Box 1). The pilot experience will be reproduced, taking into account local specifics, but the methodology and main characteristics will follow the same format. Its dissemination is also inspiring an innovative means of linking public institutions and young people: it is proposed that an attempt be made to systematize, both from a theoretical and practical point of view, direct participation of civil society in health and land services management.

At regional level, this experience influenced Tuscan policy on encouraging large-scale youth involvement. The “piani integrati di salute” (integrated health plans), which are strongly based on intersectoral collaboration, will incorporate the aims of the project into specific initiatives at local level.

Youth involvement is one of the critical success factors listed by the *WHO European strategy for child and adolescent health and development* (21) in the “planning, delivery and evaluation of plans to improve child and adolescent health”. It is also stated that “adolescents are invariably the experts of youth culture and, as such, are well placed to help in the design and running of youth-friendly services”.

Findings emerging from the “Di testa mia” regional project show that youth involvement is possible when young people are free to express their ideas and participate in an appropriate context. The experience of this initiative suggests that the presence of tutors facilitated the expression of the young people’s abilities to identify better ways to plan health promotion activities with youth. The continuing positive relationships among the participants, both young people and tutors, that have been evident even after the end of the first pilot demonstrate the validity of the method.



### Box 1. Spreading the project throughout the Region

The Tuscany Regional Board Deliberation No. 29 (1) calls for:

- reproduction of the format “Di testa mia” in the biennium 2009/2010;
- implementation of the winning projects from the 2008 pilot experience; and
- development of three health education and promotion centres based in the local health agencies of Lucca, Grosseto and Florence.

The main actions undertaken or planned for the year 2009 are:

- organizing competitions in three different zones which cover the whole regional territory of Tuscany and refer to the three health education and promotion centres;
- holding three summer camps in Volterra, based on selection of ideas from the competitions;
- selecting the winning projects from each summer camp;
- documenting and disseminating the results through the same outlets as in 2008, including the regional Festival of Creativity in October 2009; and
- implementing the winning projects from 2008.

The main actions planned for 2010 are:

- reproducing the format “Di testa mia” in collaboration with other local health agencies in each of the three areas (repeating the competitions, the camp and the documentation and dissemination phase); and
- implementing the winning projects from 2009.

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## Kazakhstan: prevention of road injuries among schoolchildren

*Akmet Khairushev,<sup>1</sup> Lyudmila Shumilina,<sup>2</sup> Gainel Ussatayeva,<sup>3</sup> Alma Zhylkaidarova<sup>3</sup>*

*<sup>1</sup>Centre for Injury Prevention and Safety Promotion, Almaty city*

*<sup>2</sup>National Centre on Healthy Lifestyles, Almaty city*

*<sup>3</sup>Kazakhstan School of Public Health, Almaty city*

### Executive summary

This case study focuses on the educational intervention (school curriculum) developed for schoolchildren aged 6–14 years to help them learn the “rules of the road” and first aid skills for injured people. The intervention was introduced in September 2008.

Data on children’s mortality and morbidity due to RTIs were derived from traffic police reports and studies conducted by the authors of the case study. We attempted to analyse data in respect of gender, socioeconomic and rural–urban differences, but only indirect information was obtainable due to lack of data and studies in this area.

The analysis showed age differences, with the majority of children killed being of school age. We also discovered information about regional differences in mortality levels due to RTIs and the number of transport units in different regions (oblasts). High numbers of the RTIs with child fatalities occurred in regions with high-density populations, a high proportion of people under 15 years and a large quantity of transport units.

The case study describes the social and policy context in Kazakhstan, which is characterized in economic terms as a country in transition; the same could reasonably be said about its policy situation regarding road safety. Despite this, Kazakhstan has started to move in the direction of promoting road safety.

We then provide information about the intervention, its aim and objectives, implementation mechanisms, tools of control, settings and actions. We also discuss relationships between the intervention and European policy frameworks. The implementation of the intervention, which is designed to cover all groups of schoolchildren who live and study in Kazakhstan, does not involve the use of external monitoring and evaluation tools, apart from routine rating of schoolchildren’s knowledge and skills.

The lessons learnt emphasize the importance of sustainability of the intervention in the future and the development of monitoring and evaluation (M&E) tools to derive evidence-based information to track positive changes in the health status of children at country level. The main lessons learnt point to the need for:

- a rigorous M&E system, with the introduction of effectiveness indicators and the development of pre- and post-test questionnaires;
- regular training for teachers;
- seminars and workshops on road safety for specialists from different sectors, including mass-media specialists;
- involvement of parents in road safety activities (parents are the most important stakeholders in promoting the health and safety of their children); and
- public health leadership to drive the sustainable promotion of children’s environmental health.

## Background information

### Current situation in the country

Unintentional injuries rank top in the causes of child and adolescent mortality in Kazakhstan over the last decade (1). Figures from the Agency on Statistics show that in 2006, 3436 children in the age group 1–14 years in Kazakhstan (or 100.9 per 100 000) were killed as the direct result of accidents.

Before independence, drowning and poisoning were the main causes of unintentional fatal injuries in children (2), but the pattern of children's mortality changed in the 2000s, when burns and road accidents became dominant. The pattern of child mortality due to unintentional injuries is different throughout the country, however. For example, almost one third of fatally injured children in Almaty were killed by RTIs, while fatalities in rural areas are characterized by a high prevalence of fatal burns and drowning (3).

The death rate from RTIs for children and young people in Kazakhstan is one of the highest in the WHO European Region: it takes fifth place for children aged 0–19 years (4), and third place for children and young people aged 0–24 years (5).

Children in lower socioeconomic groups are at much greater risk of RTIs than those living in more advantageous circumstances. Many studies conducted in the countries of the WHO European Region have shown that children in the lowest socioeconomic groups are four times more likely to die from RTIs and five times more likely to die as pedestrians than those in the highest groups (4). Socially disadvantaged children are more likely to live in neighbourhoods with unsafe roads, high-speed traffic and few safe areas to play; their families find safety equipment less affordable and have less access to information about safe equipment and social support to guarantee the supply of safe devices.

No studies that aimed to examine the relationship between socioeconomic conditions and the prevalence of RTIs had been carried out in Kazakhstan, so we conducted a search of studies related to the availability and quality of medical care for people from different socioeconomic groups.

The Agency on Statistics, in collaboration with United Nations organizations (UNICEF, the United Nations Population Fund (UNFPA) and the International Labour Organization (ILO)) and the United States Agency for International Development (USAID), conducted a cluster study in all regions (oblasts) and two main cities of Kazakhstan in 2006 to estimate the availability and quality of medical care for the population. They found that people in rural areas, despite having relatively good access to health care facilities, made fewer visits to primary health care services than those in urban areas, mainly due to organizational and financial issues (6). Respondents with the lowest incomes attended least frequently for medical aid. This suggests that the financial factor continues to pose an obstacle to equal access to medical services in Kazakhstan (6).

### Sources of data

To illustrate the severity of RTIs in Kazakhstan, we used data from traffic police, the Agency on Statistics and WHO reports.

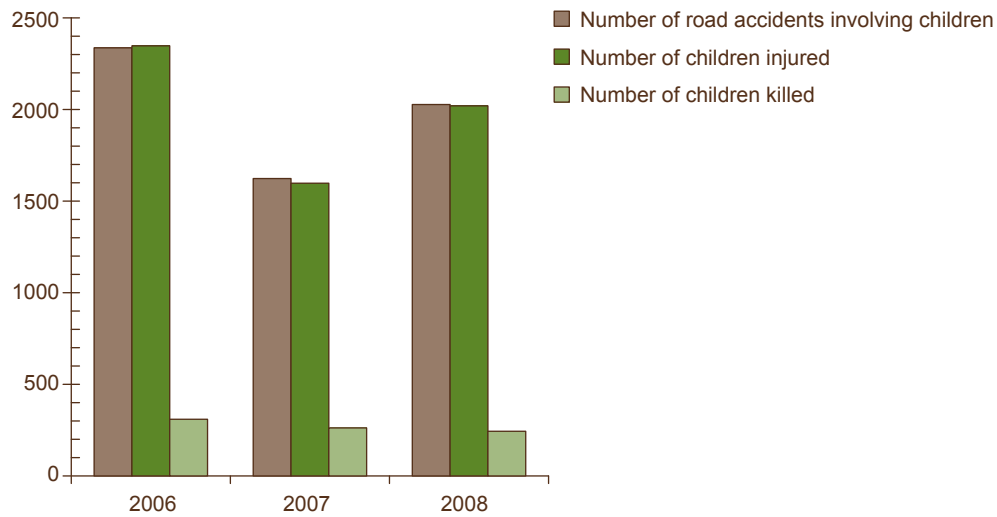
Fig. 1 shows the number of road accidents, number of injured children and number of deaths in the group aged 0–16 years in Kazakhstan between 2006 and 2008 (police use this age group for surveillance purposes). It can be seen that all road accidents involving children resulted in either injury or death.

Fig. 2 and Fig. 3 show the levels of child morbidity and mortality due to road accidents in Kazakhstan between 2006 and 2008. Approximately 50% of children injured in road accidents were schoolchildren aged 7–14 years. Morbidity and mortality levels have decreased over the last three years, but it is too early to conclude that positive change is occurring in this area: three years is too short a time interval to make a reasoned assessment, and no information about confounding and transitional factors has emerged.

Data on child RTIs are used for monthly, quarterly, half-yearly and yearly reports from traffic police and the Ministry of

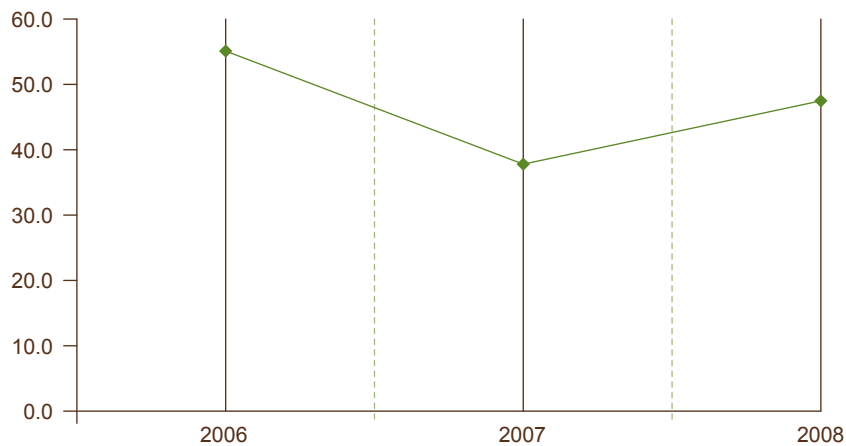
**Fig. 1**

Number of road accidents, injuries and deaths in children aged 0–16 in Kazakhstan, 2006–2008



**Fig. 2**

Morbidity rates for RTIs in children aged 0–16 years in Kazakhstan, 2006–2008



Health, and the President of the country has taken this issue under his personal control.

### Regional differences

The territory of the country is divided into 14 regions (oblasts) and two city districts (Astana as the capital of the country and Almaty as the biggest city). Table 1 provides information about the number of children killed in the oblasts and cities between 2006 and 2008.

The highest numbers of fatal RTI cases were observed in Southern Kazakhstan, Almaty and Zhambyl oblasts (mortality rates were unavailable). These oblasts are situated in the south of the country and are characterized by a high-density population,

**Fig. 3**

Mortality rates for RTIs in children aged 0–16 years in Kazakhstan, 2006–2008



a higher proportion of population being under 15 years, and high numbers of motor vehicles (Table 2).

Previous studies of child mortality (in Almaty city) showed that the greater number of road accidents and deaths due to road accidents occurred during the warm season (April–October). The majority of children killed were boys (70%) and pedestrians (80%). Almost all of the children in Almaty who had fatal RTIs died from brain injuries (their head-to-body ratio increases the risk of head injury) (3).

**Table 1**

Number of children aged 0–16 years killed due to RTIs in Kazakhstan, 2006–2008

	Oblast/city	Number of children killed		
		2006	2007	2008
1	Akmola oblast	17	14	11
2	Aktobe oblast	13	4	10
3	Almaty oblast	52	38	48
4	Atyrau oblast	3	6	3
5	Eastern Kazakhstan oblast	23	11	15
6	Zhambyl oblast	26	31	32
7	Western Kazakhstan oblast	11	6	4
8	Karagandy oblast	21	20	24
9	Kostanai oblast	13	7	6
10	Kyzylorda oblast	10	7	7
11	Mangystau oblast	4	14	6
12	Pavlodar oblast	13	3	7
13	Northern Kazakhstan oblast	4	0	1
14	Southern Kazakhstan oblast	77	69	66
15	Almaty city	20	9	7
16	Astana city	11	8	2
	<b>Total</b>	<b>318</b>	<b>247</b>	<b>249</b>

**Table 2**

Number of vehicles in Kazakhstan, 2006–2008

	Oblast/city	Number of vehicles		
		2006	2007	2008
1	Akmola oblast	103 273	105 078	118 634
2	Aktobe oblast	176 156	185 347	212 176
3	Almaty oblast	84 761	115 475	136 152
4	Atyrau oblast	50 237	54 359	59 019
5	Eastern Kazakhstan oblast	160 159	174 551	195 345
6	Zhambyl oblast	61 420	70 687	100 928
7	Western Kazakhstan oblast	59 547	69 191	97 091
8	Karagandy oblast	158 385	169 896	201 868
9	Kostanai oblast	43 360	47 633	79 240
10	Kyzylorda oblast	133 891	137 119	154 469
11	Mangystau oblast	63285	75962	94287
12	Pavlodar oblast	102 429	133 067	146 355
13	Northern Kazakhstan oblast	78 660	84 315	95 616
14	Southern Kazakhstan oblast	151 246	262 911	331 045
15	Almaty city	90 819	121 099	151 971
16	Astana city	290 109	373 710	496 762
	<b>Total</b>	<b>1 807 737</b>	<b>2 180 400</b>	<b>2 670 958</b>

## Social and policy context

Economically, Kazakhstan is characterized as a country in transition. The change from a planned to a market economy has been followed by a rapid increase in motor vehicle ownership, population migration from rural to urban settings and increasing intake of alcohol among the population, but with weak regulatory mechanisms.

The policy situation regarding road safety could also be characterized as transitional. Alongside positive changes in policy relating to road safety sit actions directed at toughening penalties and increasing fines for those who break traffic rules and educational interventions to create healthy environments, such as the mandatory wearing of helmets for riders of two-wheeled vehicles and the establishment of car-free zones in areas with high child populations.

Prevention of accidents is identified as a key issue in the *Programme of injury prevention in the Republic of Kazakhstan (7)*. The main aims of the programme, developed in collaboration with the department of traffic police, are promoting road safety and reducing traffic accidents and other unintentional injuries.

In 2004, the Fourth Ministerial Conference on Environment and Health adopted the CEHAPE (8). Among the aims of CEHAPE is reduction in RTIs and ensuring safe conditions to support efforts to promote physical activity among children. It advocates strengthened implementation of measures, including the imposition of adequate speed limits, education for drivers and children and enforcement of the corresponding legislation (9).

In the same year, World Health Day was devoted to prevention of road injuries. Many agencies in Kazakhstan started to work in this area, including the health sector, traffic police and the education sector.

The years 2006 to 2008 were years of significant change in policy relating to road safety. They saw measures to:

- introduce mandatory use of seat belts in cars;
- strengthen actions in favour of speed limits;
- reinforce control of driving schools;



- reduce the incidence of driving under the influence of alcohol;
- organize and conduct of regular “road safety months” (in April) and the “decade of safety” (1–10 September);
- develop educational materials for children, parents and teachers about injury prevention (textbooks, guidelines, brochures, leaflets); and
- recommence the school curriculum on road safety at national level.

## Intervention

### Brief description of the intervention

In August 2007, the Ministry of Education and Science of Kazakhstan issued Order No. 404 on the introduction of the School Curriculum on Road Safety at national level for schoolchildren of grades 1–8 of primary and secondary schools.

The aim of the intervention is to improve schoolchildren’s knowledge about the “rules of the road” and teach them the ABCs of first aid.

The objectives are to:

- teach schoolchildren about the basic rules of the road;
- explain how to stay safe in different critical situations (absence of traffic lights, possible dangerous situations on the road, crossing busy streets, etc.);
- learn how to stay safe as a pedestrian, passenger in a car, passenger on public transport, bike rider, etc.;
- provide information about different types of road injuries; and
- offer training in providing first aid to victims of road accidents.

The curriculum was developed for one school year (9 months), with 18 academic hours for schoolchildren of grades 1–4 and 14 hours for grades 5–8. It is designed to be implemented through the regular timetable for primary school and as additional hours in secondary school.

Instructors on the curriculum are primary schoolteachers, form masters and teachers on labour training. Specific themes can also involve input from traffic police officers, drivers, nurses and physicians.

Knowledge evaluation is carried out through assessment of pupils’ school journals, which should include separate pages reflecting the themes of the programme and indicating the pupil’s attendance and marks. The educational process is controlled by the responsible person and administration of the school.

The intervention is carried out in specially designed classrooms or specially equipped areas (such as the schoolyard or gym), with traffic markings to indicate crossroads, pedestrian crossings, traffic lights and road signs. Some classes are conducted in real conditions on the street, at crossroads and in public squares to experience real pedestrian and traffic flows and understand traffic control systems. Additional visual aids include short films, videos and slides.

One of the important components of the programme is the organization of, and support for, “young traffic inspectors”, a voluntary movement of teacher-supported schoolchildren aged 11–14 years who want to learn road rules through peer education, a form of education that is common in the country, particularly in relation to prevention of alcohol and drug misuse, early sexual relationships and sexually transmitted infections and HIV/AIDS. Quizzes, sport competitions and meetings with specialists help to promote schoolchildren’s interest in road safety, support them to understand the relationship between safety and health, and enable them to develop their leadership abilities.

## Implementing the intervention

No external monitoring and evaluation tools are involved in the implementation of the intervention, apart from routine rating of schoolchildren's knowledge and skills.

The intervention was developed as a part of intersectoral action involving the education and health sectors, traffic police and NGOs to reduce RTIs among children. It is intended to cover all groups of schoolchildren who live and study in Kazakhstan. Every child in the country has a statutory right to access free secondary education, meaning the intervention has the potential to cover all children. But children from disadvantaged rural areas which have low numbers of teachers and classroom assistants and groups of children who simply do not attend school for various reasons (truancy, work during school hours, etc.) are at risk of not accessing the intervention.

## Relationship with European policy frameworks

This educational intervention relates to the following European policy frameworks:

- CEHAPE - RPG (II) (8); and
- WHO European strategy for child and adolescent health and development, approved by the WHO Regional Committee for Europe in September 2005, with a focus on physical environment and/or injuries (10).

RPG II aims to prevent and substantially reduce health consequences from accidents and injuries. Our educational intervention aims to improve children's knowledge and skills relating to road safety. Education of children about existing "rules of the road" and the variety of potentially dangerous situations they face can empower them to preserve their own safety and that of others and may lead to the development of a new generation with advanced attitudes toward safety. The 1990s in Kazakhstan were characterized by collapse of the values of the Soviet period, which affected attitudes towards education and health. We have no evidence-based information to support our assumptions, but we can reasonably assume that the growth of RTIs in recent decades was a consequence not only of enormous motorization of the country, but also the deterioration in knowledge levels about road rules and the absence of a safety orientation among young people.

The intervention relates to the *WHO European strategy for child and adolescent health and development (10)* in relation to creating equity, promoting intersectoral collaboration and encouraging participation. It was developed to be implemented at national level in both public and private schools and to cover all schoolchildren aged 6–14 years in the country. At least four sectors collaborate in the intervention and related actions (the education and health sectors, traffic police and NGOs). The intervention also encourages schoolchildren to participate regularly in different activities as "young traffic inspectors".

## Lessons learnt

The intervention (school curriculum) is not a new idea. Schoolchildren at primary school during the 1970s and 1980s learnt the rules of the road in classrooms and in real conditions. The differences between the old and the new programme, however, are that the new programme reflects:

- the significant increase in traffic load on the streets
- increased hours of education and practical road experience for schoolchildren
- teaching the ABCs of first aid in secondary schools.

RTIs are a serious public health issue for children. Stakeholder involvement from different sectors, not only traffic police, education and health, is necessary to tackle it. But despite encouraging development in intersectoral collaboration, communication between sectors is sometimes difficult to achieve, and unisectoral actions are still being taken. Sometimes, for instance, the education sector works independently without consulting the health sector, and vice versa. Traffic police and NGOs act as "buffers" and are positive forces for encouraging strong intersectoral communication. Good communication and collaboration, of course, tend to rely on the personal characteristics of specialists involved.

Indeed, the human factor in general plays a significant role in successful implementation of the intervention. More advanced specialists provide comprehensive information to schoolchildren, organize work to promote road safety and introduce actions to prevent RTIs. There is, however, a lack of systematic training for teachers on road safety issues and injury prevention.

The countrywide intervention to support the development of “young traffic inspectors” is an important means of empowering school communities and strengthening leadership among schoolchildren. Implementing the intervention has reinforced the view that Kazakhstan is a country with inequitable socioeconomic development and an unequal population spread across rural and urban settings in different oblasts of the country.

### **Facilitators and barriers**

It was not possible to fully analyse the intervention due to the absence of a rigorous system of monitoring and evaluation. We are therefore not able to evaluate the effectiveness and efficiency of the programme. But despite the absence of clear M&E tools, we can nevertheless make a preliminary assessment of the intervention.

1. Improving children’s awareness of road safety issues has the potential to change attitudes and policy in the future.
2. Actions conducted during the academic year attract the attention of parents, specialists and others to children’s road safety issues.
3. Lack of funding is a significant problem for many schools. Some principals and teachers can access additional funds through sponsors and donors to help them organize work in relation to, for instance, developing “young traffic inspectors”, but other schools are unable even to buy textbooks and visual aids on road safety.
4. Insufficient support has been forthcoming from local authorities, relevant ministries and private companies. Traditionally, the public and policy-makers blame the problem of RTIs on the health sector and sometimes traffic police: they claim there is a low quality of medical care for injured people and that police officers are not able to provide first aid to survivors of road accidents. There are misunderstandings here among the lay public and policy-makers about causes and consequences that public health specialists may be able to correct.
5. Despite efforts to provide advanced information to the mass media about the intervention, there has been weak communication with the media during implementation. Representatives of the “fourth estate” tend to ignore it in favour of other, more trivial, items. It is therefore necessary to educate journalists and broadcasters about the importance of injury prevention and road safety promotion for children.

### **Future planning**

This is a long-term intervention that requires the following to achieve full implementation.

- A rigorous system of M&E needs to be developed and indicators of effectiveness and the development of pre- and post-test questionnaire introduced. The National Centre on Testing could be engaged to conduct pre- and post-test surveys. Evidence-based information about the effectiveness of the intervention will provide strong support for claims for additional funding from the government and business sector.
- Regular training should be provided for teachers. The National Centre on Healthy Lifestyles and the Kazakhstan School of Public Health, working in collaboration with traffic police, could help to organize training through institutes of advanced training for teachers.
- Seminars and workshops on road safety should be held for specialists from different sectors, including mass-media specialists. Regular meetings can help to lay the foundations for sustainable collaboration among different sectors.
- Parents should be involved in road safety initiatives. Parents are the most important stakeholders in promoting the health and safety of their children.

The educational intervention (school curriculum) is a first, important step towards securing the improvement of children’s environmental health and enabling their empowerment. Despite the barriers faced, work on the issue of RTIs has promoted the development of concrete actions based on intersectoral collaboration. Several years ago, public health specialists raised

the problem of children's RTIs in Kazakhstan and stimulated other sectors, particularly traffic police, to become influential proponents of child road safety. It is therefore very important that the public health sector continues to play a leadership role in fostering sustainable promotion of children's environmental health.

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## Lithuania: mediating the effects of alcohol and traffic safety control and policies

Apolinaras Zaborskis,<sup>1,2</sup> Aurelijus Veryga,<sup>1,2</sup> Nida Zemaitiene,<sup>1,2</sup> Rolandas Zuoza,<sup>3</sup> Aldona Gaizauskiene,<sup>4</sup> Robertas Petkevicius,<sup>5</sup> Aida Laukaitiene<sup>6</sup>

<sup>1</sup>*Institute for Biomedical Research at Kaunas University of Medicine, Kaunas*

<sup>2</sup>*Kaunas University of Medicine, Kaunas*

<sup>3</sup>*Ministry of Education and Science of the Republic of Lithuania, Vilnius*

<sup>4</sup>*Lithuanian Health Information Centre at the Ministry of Health of the Republic of Lithuania, Vilnius*

<sup>5</sup>*World Health Organization Country Office, Lithuania*

<sup>6</sup>*State Environmental Health Centre at the Ministry of Health of the Republic of Lithuania, Vilnius*

### Executive summary

Lithuania has been among the countries with the highest injuries rate in the EU, a rate that is becoming more and more associated with the youngest inhabitants of the country. According to statistical data from Lithuania, injuries remain responsible for nearly 46% of all child and adolescent deaths. Road traffic injuries in childhood and adolescence continue to constitute the greatest proportion (44%) of all external causes of death and are among the highest in the EU. Many deaths and injuries on roads are caused by drink-driving.

Data from HBSC surveys carried out in Lithuania in 1994, 1998, 2002 and 2006 have demonstrated the growing prevalence of unintentional injuries (respectively by year of survey, 22.9%, 31.0%, 50.3% and 53.5% of students reported at least one medically attended injury in the last 12 months). A significant relationship between adolescents' injuries and repeated alcohol use was revealed.

The facts call for immediate and effective preventive actions. The Government and many professionals recognize the importance of the issue, and all policies on child health adopted by the Ministry of Health in recent years have considered children's injury an important area. New traffic safety measures, road safety education programmes in schools and social advertisement campaigns have been implemented in Lithuania during the past few years.

Alcohol consumption is also recognized as one of the greatest social problems Lithuania faces, with substantial effects on the injury rate. The year 2008 was announced as the "year of sobriety". All the efforts that were made in 2008 produced clear results. This was the first year since the adoption of the Lithuanian health programme in which consumption of alcohol decreased significantly, from 14.3 litres of absolute alcohol per person in 2007 to 13.2 litres in 2008. The percentage of alcohol-related fatal road accidents has also been going down, from 18.4% in 2000 to 12.2% in 2008.

The positive changes that have taken place clearly demonstrate that implementation of evidence-based alcohol control and other measures have a significant influence on road traffic safety overall and help to preserve children's health and save lives. There is, however, a lack of scientific data reflecting the role of new policy aimed at reducing injury rates among the youngest inhabitants of our country.

Our case study highlights the burden of child and adolescent injury in the context of alcohol and traffic safety control policy in Lithuania over the last decade. The analysis is based on the data of four HBSC surveys and other relevant data retrieved from national and international databases. It concludes that the prevention of child injuries can be strongly improved in Lithuania; indeed, the country has recently developed policies to reduce and prevent road traffic accidents and alcohol-related injuries.

### Background

Injuries are a serious public health problem in Lithuania. They rank among the leading causes of morbidity and mortality, with injury fatalities appearing third in recent years after cardiovascular and cancer mortality. Lithuania has been among the countries with the highest injuries rate in the EU (1). The problem is now becoming more and more associated with the

youngest inhabitants of the country. Each year, about 400 school-aged children die needlessly in Lithuania due to unintentional injuries (2). That is the equivalent of losing an entire average school of children.

Alcohol consumption is recognized as one of Lithuania's greatest social problems, with substantial effects on the injury, morbidity and mortality rates and a wide spectrum of negative consequences on the quality of life of the population (3).

The Lithuanian health programme, adopted by parliament in 1998, was an important step in developing a more integrated Lithuanian public health policy (4). It includes targets to reduce mortality rates from accidents (by 30%) and to reduce alcohol consumption (by 25%) over the next two decades. Various laws have been adopted by parliament to facilitate the implementation of the programme.

Our case study aims to highlight the burden of child and adolescent injury in the context of alcohol and traffic safety control policy in Lithuania over the last decade. The analysis is based on the data of four HBSC surveys and other relevant data retrieved from national and international databases.

### Injury statistics for children in Lithuania

Injury fatalities, both intentional and unintentional, are the third leading cause of death for the Lithuanian population of all ages. Standardized rates (146.7 per 100 000 in 2007) are higher than those of the WHO European Region and about 3.5 times as high as the value for the EU (1,5).

Children and adolescent mortality due to unintentional injuries is above the median range compared with other countries of the WHO European Region and EU (Table 1). According to the CSAP project (6), Lithuania's child and adolescent injury mortality rates ranked last and twenty-first for males and females, respectively, among the 24 countries participating in the child safety report cards in 2009 (7).

**Table 1**

Selected measures of child and adolescent injury mortality in Lithuania, the WHO European Region, and the EU

	Lithuania	WHO European Region	EU
Injury death rate, children and adolescents 0–19 years, per 100 000 population*	29.72	12.78	12.22
Proportion of unintentional injuries to all child and adolescent mortality, percentage	39.03	21.53	23.57
Potential years of life lost as a result of injury deaths to children and adolescents 0–19 years (2005)	17.869		–

\*Data presented are for the most recent year(s) available from the European detailed mortality database (1). Mortality data are for ages 0–19 as data for ages 0–17 were not available.

Injury deaths in children and adolescents in Lithuania in 2005 represented nearly 18 000 potential years of life lost (PYLL), including over 14 000 PYLL for unintentional injury (7). Child and adolescent injury death rates increased from the late 1970s until the mid-1990s, when a slow descent began (8). However, in recent years the decrease seems to have levelled off and injuries remain responsible for nearly 46% of all child and adolescent deaths, more than all other causes combined (7).

A look at specific causes indicates that RTIs continue to take the greatest toll, particularly in 15–19-year-old males (Table 2) (7). This fact calls for detailed analysis to identify effective preventive actions through safe transport and injury prevention policies. Other causes of accidents, however, also contribute significantly to injury deaths. Of note are the higher rates of drowning-related deaths among males.

**Table 2**

Unintentional injury-related death rates (per 100 000) by specific cause for children and adolescents 0–19 years, 3-year averages 2003–2005

Victims and causes	Males		Females	
	0–14 yrs	15–19 yrs	0–14 yrs	15–19 yrs
Motorcycle riders	0.51	2.85	0.00	0.77
Motor vehicle drivers/passengers	1.77	18.77	0.86	3.20
Pedestrians	2.41	4.76	0.93	3.32
Cyclists (traffic and non-traffic)	1.20	1.43	0.33	0.00
Drowning	6.34	8.09	1.72	1.24
Falls	0.44	3.20	0.69	0.73
Fires, burns and scalds	0.65	1.44	1.27	0.00
Poisoning	1.96	3.56	0.79	0.98
Choking/strangulation	2.86	0.72	1.59	0.75

## RTIs

The standardized death rate for RTIs in children and young people aged 0–24 years in Lithuania is 14.9 deaths per 100 000 population, the second highest in the WHO European Region (1). RTIs in Lithuania claim more than twice as many lives as the EU average. They have led to considerable human, material and economic losses (approximately 3% of gross domestic product (GDP) (9). Despite the diversity of legal regulations and measures, mortality from RTIs in children and young people in Lithuania is unacceptably high and is the leading cause of death. According to 2006 data from the Department of Statistics of the Government of Lithuania, mortality from RTIs in childhood and adolescence is 44% of all external causes of death.

Around 84% of all road traffic fatalities happened to men: deaths among boys and young men aged 0–24 years from RTIs were three times greater than for girls and young women of the same age, mainly because of the use of alcohol when driving, risky behaviour, unsafe speed and driving without a license. This is also the age at which young males first start to drive a car. Rates of dying from RTIs in a car among 15–24-year-olds are about five times higher than mortality as a pedestrian. Travelling by motorcycle is another leading cause of death, increasing significantly in the age group 15–19 years. There are also noticeable regional differences in RTIs among children and young people in Lithuania (7).

The number of death of children and young people due to RTIs has increased by 18% during the last five years. Longitudinal analysis of accidental injuries trends in Lithuania during the 35 years between 1971 and 2005 revealed that deaths among 15–19-year-olds from RTI has increased to a statistically significant degree, especially among boys (10).

## Driving and alcohol

In 2008, 625 traffic accidents due to drink–driving occurred on roads in Lithuania, in which 53 persons (5 children) were killed and 811 (117 children) were injured (Table 3). Although these figures were extremely high, the percentage of alcohol-related fatal accidents declined in recent years, from 18.4% in 2000 to 12.2% in 2008 (11). The positive changes that have taken place clearly demonstrate that implementation of evidence-based alcohol control measures makes a significant difference to overall road traffic safety and helps to protect the health and save the lives of children.

## Ambulatory care of injured children

Deaths are just the tip of the “injury iceberg”, however, and many more children are hospitalized or seen in ambulatory care settings because of an injury.



**Table 3**

Road traffic accidents, including drunken-persons\* and drunken-drivers accidents, in Lithuania, by year

	2000	2001	2002	2003	2004	2005	2006	2007	2008
All road accidents									
Number of road traffic accidents	5 807	5 972	6 091	5 965	6 357	6 772	6 589	6 448	4794
Number of injured persons	6 960	7 103	7 428	7 266	7 862	8 465	8 253	8 043	5817
Number of killed persons	641	706	697	709	752	773	760	740	499
Drunken-persons accidents									
Number of road traffic accidents	1 031	995	984	852	948	1 095	976	973	625
Number of injured persons	1 321	1 338	1 324	1 121	1 295	1 523	1 380	1 395	881
Number of killed persons	118	90	92	80	102	118	84	91	61
Drunken-drivers accidents*									
Number of road traffic accidents	770	766	829	715	816	942	824	864	625
Number of injured persons (total)	1 071	1 112	1 172	986	1 169	1 374	1 232	1 295	811
Among them children (0–17 yrs)	n/d	n/d	163	138	183	176	156	187	117
Number of killed persons (total)	101	78	83	73	87	102	71	78	53
Among them children (0–17 yrs)	n/d	n/d	7	15	6	10	9	8	5
Proportion of annual road traffic accidents attributable to alcohol, %	17.8	16.7	16.2	14.3	14.9	14.8	14.8	15.1	13.0
Proportion of alcohol-related fatal accidents, %	18.4	12.7	13.2	11.3	13.6	15.3	11.1	12.3	12.2

n/d = no data

\* Includes cases in which accidents were caused not only by a driver who was drunk, but also those caused by any other drunken person, such as a pedestrian.

In 2006, 325 000 traumas and poisonings were reported (96 per 1000) in Lithuania, of which 67 000 occurred in children. Injuries to the shoulders, arms, hips and legs were the most common between 2001 and 2006, with head injuries next. There were 5097 cases of child poisoning (26.5% of all poisonings) registered by the State Patient Fund in 2006. According to State Environmental Health Centre data on investigated cases of poisonings, the main causal agents remain medications and alcohol. Poisoning by household chemical products such as cleaning detergents and cosmetics has remained at the same level for several years (7).

### HBSC study

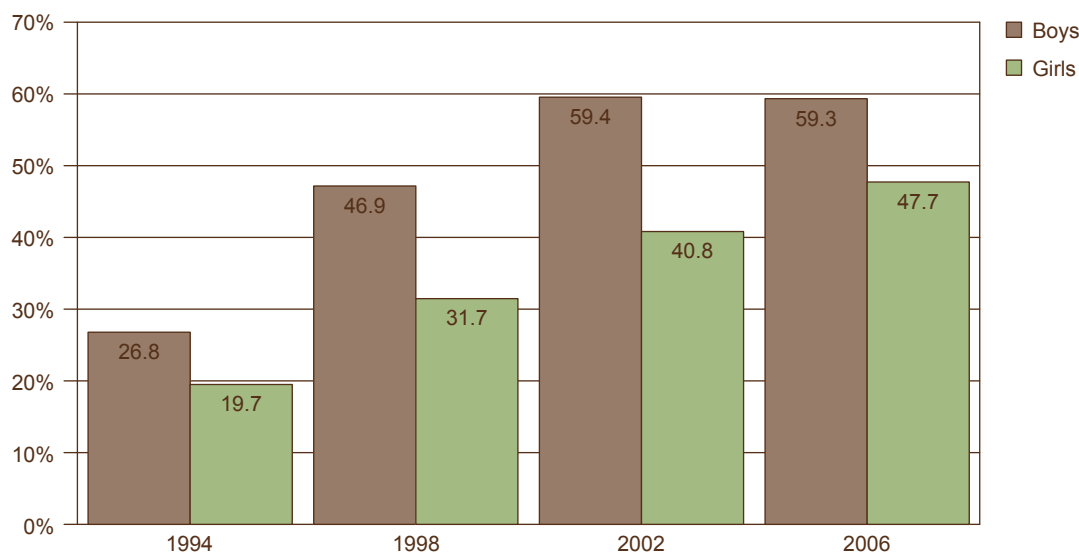
Four surveys of 11-, 13- and 15-year-old schoolchildren have been completed in Lithuania under the guidance of the WHO cross-national HBSC study (12–15). The surveys were conducted in March and April of 1994 (n=5428), 1998 (n=4513), 2002 (n=5645) and 2006 (n=5632). At each survey, young people were asked how many times during the last 12 months they had been injured and had to be treated by a doctor or nurse. Response options ranged from “I was not injured in the past 12 months” to “four times or more”.

The findings presented in Fig. 1 show the proportion of young people who reported a medically attended unintentional injury at least once in the past 12 months. It can be seen that boys are significantly more likely to report injury than girls. A matter of great concern is the growing injury rate. It has increased more than twice over the study period (1994–2006) in both boys and girls.

Reporting at least one medically attended injury in the last 12 months was identified by a growing proportion (22.9%, 31.0%, 50.3% and 53.5%) of students surveyed in 1994, 1998, 2002 and 2006. The rates for reported injuries decreased significantly by age (for boys from 63.3% to 59.0% and to 55.7%,  $p=0.004$ ; and for girls from 53.2% to 47.1% and to 42.9%,  $p<0.001$ , respectively, in 11-, 13- and 15-year-old students surveyed in 2006). This finding was specific for Lithuanian students, as the highest rates of injury were found among 13- and 15-year-olds in other HBSC countries.

**Fig. 1**

Percentage of 11–15-year-old boys and girls who reported at least one medically attended unintentional injury in the last 12 months, in 1994, 1998, 2002 and 2006



Those who reported injuries were asked where the most serious injury had occurred. Fig. 2 shows that more than half of the children had been injured at home (31.4%) and at school (22.3%). The injury was sustained in the street or road for 10% of children.

Many studies (14,15) have shown that young people's injuries are related to their psychological and social environment. To gain better insight into this problem, further analysis was conducted to identify predictors of injury among young people. We analysed the association between the injury and two sets of variables: family environment items, and school and peers environment items. A multivariate analysis was conducted for each set of variables.

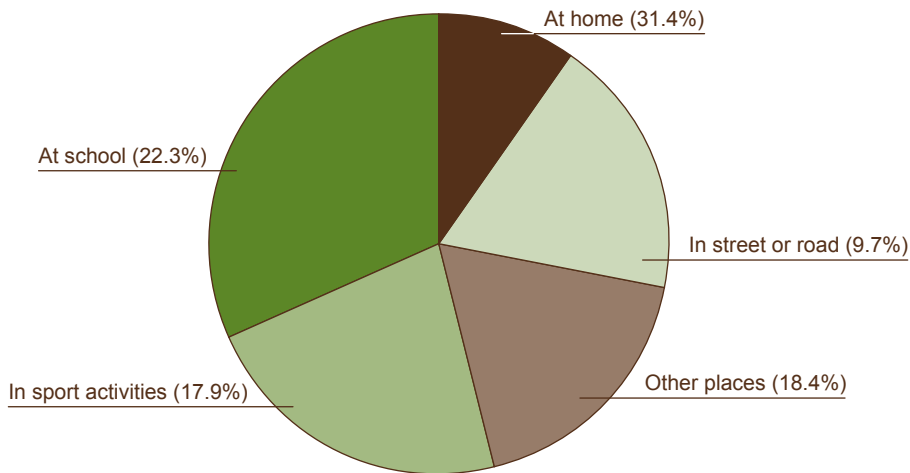
Table 4 indicates how reported injuries were associated with the family's psychosocial determinants. It can be seen that in multivariate analysis, only two items (difficult communication with mother and low father's education level) were identified as significant predictors of injuries. No significant relationship between injury and family SES was found.

Analysis of another group of variables (Table 5) revealed significant predictors of injury derived from school setting ("find schoolwork tiring" and "don't like school") as well as from relationship with peers (three or more friends of the opposite sex and spending after-school time with friends). A significant association between injury and spending evening time with friends might be notified in univariate analysis only.

Injury can be interpreted as a marker for high-risk adolescent lifestyles that include multiple risk-taking behaviour and associated health-related consequences. Results of the HBSC study presented in Table 6 show how injury is linked with other risk behaviours. It is unfavourable that injuries are statistically significantly related with repeated drunkenness.

**Fig. 2**

Places where injuries occurred, combined data from 1994, 1998, 2002 and 2006 HBSC surveys in Lithuania

**Table 4**

Family's psychosocial determinants of unintentional injuries: odds ratios (ORs) from univariate and multivariate logistic regression analysis<sup>†</sup>

Variables entered: categories (reference category)	Univariate analysis		Multivariate analysis (forward conditional)	
	OR	(95% CI)	OR	(95% CI)
Place of residence: rural (urban)	0.96	(0.86–1.07)		
Family SES: average (low)	1.04	0.93–1.18)		
high (low)	1.20	(1.02–1.42)*		
Family structure: broken (intact family)	1.08	(0.96–1.22)		
Communication with father: difficult (easy)	0.99	(0.88–1.13)		
Communication with mother: difficult (easy)	1.26	(1.09–1.45)***	1.33	(1.07 – 1.64)**
Father's education level: university (less than university)	1.24	(1.06–1.45)**	1.20	(1.01 – 1.44)*
Mother's education level: university (less than university)	1.05	(0.90–1.22)		

<sup>†</sup> Adjusted for gender and age.

\* p<=0.05

\*\* p<=0.01

\*\*\* p<=0.001

**Table 5**

School's and peers' psychosocial predictors of unintentional injuries: ORs from univariate and multivariate logistic regression analysis<sup>†</sup>

Variables entered: categories (reference category)	Univariate analysis		Multivariate analysis (forward conditional)	
	OR	(95% CI)	OR	(95% CI)
Perceived school performance: poor (good)	1.24	(1.11–1.39)***		
Find schoolwork difficult: agree (disagree)	1.31	(1.17–1.46)***		
Find schoolwork tiring: agree (disagree)	1.38	(1.24–1.54)***	1.34	(1.11–1.61)**
Liking school: don't like (like)	1.18	(1.04–1.33)*	1.23	(1.01–1.52)*
Pressured by schoolwork: not pressured (pressured)	1.17	(1.05–1.31)**		
Close male friends: 1–2 friends (have not) 3+ friends (have not)	1.22 1.34	(0.94–1.58) (1.03–1.74)*		
Close female friends: 1–2 friends (have not) 3+ friends (have not)	1.15 1.29	(0.88–1.15) (0.99–1.68)		
Close friends of the same sex: 1–2 friends (have not) 3+ friends (have not)	1.11 1.16	(0.73–1.69) (0.77–1.75)		
Close friends of opposite sex: 1–2 friends (have not) 3+ friends (have not)	1.18 1.37	(0.96–1.46) (1.10–1.70)**	1.18 1.37	(0.95–1.46) (1.10–1.71)**
After school with friends: 1–2 days a week (never) 3–5 days a week (never)	1.38 1.46	(1.15–1.66)*** (1.23–1.74)***	1.77 1.64	(1.36–2.29)*** (1.27–2.11)***
Evening with friends: 1–3 evenings a week (never) 4–7 evenings a week (never)	1.34 1.50	(1.18–1.53)*** (1.28–1.75)***		

<sup>†</sup> Adjusted for gender and age.

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

**Table 6**

Unintentional injuries and other risk behaviours: ORs from univariate and multivariate logistic regression analysis<sup>†</sup>

Variables entered: categories (reference category)	Univariate analysis		Multivariate analysis (forward conditional)	
	OR	(95% CI)	OR	(95% CI)
Smoking: smoked (not smoked)	1.70	(1.44–2.00)***	1.23	(1.02–1.48)*
Regular use of alcohol: weekly (less than weekly)	1.67	(1.44–2.00)***		
Drunkenness: 2+ times (never or 1 time)	1.65	(1.44–2.00)***	1.29	(1.10–1.51)**
Use any drugs in life <sup>#</sup> : used at least once (never used)	1.84	(1.42–2.39)***		
Early sexual intercourse <sup>#</sup> : yes (no)	1.60	(1.25–2.06)***		
Bullied other students past couple of months: yes (no)	1.46	(1.28–1.66)***	1.22	(1.06–1.40)**
Physical fights: yes (no)	1.90	(1.68–2.13)***	1.64	(1.45–1.86)***
High suicidal risk: yes (no)	1.96	(1.61–2.39)***	1.59	(1.29–1.96)***

<sup>†</sup> Adjusted for gender and age.

<sup>#</sup> Only for 15-year-olds, excluded from multivariate analysis.

\* p<=0.05

\*\* p<=0.01

\*\*\* p<=0.001

## Current social and policy content

### Country profile of Lithuania

Lithuania is one of the three states situated along the south-eastern shore of the Baltic Sea (area 65.2 km<sup>2</sup>, population 3.37 million, state language is Lithuanian, the capital is Vilnius) (16). At the beginning of the year 2008, the number of children (below the age of 18 years) was 653 700 (about 20% of the population). The number of children has been decreasing extraordinarily (by 200 000, or approximately 25%, since 2000) (17).

Lithuania gained its independence in March 1990, and the country is now in a complex transition phase as it moves from being a centralized economy to a democratic society with a market economy. It became a Member State of the North Atlantic Treaty Organization (NATO) and joined the EU in 2004.

In 2003, before joining the EU, Lithuania had the highest economic growth rate among all candidate and member countries. Economic development continues to be high, with annual GDP growth above 5%. Five and a half per cent of GDP was spent on health. However, Lithuania has recently been strongly affected by the global economic crisis: in December 2008, GDP fell to 2.0% of the level of December 2007, and the unemployment rate was 7.9%.

### Key public health problems (in respect of external causes of death)

These are some of the key problems the country faces.

Real levels of alcohol consumption are likely to be higher than reported (13.2 litres per capita in 2008). Morbidity by alcoholic psychosis grew from 58.5 per 100 000 in 1998 to 111.3 per 100 000 in 2007 (although there was a decline by 12% in 2008).

Substance abuse increased from 81.2 per 100 000 in 1998 to 146.3 per 100 000 in 2004. Tobacco consumption among young people has stabilized in recent years, while alcohol consumption is still growing, remarkably so in young women.

The number of road traffic accidents with injury reached 9594 per 100 000 in 2006 and was twice as high as the EU average; a small decrease was noticed in 2007 and a further decrease of 30% was recorded in 2008 (5).

### Policy profile for the prevention of injuries

In Lithuania, as in other countries of eastern Europe, the change to a market economy was accompanied with an unprecedented increase in motorization in the country. Changes in infrastructure, safety standards, laws and regulations, however, have not kept pace. An increased level of alcohol intake, plus heavy marketing by the alcohol industry, has meant more drink–driving. Coupled with this are insufficient capacity of road safety experts and changes in governance that have led to inadequate enforcement of safety standards and laws (9). This evoked an increase in RTIs in children during the periods of greatest change in Lithuania. Although downward trends followed, the RTI rates in children are still among the highest in the region, and deaths from RTIs have not shown significant declines, in contrast to other causes of child mortality (7).

A country assessment on preventing injuries and promoting safety in Lithuania was carried out recently (18). It is based on the responses to a WHO questionnaire designed to gather information on key elements of the Council Recommendation of 31 May 2007, the WHO Regional Committee for Europe resolution RC55/R9 (19) and WHO data and information.

Lithuania reported overall implementation of 40% of a range of selected effective interventions for injury prevention. This is lower than the regional median scores of 64% for unintentional injury prevention. Lithuania has reported implementation and enforcement of the following three specific policies on:

- ban on sales of fireworks to children under 18 years of age;
- mandatory child-resistant packaging for nonpharmaceutical products with the potential to poison; and
- ban on the use of drawstrings in children's clothing.

There was a lower proportion of reported implementation in the areas of fires, poisoning, burns and falls for unintentional injuries.

Lithuania acknowledged that adoption of the resolution helped raise the policy profile of the prevention of injuries as a health priority. There is an overall national policy on injury prevention (with political commitment) and many of the key steps considered necessary for policy development are in place, such as intersectoral collaboration and exchange of best practice.

It was stated that, for the next steps, greater attention needed to be given to the development of national policy on prevention and implementation of evidence-based interventions for road safety. Alcohol has a strong role to play in this excess mortality, and interventions are also needed against harmful alcohol use.

### Driving forces and key players

Currently, there are many health institutions and other relevant institutions in place to deal with prevention of injuries to children.

At central level, the public health department of the Ministry of Health deals with environmental health issues. The work of the department is based on the public health law (2002, amended in 2007) (20), which sets out a legal requirement to have the national environment and health action plan adopted by the government. From the national perspective, the state public health service is run under the Ministry of Health with 10 regional public health centres that focus on public health safety control.

The delivery and infrastructure of public health services, including environmental health, are being reformed to extend the public health system infrastructure at local level. The core of the reform, introduced in 2006, is the establishment in a number

of municipalities of public health bureaus with a wide range of services, with the objectives of being closer to the population and providing more effective public health care and prevention services.

The state environmental health centre collects and analyses information about environmental health conditions and indicators, creates databases and information systems, carries out epidemiological studies and forwards its results and recommendations to governmental bodies, other interested institutions and the public. The centre is also responsible for coordination of the activities on children's health and the environment within CEHAPE and for reporting back to WHO.

The main functions of the health information centre are to gather and process statistical information about the health of the population and the activity and resources of health care institutions.

The national health board coordinates policy on alcohol and tobacco control, prevention of injuries and disease prevention and control. It also implements the Lithuanian health programme adopted by the parliament and other state health care programmes.

There are 6.32 km of roads per 1000 population in Lithuania. The Lithuanian road administration, under the Ministry of Transport and Communications, is in charge of organizing and coordinating the reconstruction, maintenance and development of significant roads. Among its many important aims is to ensure traffic safety.

The transition process presents huge challenges and reforms for youth education, which are being addressed by the Ministry of Education and Science. Health promotion, including injury prevention, is a new challenge for Lithuanian schools, but schools have been designated as one of the settings in which to reduce inequalities in health. There is a partnership agreement between the health and education sectors at ministerial level, but there is no specific department to deal with students' health and safety at school.

## Policy and interventions

This section describes several exemplary interventions.

### Safety on roads

The current national action plan for road safety, "Complex traffic safety development programme until 2010", follows the "Road safety programme for 2001–2005". The main target of the current strategy is a 50% reduction in road fatalities and a 20% reduction in road injuries between 2004 and 2010. The current road safety programme lists a number of actions to be implemented to achieve the target. It is proposed to give priority to the main problem areas, which seem to be vulnerable road users, road lighting problems, drink-driving and the condition of municipal roads (21,22).

Children and young people are particularly vulnerable to RTIs. They have limited experience, engage in risky behaviour and are inexperienced in using alcohol. Drivers with limited experience of driving (one year or less) cause the biggest share of all traffic accidents. In addition, environmental conditions are believed to contribute significantly to RTIs.

Lithuania has adopted a number of measures to protect children from RTIs:

- special seats are required in front passenger seats for children under 12 years or under 150 cm in height; children over 3 years shall be seated in rear seats using regular seat belts, and those under 3 years shall be seated in a special seat;
- it is obligatory for all motorcycle passengers to wear a helmet, but children below 12 years of age are not allowed to be carried by a motorbike at all; and
- the maximum speed limit has been set at 50 km/hour for settlements and 20 km/hour for residential areas within settlements.



Lithuania participated in advocacy events of the first United Nations Global Road Safety Week and is taking part in the Global Status Report on Road Safety project (23).

### Educational traffic safety campaigns

The road administration, under the Ministry of Transport and Communications, has been carrying out the following educational traffic safety campaigns ([http://www.lra.lt/en.php/traffic\\_safety/campaigns/4568](http://www.lra.lt/en.php/traffic_safety/campaigns/4568)).

- Video and audio clips encouraged drivers not to exceed the speed limit, not to drive under the influence of alcohol, to observe traffic regulations and to use reflective materials; road users to behave on the roads carefully and safely; and information messages on traffic safety were broadcast on the most popular television channels and radio stations.
- Educational information on traffic safety were published in the biggest newspapers.
- Safety belts' efficiency and vehicle turnover simulation equipment were demonstrated in all municipalities.
- Schoolchildren's competition, "Save young lives on the roads", includes:
  - "Traffic lights" competition for primary schoolchildren
  - "Safe wheel" competition for young cyclists
  - competition for young moped, motorcycle and car drivers
  - a conference for young traffic wardens
  - training of young bicyclists' team and their participation in international competitions.
- Booklets on traffic safety were published. In 2008, the booklets "Let all trips be safe" were purchased and disseminated. It is planned to purchase and disseminate booklets for primary schoolchildren, "Safely to school, safely back home", calendars with pictures about traffic safety and information publications on the statistics of RTIs in Lithuania from 2004 to 2007 in Lithuanian and English.
- Two hundred thousand reflectors for pedestrians and cyclists were purchased and disseminated through municipalities, schools and other institutions annually.
- Joint educational traffic safety improvement campaigns carried out with state road maintenance companies.
- Regular activities in "Safe traffic schools" ("Safe child schools") were carried out. The schools were established in Vilnius and Kaunas and produce evidence-based guidance on promoting child safety and good practice for kindergartens and schools. The schools organize seminars and conferences for teachers from all over the country and publish methodical literature. They also have partners in educational projects from the EU programmes Leonardo da Vinci and Socrates Comenius (24).

### Participation in CSAP

The state environmental health centre has joined the CSAP project, an initiative led by ECSA with co-funding and partnership involving the European Commission, the Health and Environment Alliance (HEAL), UNICEF, the universities of Keele and the West of England, WHO and partners in each of the 26 participating countries. The child safety country profile and child safety report card were developed by ECSA (6).

Evidence-based good practice is a main focus of the initiative and good practice is built into the CSAP development process. To support country partners in this, current evidence on what works in child and adolescent injury prevention was collected and reviewed. The *Child safety good practice guide: good investments in unintentional child injury prevention and safety promotion* (25) was subsequently developed and distributed.

The Lithuanian child safety report card was published in 2009 (26). It highlights the burden of child and adolescent injury and examines sociodemographic determinants to provide a starting point for interpreting its results and for measuring progress toward, and setting targets for, reducing child and adolescent injury-related death and disability.

In response to the report card and profile, an invitation to present the CSAP and the report card at a conference on child care was received, and Lithuania was invited to join the second phase of the CSAP project from 2008 to 2010 as a participating country.

### **Alcohol control as a priority health policy**

When the number of alcohol-related diseases and deaths significantly increased within a very short period of time in Lithuania, alcohol consumption became an issue of public concern. The period 2007/2008 became a time for legislative work on alcohol-control policies and 2008 was designated as the “year of sobriety”. Despite enormous pressure from the alcohol industry, substantial changes in alcohol-control policy were achieved (Box 1).

#### **Box 1. The main changes in alcohol-control policy**

- A ban on daytime (from 06:00 to 23:00) alcohol advertising on radio and television.
- The excise duty on alcohol (including cider) was increased, and tax relief was abolished for small breweries.
- From 1 January 2009, alcohol sales have been banned from 22:00 until 08:00. This ban is valid for restaurants and bars as well as for shops and kiosks.
- It is forbidden to have alcoholic beverages in the passenger space of cars.
- Alcohol trade will be forbidden in trade stalls from 2010.
- Not only was the fine for drink-driving increased, but the law also authorized confiscation of the vehicle and even administrative arrests.
- The permissible alcohol concentration in blood was reduced from 0.4 to 0.2 ppm for professional drivers and for drivers in their first two years after gaining a driving license. Alcohol breath testing has also been strengthened.

The “year of sobriety” produced clear results. It was the first time that the Lithuanian health programme confirmed a reduction in alcohol consumption, from 14.3 litres of absolute alcohol per person in 2007 to 13.2 litres in 2008. While this represents positive progress, the revised amount of alcohol per capita remains nearly two times above the safe limit suggested by WHO.

The effectiveness of measures taken during the “year of sobriety” was also reflected in the decrease in child alcohol intoxications (Table 7). These trends are closely related to dynamics of alcohol-related deaths and injuries on the roads (see Table 3).

#### Prevention of supply of alcohol to minors

Common alcohol-control measures have already had effects on children, with a decrease in the number of children treated because of alcoholic intoxication in 2008 (*II*). The sale of alcoholic beverages to minors remains worrying, however. Several amendments to alcohol-control law to improve control of alcohol supply to minors have been proposed in the parliament, aiming to:

- reduce the number of trade points to restrict alcohol availability and allow alcohol sales only in specialized shops;
- require a personal document with photograph and date of birth from all young persons wishing to buy tobacco and alcohol products; and
- increase society’s awareness that selling alcohol to minors is unlawful.

Table 7

Mental and behavioural disorders and toxic effects due to alcohol use among school-aged children, 2001–2008

Year	Toxic effect of alcohol				Mental and behavioural disorders due to use of alcohol (acute intoxication)			
	7–14 years		15–17 years		7–14 years		15–17 years	
	n	Per 100 000 population	n	Per 100 000 population	n	Per 100 000 population	n	Per 100 000 population
2001	19	4.6	37	22.2	8	1.9	5	3.0
2002	36	9.0	19	11.3	5	1.3	7	4.1
2003	84	21.9	51	30.4	10	2.6	15	8.9
2004	149	40.6	125	76.3	4	1.1	12	7.3
2005	206	58.9	188	117.7	8	2.3	6	3.8
2006	269	81.1	250	158.3	9	2.7	10	6.3
2007	329	105.2	277	176.3	7	2.2	22	14.0
2008	246	81.2	283	180.4	8	2.6	16	10.2

## Lessons learnt

Data from the HBSC study and health statistics databases clearly indicate that, while child and youth injury is currently highly prevalent, problems related to injury among this group have high priority in Lithuania. Establishing new policies for young people's injury prevention, including alcohol-control policy related to accidents, is currently on the agenda (8,27). The government and many professionals recognize the importance of the subject, and all policies on child health adopted by the Ministry of Health in recent years have considered children's injuries as an important area.

Overall, the data on interventions show that the prevention of injuries can be improved in Lithuania. The country has recently developed policies to reduce and prevent accidents, especially RTIs and alcohol-related injuries. Despite some notable achievements, significant barriers to successful implementation of projects remain, particularly in road traffic safety and alcohol-control policy areas.

The *World report on road traffic injury prevention* (28) noted that multiple programmes and policy initiatives have helped to produce rapid declines in RTIs throughout the developed world. Sweden and Finland are examples of countries in which traffic safety measures have resulted in significant decreases in the road fatality rate in children. Lithuania, however, shows a very different picture. Here, traffic safety receives fewer resources and is a low policy priority. There is little media attention and the issue is not a cause of public concern.

Much can be learned from the experiences of high-income countries in tackling their child traffic injury rates, but the measures must be redefined for particular country conditions. A concerted effort across many sectors is needed to enable effective action. A basic starting point is a national road safety strategy and plan of action, which Lithuania lacks.

Alcohol is another key public health and social concern related to accidents. Lithuania has the highest proportion of alcohol drinkers in Europe, the highest levels of alcohol consumption per population and a high level of alcohol-related harm. Despite a decrease in the number of alcohol-related fatal accidents in recent years, the rate remains the highest in the EU. According to the Lithuanian road administration, the most common type of accident on national roads between 1999 and 2004 involved drivers without licenses and intoxicated drivers (21,22).

Alcohol-control measures have already had effects on children with decreases in childhood alcohol intoxication, but the consumption situation is still worrying. One of the biggest problems – the sale of alcoholic beverages to minors – still exists.

There is little evidence to support the use of isolated education measures to reduce the consumption of alcohol. Effective

education measures must be systematic, professional, age-specific and evidence-based, but only a few programmes meeting these criteria exist in Lithuania. A radical review of education on healthy lifestyle in education institutions is therefore required.

The high accessibility of alcohol to minors presents a barrier to success. Reducing the accessibility of alcoholic beverages was covered in the state alcohol-control programme, but the measures set out in the legislation have not yet been implemented.

It is important to point out that formulating and planning injury prevention actions and monitoring the progress of their implementation will substantially benefit from an integrated surveillance system for unintentional injuries. The system should facilitate access to information on diverse health endpoints collected by different authorities, as well as to different information cross-sections by type of injury, risk, etc.

Finally, a management system for integration of intersectoral activities is required. Management systems provide the resources for programme implementation and maintenance, including technical information, assigned responsibility, adequate expertise and authority, hazard identification and assessment, hazard prevention and control, and programme evaluation procedures. An evaluation looks at the systems that have been created to carry out the programme and asks if they are working effectively. All systems that contribute to the programme should be reviewed.

The basis for an evaluation of the effectiveness of implemented and existing injury prevention programmes, including alcohol-control measures, is continuous collection and analysis of statistics on injury, alcohol consumption-related health, economics and crime. Special attention must be paid to children's population subgroups. The methods for evaluation and information sources should be selected from scientific research options in conjunction with epidemiological studies of injuries in childhood. Research in this field should have appropriate support.

Key lessons learnt are summarized in Box 2.

#### **Box 2.** Key policy messages and recommendations

- RTIs are the leading cause of death in Lithuania, largely related to alcohol consumption. Consequently, evidence-based alcohol prevention measures must be created and implemented; the permissible alcohol concentration in blood must be reduced to “zero” for all drivers, and alcohol breath-testing must be strengthened. A concerted effort across many sectors is needed for effective action.
- Traffic death rates among children in Lithuania are still among the highest in the European Region and have not shown significant declines, in contrast to other causes of child mortality. Consequently, the problem of road traffic injury of children and young people in the country requires a high priority.
- In the HBSC 2006 survey, more than half of 11- and 15-year-old respondents reported a medically attended injury at least once in the past 12 months; this figure was more than double that of 12 years previously. Consequently, the development and implementation of evidence-based health education in schools, including injury prevention, is a matter of great concern.
- The HBSC survey data suggest that adolescent injuries have a strong relation with the use of alcohol and other risky behaviours. Consequently, an integrated approach to the prevention of injury and other risky behaviours among adolescents must be developed and implemented.
- There is lack of information on evaluation of the effectiveness of programmes and other measures tailored to injury prevention. Consequently, continuous collection and analysis of injury statistics, including alcohol consumption-related health, economics and crime statistics, must be provided. Access to information on diverse health endpoints collected by different authorities and to different information cross-sections by type of injury is warranted.

Establishing a system that ensures financing and implementation of preventive programmes of injury prevention and alcohol-control policy on a sustained and enduring basis remains a big challenge. The case study has been able to point to the challenges that need to be addressed to improve the safety of the young population of Lithuania.

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# Norway: reducing inequality gaps in physical activity through school-based interventions

Ellen Haug,<sup>1</sup> Grete Haug,<sup>2</sup> Sissel Jacobsen,<sup>3</sup> Torill Larsen,<sup>4</sup> Nina Strand Oelnes,<sup>5</sup> Henriette Oien,<sup>5</sup> Vigdis Roenning,<sup>3</sup> Oddrun Samdal<sup>1</sup>

<sup>1</sup>Research Centre for Health Promotion, Faculty of Psychology, University of Bergen,

<sup>2</sup>Directorate for Education and Training, Oslo

<sup>3</sup>Ministry of Health, Oslo

<sup>4</sup>Betanien Deaconal University College, Bergen

<sup>5</sup>Directorate of Health, Oslo

## Executive summary

The national policy focus on physical activity in Norway started in 1999 with the establishment of the National Board of Nutrition and Physical Activity. A key priority for the new board was to explore existing national population data on physical activity and the relationships between physical activity and health as a basis for policy and action development. Norwegian data from the HBSC study have been key sources for population data on children's and adolescents' levels of physical activity and sedentary behaviour. The priority given to promoting physical activity by Norwegian national authorities has been demonstrated further through white papers from the ministries of health and education. In addition, an extensive collaboration involving eight ministries was initiated as part of the development of the *Action plan on physical activity 2005–2009: working together for physical activity*, which was launched in 2005.

The ministries of education and health launched a joint intervention programme, “Physical activity and healthy meals in school”, in 2004. This aimed to identify models that facilitate 60 minutes of daily physical activity in the course of the school day and ensure implementation of national guidelines for healthy meals in school. In total, 400 schools have been involved. The project had a strong focus on student participation and also aimed to address social inequities by adopting stimulating approaches to getting all students involved in activities. The evaluation results indicated that primary schools were better able to develop models in which physical activity and healthy eating were integrated by teachers in their daily teaching, while secondary schools seemed more successful when physical activity was integrated into the teaching schedule and was used as a pedagogical method for learning. In this way, all students were involved through compulsory teaching. Teachers participating in the project asked for training and the provision of a searchable database with descriptions of concrete activities to help them in their efforts to facilitate daily physical activity at school. In response to this, the Minister of Education established in 2009 a web-based tool to enable teachers to increase students' daily physical activity. The Government is gradually increasing the number of school hours to allow the integration of physical activity as a regular part of the school day.

Three main lessons have been learnt from the processes of development described above. First is the importance and usefulness of employing research to guide the development of national policies and actions. Second, close collaboration involving several ministries in the development of action plans and policy documents has proven to be highly successful. And third, the ministries have emphasized the importance of evaluating the effects of their actions to learn how they can best improve population-level physical activity, particularly among children and adolescents.

## The evidence base

Children and young people have been identified as key target groups for physical activity promotion through national and cross-national policy plans across the western world (1–8).

Understanding the factors influencing physical activity within the arenas in which young people spend significant amounts of time on a daily basis will be crucial in developing effective interventions. Consequently, school has been recognized as a promising setting in which to promote physical activity uptake and balance socioeconomic differences in physical activity levels. Virtually all young people attend school and spend a large part of the day there, meeting friends with whom they can play and be physically active. Interaction with fellow students also provides opportunities for learning skills and developing attitudes and norms that can positively influence motivation for physical activity (9).



Students in school settings are exposed to, and can become familiar with, various types of physical activities that may stimulate their motivation to be physically active. Schools also have staff with experience in teaching sports and physical activity as well as trained educators who know how to communicate and provide the support and encouragement needed to motivate students. Moreover, schools provide facilities and equipment that can encourage physical activity; it has even been suggested that schools may be the only providers of such facilities for some socioeconomically disadvantaged students (10).

Schools offer a range of opportunities for young people to engage in physical activity through, for instance, organized physical education classes and leisure-time periods during the school day (such as morning and afternoon break, and lunch time). Some schools also provide extracurricular activities during or after school (11,12).

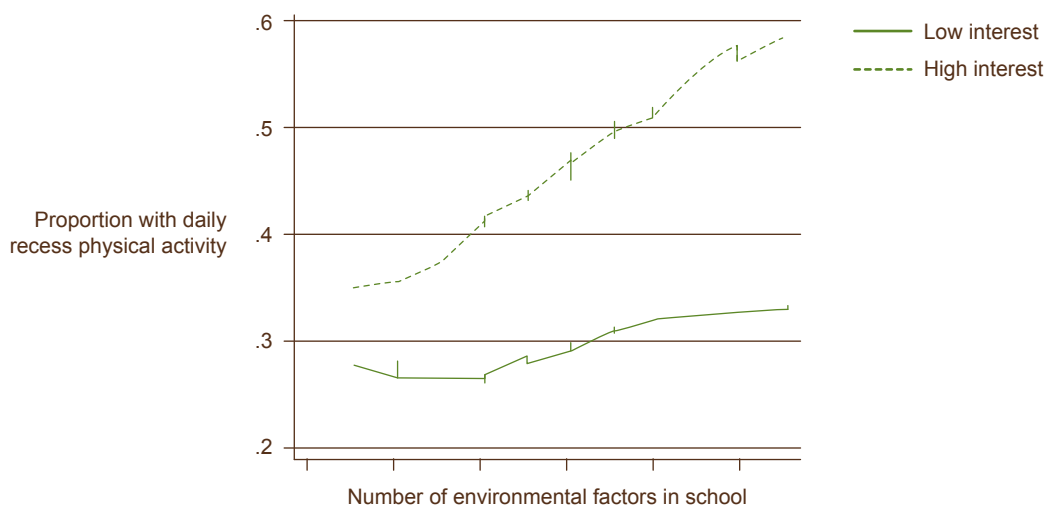
The number of physical education classes offered to students on a weekly basis tends to vary between countries and schools, with few schools providing daily physical education periods (11,13). In Norway, a national survey has reported on the number of total school classes (physical education, extracurricular classes and other classes) per week involving moderate-to-vigorous physical activity for 11-, 13-, 15- and 16-year-old students. The numbers ranged from an average of 1.5 classes per week for 16-year-olds to 2.2 classes for 13-year-olds.

Students in primary and secondary schools in the Norwegian school system have several recess periods during the day (14), offering opportunities to be physically active on a daily basis. The recess period is defined as a regularly scheduled time for unstructured physical activity and play (12). Noncurricular school time such as this can contribute up to 50% of the 60 minutes of daily moderate-to-vigorous physical activity recommended for students up to 12 years (15,16). In a national survey of all Norwegian schools in 2000, the proportion of students who reported having been physically active in the previous recess was 89% for grades 1–4, 78% for grades 5–7 and 31% for grades 8–10 (14). The Norwegian HBSC 2005/2006 survey showed that the average self-reported time spent in moderate-to-vigorous physical activity during recesses was 1.3 hours per week for 11-year-olds, 0.5 hours for 13-year-olds, 0.3 hours for 15-year-olds and 0.2 hours for 16-year-olds (17).

Norwegian HBSC data on 13-year-olds, in combination with school-level data on the physical environment of the school reported by principals (18), showed that the chances of students in schools with many facilities for physical activity being physically active during recesses were three times higher than those of students in schools with few facilities (19) (Fig. 1). The association between the environment and physical activity was stronger for students with a high interest in school physical activity (after controlling for SES and gender), indicating that students' interests may moderate the impact of facilities on participation in physical activity during recesses.

**Fig. 1**

Students' physical activity levels by number of available facilities and students' physical activity interest (19)





Differences in participation rates were small in schools deprived of environmental support, and were generally low in both interest groups. A large increase in the proportion of students being active in the “high-interest group” was seen with an increasing number of facilities, but no notable changes were seen in the group with weak interest. These results underpin the importance of combining environmental change strategies with interventions aimed at increasing students’ motivation and skills in physical activity.

The survey also showed that physical activity participation during recesses did not differ significantly among SES groups, and SES did not confound the relationship between the physical environment and participation in physical activity. These results are encouraging and support the idea that the school setting can be an arena in which social inequalities in health can be reduced (in this case, inequalities relating to participation in physical activity) (20).

The impact of local school policies on students’ physical activity levels was also studied. The results showed that schools with a written policy on physical activity and those offering organized noncurricular physical activity several times a week had a higher proportion of students reporting daily participation in recess physical activity, after controlling for gender, SES, individual-level interests and the physical environment (20). The results give scientific support to policy documents recommending the implementation of school policies to increase physical activity.

## The social and policy context

The national policy focus on physical activity in Norway started in 1999 with the establishment of the National Board of Nutrition and Physical Activity. This was split into two boards in 2002 (one for nutrition and one for physical activity) to better address the population-based challenges related to each of these health behaviours. Separate departments of physical activity and of nutrition were established within the Directorate of Health and Social Affairs in the same year.

A key priority for the National Board of Physical Activity, working in close collaboration with the Department of Physical Activity in the Directorate for Health and Social Affairs, was to explore existing national population data on physical activity and the relationships between physical activity and health as a basis for policy and action development. It also sought to identify needs for new surveys to secure a scientific basis for policy and action development.

Norwegian HBSC data have been key sources for population data on children’s and adolescents’ levels of physical activity and sedentary behaviour and have been used by national health authorities to inform policy development and prioritize actions.

The priority given to promoting physical activity by Norwegian national authorities was demonstrated in the 2003 White Paper, *Prescription for a healthier Norway* (21). This listed physical activity first among the five most important public health areas for the upcoming decade.

The National Board of Physical Activity and the Department of Physical Activity in the Directorate for Health and Social Affairs have worked systematically to persuade other ministries to include a focus on physical activity in their policies. Particular emphasis has been given to promoting collaboration with the Ministry of Education; consequently, a focus on physical activity among education authorities was confirmed in the education White Paper, *Culture for learning* (22).

An extensive collaboration with seven other ministries was initiated as part of the development of the *Action plan on physical activity 2005–2009: working together for physical activity* (23) (Fig. 2). The plan, the first of its kind worldwide, was launched in 2005 as a follow-up to the Commission of the European Communities’ White Paper, *A strategy for Europe on nutrition, overweight and obesity-related health issues* (2) and as an adaptation of the *WHO Global strategy on diet, physical activity and health* (8).

The collaborative effort involving eight ministries in the development of the action plan was coordinated by the Ministry of Health under guidance from the Norwegian National Board of Physical Activity and the Directorate of Health and Social Affairs. Representatives from all the ministries were invited to regular meetings to discuss how they could integrate a focus on physical activity in their policies as part of fulfilling their own aims. Between meetings, the representatives were asked

**Fig. 2**

National action plan for physical activity developed by eight ministries (left) and the action plan to meet health inequities developed by the Directorate for Health and Social Affairs (right)

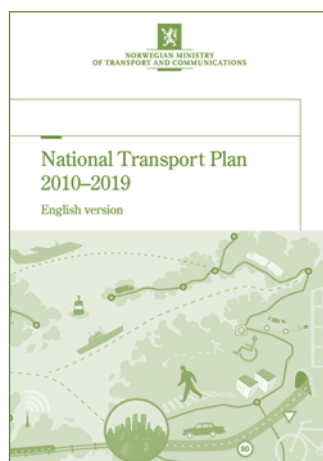


to identify concrete actions that could be included in the action plan and for which their ministry could take responsibility. A White Paper and action plan on reducing social inequalities has been developed in a similar collaboration involving several ministries.

The actions from the Norwegian action plan for physical activity have been used to underpin policy documents and action plans from individual ministries. For example, a recently launched ten-year national plan for transport (24) (Fig. 3) prioritizes the development of walking and cycling paths, safer school routes and measures to increase traffic safety, all of which are important in promoting children's and adolescents' physical activity. In another initiative, a new national strategy on preventing injuries is being developed, with school health services identified as being key players in promoting physical activity and preventing injuries among young people.

**Fig. 3**

*National plan for transport (2010–20) (24)*



Common to the development of different policy plans and documents on physical activity was an acknowledgement of the importance of children and young people as target groups for physical activity promotion, with the school arena seen as a key setting in which to promote physical activity and induce population-wide changes.

## Specific policies and interventions on promoting physical activity and reducing inequalities

The ministries of education and health launched a joint intervention programme, “Physical activity and healthy meals in school”, in 2004. This aims to identify models that facilitate 60 minutes of daily physical activity in the course of the school day and ensure implementation of national guidelines for healthy meals in school (25). Additionally, the project is intended to act as a vehicle to address social inequalities in health through increasing levels of physical activity and healthy eating for *all* children in school.

All schools in Norway were invited to apply to participate in the project in early spring 2004. A total of 400 schools have been involved, each receiving a small sum of money to stimulate development of efficient models. The schools were given guidelines based on principles developed through the Norwegian Network of Health Promoting Schools (26) on how to create and implement strategies and activities to promote physical activity and healthy school meals. Student participation in planning and implementation of activities was strongly emphasized.

County-level counsellors, specifically appointed to initiate activities in health promotion at county and municipality level and provide advice to practitioners, were invited to a seminar in which the planning model from the Norwegian Network of Health Promoting Schools was presented (27). The model emphasizes the importance of establishing ownership of the process among students and staff and the key role of the school principal in motivating and facilitating the change process. The importance of addressing structural and organizational aspects to facilitate physical activity and healthy eating, rather than aiming to change students’ motivation and knowledge of physical activity and healthy eating, was stressed.

Schools were recommended to limit and focus their actions to identify and achieve change. Such limitations could include identifying specific target groups or addressing competence-building among staff before initiating activities for students. The intention behind the limited focus is that the schools concentrate on working extensively in one area to develop efficient models for that particular topic. Participating schools can consequently develop in-depth and efficient models over a large number of focus areas and create a database on which other schools can build. The schools were also requested to establish a project task force involving students, staff, school health services and other relevant partners. The information given to the county-level counsellors was also made available to the participating schools via the Internet and the counsellors were encouraged to organize local networks of schools to stimulate the development of local models.

The Research Centre for Health Promotion at the University of Bergen was given the task of evaluating the programme and identifying efficient models. The emphasis of the evaluation was on identifying structural aspects that are important for facilitating physical activity and healthy meals in schools. These involved changes in organizational aspects and physical structures. In addition, behaviour data were collected from 16 000 students.

The evaluation results indicated that primary schools were better able to develop models in which physical activity and healthy eating were integrated by teachers in their daily teaching (28), while secondary schools seemed more successful when physical activity was integrated in the teaching schedule and was included as part of learning objectives in other subjects. In this way, all students were involved through compulsory teaching.

Another successful model developed in secondary schools was to restructure the school day and set aside an hour in the middle of the day for voluntary physical activity organized either by students or staff, although students do have the option of not participating with this model. Student activity levels were higher in schools where activities were organized by teachers rather than in those where students were left to organize activity, and in those that had many facilities to promote physical activity (19).

Teachers participating in the project asked for training and the provision of a searchable database with descriptions of concrete activities to help them in their efforts to facilitate daily physical activity at school. In response to this, the Minister

of Education established a web-based tool to enable teachers to increase students' daily physical activity. The web-based tool was launched in August 2009 and includes concrete activities that teachers can use with their students. Teachers can search for activities by identifying the age group and the learning aims of the activities.

Many participating schools in the national project "Physical activity and healthy meals in school" spent time and resources on making changes to the outdoor environment to promote students' physical activity levels. Schools have also been encouraged to apply for specifically allocated national lottery funding to upgrade the outdoor environment. Building on these experiences, the Minister of Education has identified change to the outdoor school environment as a key priority for the new physical activity initiative.

Schools will allocate two hours per week for physical activity for grades 5–7 commencing autumn 2009, and there is now a national drive to provide more time for physical activity in secondary schools. A national project on active transport to school has also been established with the aim of increasing the number of students walking or cycling to school. The National Bureau of Transport runs regular surveys to identify people's travel patterns to and from work and school to monitor the effect of such initiatives.

Further, the focus in the national intervention project "Physical activity and healthy meals in school" has been sustained by the Ministry of Education through the launch of a new national initiative called "Holistic school day". This project aims to integrate physical activity and healthy eating as a regular part of the school day.

## Lessons learnt

Three main lessons have been learnt from the processes of development described above.

First is the importance and usefulness of employing research to guide the development of national policies and actions; a core part of this approach is to ensure close collaboration between staff in the ministries and directorates and researchers. Second, close collaboration involving several ministries in the development of action plans and policy documents has proven to be highly successful. Third, the ministries have emphasized the importance of evaluating the effects of their actions to learn how they can best improve population-level physical activity, particularly among children and adolescents.

Each of these is discussed below.

### Research

The ministries and directorates involved in promoting physical activity in young people systematically use available national and international research and policy priorities when developing their strategies. The relevance and importance of this approach became very evident in 1999, when the national health authorities set about developing national policies on physical activity from scratch. They contacted physical activity researchers at national universities and colleges to help them identify relevant national and international research on physical activity levels and correlates of physical activity. Researchers were invited to sit on the Norwegian Board for Physical Activity and similar boards established in other health areas (such as nutrition and tobacco) as part of the initiative.

Findings from the national and international HBSC survey have been used to guide development of national health and education policies and actions. Specifically, results from the survey suggest that programmes aiming to promote physical activity in lower secondary schools should incorporate strategies to increase students' interests and motivation for school physical activity, in addition to having a specific focus on environmental facilitation.

The evaluation of the Norwegian Network of Health Promoting Schools suggests that whole-school interventions that address individual, social and environmental factors are more promising approaches to increasing physical activity among schoolchildren than curriculum-only programmes (physical education) (26); this finding is in line with international literature reviews (27) and the Norwegian HBSC survey.

The Research Centre for Health Promotion at the University of Bergen is responsible for the Norwegian HBSC survey and the Norwegian Network of Health Promoting Schools, meaning that researchers at the Centre have been able to collaborate closely with ministries and directorates of health and education through both projects.

Funding has been channelled to the Norwegian Research Council to enable university teams to apply for support for further research into identified gaps in this area. The Directorate of Health and Social Affairs has established a national “centre of knowledge” which specializes in literature research in public health, with particular emphasis on Cochrane reviews.

### **Collaboration**

White papers and action plans aimed at supporting increases in physical activity levels in the population have been developed through close collaboration involving several ministries. The Ministry of Health has successfully spearheaded collaboration across ministries, resulting in a number of actions being taken outside the health sector, such as providing cycling and walking paths to stimulate active transport.

This could only have been achieved through close collaboration with relevant ministries, and collaboration involving the ministries of health and education has been particularly influential. Initiatives in schools that promote physical activity have been considered highly important; they represent an opportunity to reach all children and consequently may contribute to reducing social inequalities in physical activity in this age group.

While the first entry points to schools to promote physical activity were very much health driven, the Norwegian Ministry of Education is now driving this agenda, anchoring it in the aim of promoting productive learning environments for students (22). Recent research which shows that allocation of time for physical activity during the school day does not compromise students’ academic achievement (29) has helped facilitate a new initiative from the Ministry of Education on promoting physical activity in Norwegian schools.

### **Evaluation and sustainability**

National health and education authorities have recognized the relevance of evaluating national initiatives and have prioritized funding to support evaluation. Evaluation processes also stimulate contact between ministries and researchers, as the evaluations are contracted to universities and colleges.

Further, evaluation of the project “Physical activity and healthy meals in school” showed that when the first cycle of funding ended, schools turned their attention to other projects that came with new funding opportunities (28). As has been observed in other projects worldwide, this highlights the importance of continued national stimulation of school-level action through policies and projects, followed by funding incentives (30).

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# Poland: progress in child and adolescent physical activity promotion and injury prevention

Joanna Mazur,<sup>1</sup> Barbara Woynarowska,<sup>2</sup> Wojciech Hanke,<sup>3</sup> Tomasz Półgrabski,<sup>4</sup> Marta Malinowska-Cieślik,<sup>5</sup>  
Anna Dzielska,<sup>1</sup> Hanna Kołoto<sup>1,6</sup>

<sup>1</sup>Department of Child and Adolescent Health, Institute of Mother and Child, Warsaw

<sup>2</sup>Faculty of Pedagogy, University of Warsaw

<sup>3</sup>Department of Environmental Epidemiology, Institute of Occupational Health, Lodz

<sup>4</sup>Ministry of Sport and Tourism, Warsaw

<sup>5</sup>Institute of Public Health, Jagiellonian University Medical College, Cracow

<sup>6</sup>Faculty of Humanistic Sciences, Academy of Physical Education, Warsaw

## Executive summary

Awareness of the importance of socio-environmental determinants of health inequalities and of partnership approaches to activities aimed at promoting physical activity and preventing injury is increasing in Poland.

Recent reports from the European Union Survey on Income and Living Conditions (EU–SILC) and the HBSC study have highlighted the problem of child poverty in Poland. While the socioeconomic situation has generally improved following accession to the EU, up to one third of young people (particularly those in households with three or more children) are at risk of poverty and related health problems.

The CSAP project highlighted injury risks to young people from situations other than road accidents, including those occurring during sport and recreational activities. The national programme for the prevention of injuries among children and young people has not yet been implemented, but a number of deficiencies and barriers to progress in the area of child injury prevention have been identified.

The main objectives of this case study are to describe the extent of health inequalities affecting children and to provide examples of national actions, with special emphasis on environmental interventions. An attempt has been made to combine individual data reported by students during the HBSC survey in relation to family and neighbourhood characteristics with school-level data. The data show that:

- the risk of low physical activity increases notably among poorer families and young people who have a negative perception of the school environment;
- the risk of injuries increases in more socially disadvantaged areas;
- basic school resources are appropriate to meet needs only in a small number of schools;
- students in well-equipped schools perceive the school psychosocial environment more favourably, and there are fewer injuries and less antisocial behaviour; and
- the social gradient is less pronounced in relation to students meeting the minimal recommended physical activity levels.

The “My sports field – Orlik 2012” programme provides an outstanding example of good practice in the area of social inclusion. It was developed to provide accessible sports fields to populations in each community. Improvement across two important child health indicators was anticipated as a result: an increase in the level of physical activity, and a reduction in the prevalence of injuries and related health consequences. The programme may also contribute to the reduction of regional health inequalities through its contribution to creating sustainable development within regions.

The initiatives described in the case study show that it is possible to achieve cooperation among stakeholders. Cooperative agreements between ministries and local communities have been put in place and many institutions have started to engage in joint projects, with cooperation between institutions and merging of programmes with common goals being observed.



## Background

### Research on health inequalities

Social inequalities are identified in the national health programme 2007–2015 (1) regionally, rather than by social group. Two approaches are followed in the analysis of social inequalities. The first approach, “zooming in”, emphasizes assessment of the impact of individual factors. The second approach, “zooming out”, puts the emphasis on diversity between regions and local communities. Creating equality of development opportunities among regions may contribute to the reduction of social inequalities.

Population studies, such as the HBSC survey (2), provide a unique source of information on social determinants of health. Our analysis goes beyond a study of the impact of family wealth on health inequalities to also consider the influence of neighbourhood and the physical and psychosocial school environment.

### Prevalence of injuries and low physical activity among children and adolescents

Approximately 1300 deaths due to injuries in children and adolescents up to 19 years are reported annually in Poland. Of these, 40% occur as the result of road accidents. Mortality from external causes is higher in rural areas than in the cities (Fig. 1) and is higher in Poland than in EU15 countries (that is, countries belonging to the EU before May 2004). A declining trend is evident, although injury-related morbidity in urban areas is increasing (3).

The HBSC 2006 data show that about 33% of boys and 21% of girls aged 11–15 years suffer from non-fatal medically treated injuries each year. While total prevalence is lower in Poland than in most European countries, injuries at schools occur more frequently. School sports fields in small communities continue to be the main venue where young people meet after school to engage in sports activities, usually without adult supervision. HBSC data show that most non-fatal injuries in school-aged children occur during sport and leisure activities (4).

According to the results of the HBSC 2006 survey, the percentage of children reporting at least 60 minutes of MVPA daily varies by country, age and gender (5). In Poland, the percentage of students who do not meet the minimum recommended daily physical activity levels ranges from 48% to 55% in boys and from 55% to 73% in girls, depending on age group. Polish students, especially those in younger age groups, are less active than their peers in many European countries. Fifteen-year-old boys who are more active report more injuries than those who are less active (39% versus 30%), with no differences seen between active and less active girls.

### Socio-environmental determinants of low physical activity and injuries

The HBSC 2006 survey data suggest that the impact of gender, place of residence, family wealth, school psychosocial environment and perception of the local neighborhood should be the key elements to consider in relation to the socio-environmental determinants of low physical activity and injuries. The main social predictor of injuries is living in a region with many local problems and a high level of family wealth, while low physical activity is strongly connected with family poverty and poor perception of the school environment (Table 1).

### Physical and psychosocial school environment

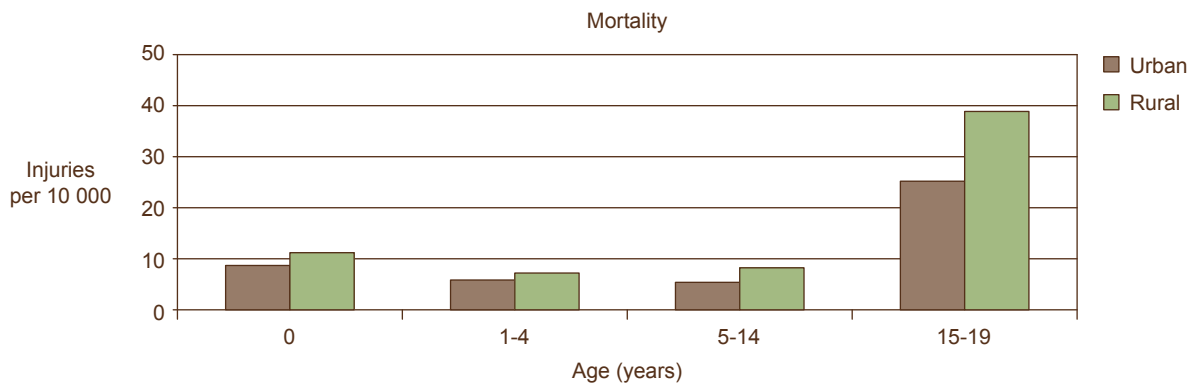
According to previous HBSC surveys (6), the poor condition of school buildings and their surroundings contributed to injuries at school. The prevalence of school injuries reported by students in Poland was much higher than it appears in the injury register developed by the Ministry of National Education: the prevalence was 9.4% in the HBSC 2002 survey, against 1.4% on the register. It was also found that fewer injuries occurred at school if school facilities met students’ and teachers’ needs.

Many schools in Poland still operate in poor technical conditions. The physical school environment was assessed by headmasters using the HBSC 2006 school-level questionnaire, and a combined index covering 15 school characteristics

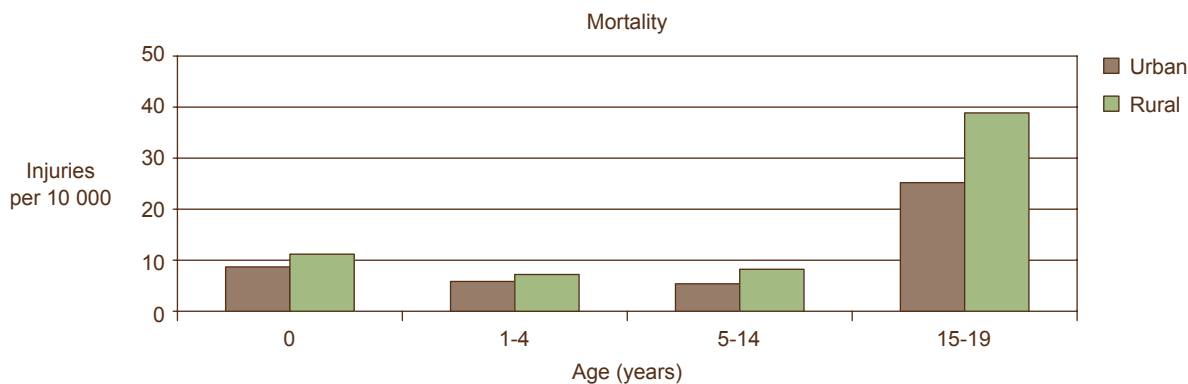
was created. It was found that in only 15% of schools did four basic resources (school buildings, grounds around the school, gymnasium and sports equipment) meet defined needs.

The relationship between the physical and psychosocial school environment was also evaluated. The risk of antisocial behaviour was found to increase in schools in poor condition in comparison to well-equipped schools (6).

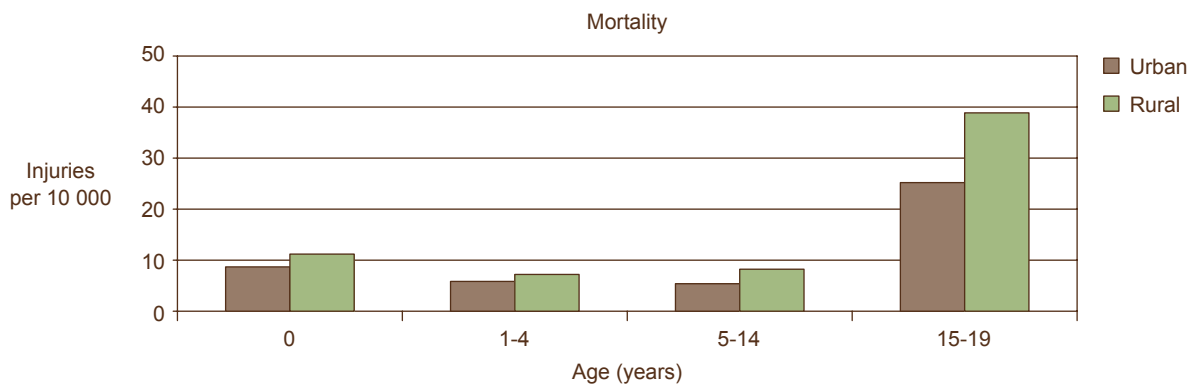
**Fig. 1**  
Urban–rural differences in the prevalence of injuries in children and adolescents, Poland 2006



Source: Central Statistical Office.



Source: National Institute of Hygiene.



Source: HBSC survey (2).

**Table 1**

Socio-environmental determinants of injuries and low physical activity in Polish 15-year-old students (2)

Independent variables	Medically treated injuries in last 12 months		Low physical activity – MVPA <5 days	
	Odds ratio (OR)*		Odds ratio (OR)*	
	%	95% CI(OR)	%	95% CI(OR)
<i>Gender</i>				
Boys	33.6	<b>1.40</b> (1.16–1.69)	54.6	<b>0.44</b> (0.37–0.53)
Girls	26.1	1	73.4	1
<i>Domicile</i>				
Urban	32.8	<b>1.38</b> (1.13–1.69)	65.3	<b>1.22</b> (1.01–1.47)
Rural	24.6	1	63.0	1
<i>Family affluence</i>				
Very low (0–1)	24.5	<b>0.64</b> (0.42–0.98)	76.7	<b>2.36</b> (1.53–3.65)
Low (2–3)	24.0	<b>0.56</b> (0.43–0.73)	67.0	<b>1.50</b> (1.17–1.93)
Average (4–5)	30.5	<b>0.77</b> (0.62–0.97)	65.5	<b>1.36</b> (1.09–1.70)
High (6–7)	36.3	1	57.2	1
<i>Local area perception</i>				
A lot of problems (0–2)	34.5	<b>1.74</b> (1.32–2.30)	65.2	<b>0.89</b> (0.70–1.14)
Average level (3–4)	28.7	<b>1.35</b> (1.03–1.75)	64.4	<b>0.88</b> (0.68–1.14)
No local problems (5–6)	23.9	1	64.5	1
<i>School environment</i>				
Poor (0–16)	31.1	<b>1.05</b> (0.78–1.42)	66.8	<b>1.57</b> (1.19–2.07)
Average (17–22)	29.3	<b>1.04</b> (0.78–1.39)	64.1	<b>1.37</b> (1.05–1.79)
Good (23–32)	27.0	1	57.9	1

\*Estimated from multiple logistic regression adjusted for gender and all these variables. Significant results are bolded.

### Physical activity as a protective factor against poor health outcomes

HBSC data provide evidence that high levels of physical activity play a protective role against selected health problems and poor health-related behaviours.

The relationship between self-rated health (SRH), physical activity and socioeconomic status was assessed on the basis of the HBSC survey conducted in Poland in 2006 among 15-year-old students. It was found that the level of physical activity modifies the relationship between SRH and three socioeconomic indicators: the FAS, local area perception and school psychosocial environment. In all three cases, a social gradient is more evident among inactive students who do not meet the minimum recommended daily levels of physical activity (Table 2). The relationship between SRH and FAS/school environment was significant only among students reporting low physical activity levels.

**Table 2**

Polish 15-year-old students reporting poor or fair self-rated health by physical activity level and socioeconomic factors

Independent variables	Low physical activity – MVPA <5 days		High physical activity – MVPA ≥5 days	
	Poor or fair SRH (%)	OR–odds ratio* 95% CI(OR)	Poor or fair SRH (%)	OR–odds ratio* 95% CI(OR)
<i>Family affluence</i>				
Very low (0–1)	26.1	<b>2.02</b> (1.19–3.42)	11.4	1.05 (0.34–3.29)
Low (2–3)	25.1	<b>1.94</b> (1.31–2.87)	11.7	1.21 (0.65–2.26)
Average (4–5)	18.3	1.30 (0.89–1.89)	9.0	0.93 (0.52–1.66)
High (6–7)	14.3	1	9.6	1
<i>Local area perception</i>				
A lot of problems (0–2)	25.6	<b>2.87</b> (1.87–4.41)	14.2	<b>2.42</b> (1.17–5.03)
Average level (3–4)	19.5	<b>1.99</b> (1.30–3.05)	8.4	1.30 (0.62–2.74)
No local problems (5–6)	10.6	1	6.5	1
<i>School environment</i>				
Poor (0–16)	26.7	<b>2.79</b> (1.71–4.53)	13.1	1.71 (0.84–3.48)
Average (17–22)	16.5	1.50 (0.92–2.44)	7.9	0.96 (0.47–1.98)
Good (23–32)	12.1	1	8.3	1

\*Estimated from logistic regression adjusted for gender. Significant results are given in bold.

## Social and policy context of interventions

### Country characteristics

Poland is one of the larger countries of Europe in terms of area and population. Only 29% of the 38 million people in the population live in larger cities of 100 000 inhabitants or more. The total urbanization rate is 61%, and 55% of the population is aged less than 19 years.

A recent series of EU–SILC reports (7) highlighted the problem of child poverty. Poland belongs to a group of eight countries where child poverty is not only above the EU average, but also in which children are at higher risk of poverty than the overall population, especially in households with three or more children. The general social and economic situation has improved since Poland's accession to the EU, however, resulting in a decrease in the child poverty rate.

Socioeconomic status is measured in the HBSC study by a series of indicators, with the FAS being most commonly used. In Poland, the percentage of children in the low FAS group (0–3 points on the scale) is much above the international average (33% versus 24%). Standard deviation of FAS is also relatively high, which indicates a high level of variability within the country (8).

Poverty is strongly related to living in small towns or villages, particularly those in which large state-owned enterprises have been closed down. The scale of deprivation can be analysed not only in relation to health care, but also in education, culture and transportation and in access to sports and recreational facilities. Providing equality of development opportunities among regions may contribute to a reduction in social inequalities and social exclusion.

Regional programmes developed rapidly after accession to the EU, and the Ministry of Regional Development was created in 2005. Its objective is to use effectively and efficiently the EU funds that are available to Poland. Much of the funding is allocated to investment in the economic development of regions.

The Ministry of Health is the central administrative unit responsible for national health policy. Within the Ministry, the Department of Public Health is involved in many disease- and injury-prevention activities through developing policy initiatives, while the chief sanitary inspectorate, working with a network of regional sanitary–epidemiological stations, is responsible for implementation. Many programmes related to children’s health and environment health, such as “Keep fit”, “Road safety week” and “Clean air around us”, have been implemented recently in cooperation with partners.

### Selected policy documents

A number of strategic and operational initiatives which shape national policy and constitute the basis for implementing social programmes have been developed in Poland in recent years. Some of these are based on general European guidelines and WHO strategies. Health considerations and the problem of marginalization due to poverty are reflected in many strategies developed beyond the health sector. A list of key initiatives and the name of the relevant ministry is presented in Table 3.

**Table 3**

Selected strategies and policy documents by relevant ministry

Strategies	Relevant Ministry
National plan for development 2007–2015	Ministry of the Economy (with the Ministry of Labour and Social Policy)
Strategy for health care development 2007–2013 National health programme for 2007–2015 CEHAPE	Ministry of Health
National road safety programme “GAMBIT”	Ministry of Infrastructure
Strategy for social policy for 2007–2013 National strategy on social protection and social inclusion 2008–2010	Ministry of Labour and Social Policy
Safe and friendly school programme 2008–2013 School core curriculum	Ministry of National Education
National development strategy 2007–2015 National cohesion strategy 2007–2013 Strategy for sport development until 2015	Ministry of Regional Development Ministry of Sport and Tourism

The national health programme for 2007–2015 (NHP) (1) is the main health policy document. It has a particular emphasis on reducing health inequalities, which is its main objective, but also contains an operational objective on the health and development of children and adolescents in relation to the *WHO European strategy for child and adolescent health and development* (9). It also addresses other issues concerning health inequalities, physical activity promotion and injuries. The general principles for the national health programme are reduction of territorial and social inequalities in health and activation of health promotion through local government and NGOs.

The problem of child poverty is well-recognized in the *National strategy report on social protection and social inclusion* (10). Detailed tasks are connected with creating developmental opportunities for children from poor families. Programmes developed so far at local level have been aimed at increasing daytime forms of child care and supporting young people and families at risk of social pathologies such as violence, crime, substance misuse and homelessness.

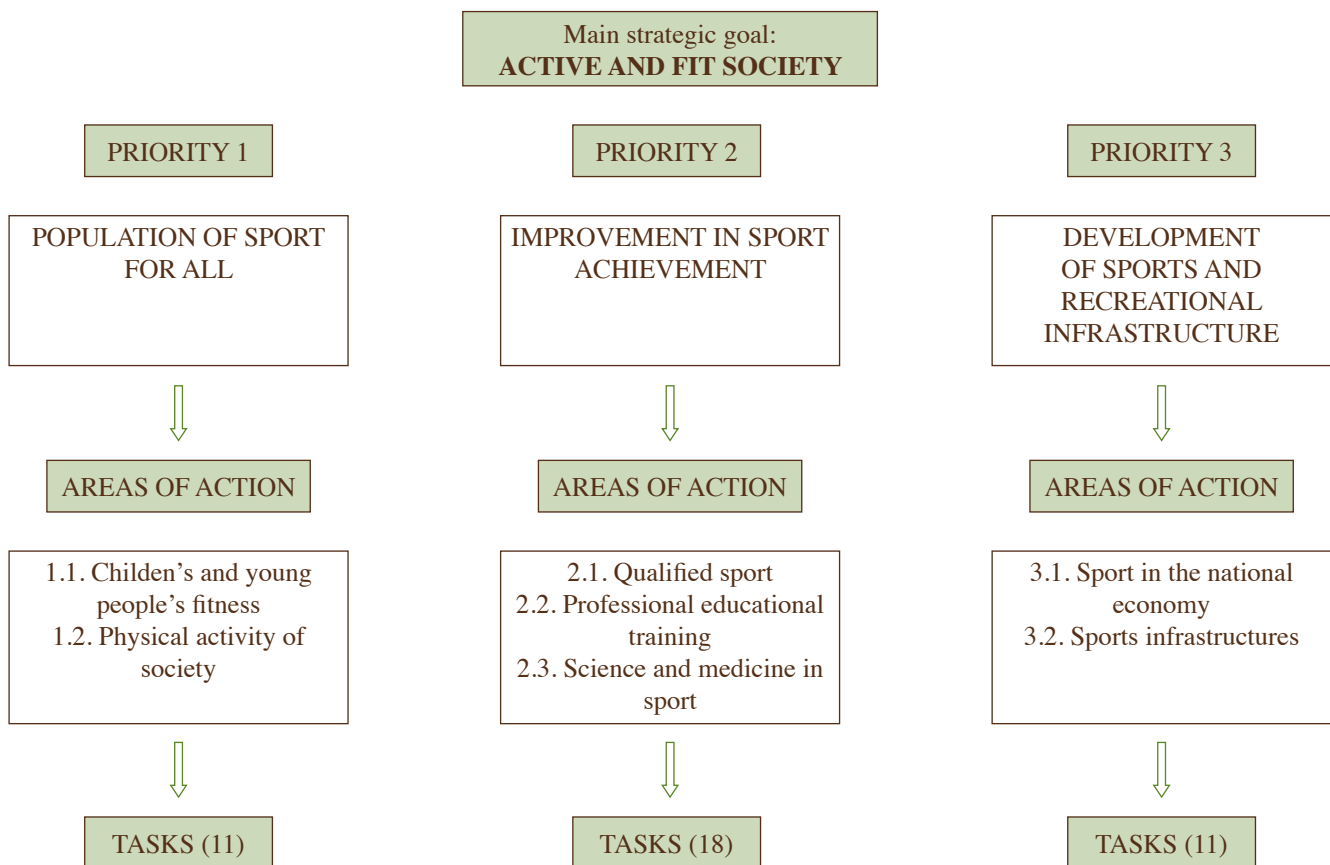
The strategy for sport development until 2015 (11) determines the direction of activities by the Ministry of Sport and Tourism and provides an example of how health determinants can be controlled by sectors other than health. The document is driven by the central goal of encouraging an “active and fit society”. Programme assumptions take into account the WHO guidelines on non communicable disease prevention contained in the *Global strategy on diet, physical activity and health* (12). Actions arising from the Polish strategy, among others, are aimed at:

- improving the physical fitness of children and young people
- eliminating sedentary lifestyles
- reducing the number of overweight individuals
- reducing morbidity among young people
- developing active ways of spending free time in communities.

The strategy is to be implemented in three priority areas (Fig. 2).

**Fig. 2**

Structure of the sport development strategy in Poland (11)



The third priority area is reducing the gap between Poland and many other European countries. The intention is to construct multifunctional sports fields, swimming pools and other generally accessible recreation facilities, most of which will be free of charge to the public. Extension of the sports infrastructure is to be funded from the Physical Culture Development Fund and from other funds at the disposal of local government, NGOs and other agencies.

As this case study is focused on schoolchildren, the updated school core curriculum at all levels of education developed by the Ministry of National Education should be mentioned. In Poland, the number of hours devoted each week to physical education classes is very high (three or four lessons per week in elementary school, four in lower secondary and three in upper secondary school). The new core curriculum creates a separation between mandatory hours of physical education classes and optional hours in which students can choose their own activities (such as dance, sports and recreation). Health education that covers psychosocial aspects of health as well as personal and social life skills will be an additional module in higher grades.

The curriculum in various subjects contains elements of health and safety, and there is a plan to introduce a new subject, “education for safety”, to higher school levels. This will prepare students to respond to threatening situations and promote first aid and cardiopulmonary resuscitation (CPR) skills.

The CSAP should also be cited. One of the objectives of this project is to assess evidence of how policies have improved child safety in Poland. CSAP stands as an example of the benefits to be derived from international cooperation with the ECSA, the European Association for Injury Prevention and Safety Promotion.

Malinowska-Cieslik (13) suggests that the national plan should be focused not only on child road safety, but also on prevention of drowning, falls, poisonings, burns and scalds and choking and strangulation, especially among young children at home. She states that the plan should include child safety promotion in professional higher education and networking at national and local levels and suggests that:

- governmental leadership should be enhanced to ensure the development and implementation of a government-endorsed national strategy;
- additional human and financial resources should be supplied to support research, national programming and coordination, and to maintain and enhance existing infrastructure and capacity;
- capacity-building in technical expertise should be supported;
- networking should be encouraged to exchange information on good practice; and
- measures should be taken to promote transferability of programmes along the continuum from national to local child injury prevention initiatives.

## Interventions based on intersectoral cooperation

At present, various institutions and organizations are involved in programmes aimed at physical activity promotion and injury prevention. Partners in two such areas of activity are government institutions (relevant ministries and government agencies), business representatives (particularly insurance companies, banks and manufacturers of children’s products), research institutes and universities, youth organizations, consumer organizations and other NGOs. Programmes are often jointly implemented by many stakeholders.

### “My sports field – Orlik 2012”

The “My sports field – Orlik 2012” programme was officially initiated by the Prime Minister in a speech delivered on 23 November 2007. It was developed to construct easy-access, free-of-charge sports fields in each community to promote active lifestyles through family sports competitions and activities (Box 1). New sports facilities are being developed to promote the sustainable physical development of children from small communities and more disadvantaged areas.

The “My sports field – Orlik 2012” programme is implemented jointly by the national government and local government. Each shares costs and responsibilities. In Poland, there are about 2500 communities that are eligible to receive financial support.

The typical Orlik sports complex includes two sports fields: one soccer field and one multifunctional field. In addition, each facility is provided with a floodlighting system and well-equipped locker rooms. All communities interested in participating in the programme send their applications to their respective local government offices, where the applications are selected and a resolution is presented to the local assembly before being submitted to the Ministry of Sports and Tourism.

By 30 May 2009, 500 sports fields had been completed and opened for public use. The government has secured funding for at least a further 750 “Orlik” sports fields, and 1000 local government representatives participated in the related conference “Let’s win together” in February 2009.



### **Box 1.** The vision of the “My sports field – Orlik 2012” programme

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#### **First: CHILDREN!**

The “My sports field – Orlik 2012” programme is implemented primarily for children and young people so that they can enjoy sports in safe conditions in modern environments.

#### **Second: ALL OF POLAND!**

The programme is addressed to all communities, regardless of their geographical location, wealth or the political preferences of their local authorities.

#### **Third: TOGETHER!**

The programme is jointly implemented by the national government and local government.

#### **Fourth: QUICK!**

The first sports fields under the programme will be built by the end of 2008! We want an “Orlik” field in every commune as soon as possible!

Source: “My sports field – Orlik 2012” <http://msport.gov.pl/en/my-sports-field-orlik-2012>

These actions are shaping the environment, improving the safety of young people and promoting physical activity. The programme contributes to the reduction of social inequalities, ensuring equal access to sports and recreational facilities. An additional advantage is the promotion of healthy lifestyles and the prevention of the kinds of social pathologies referenced above in the most threatened regions.

### **Related projects**

“My sports field – Orlik 2012” has strong links with other government projects and initiatives aimed at reducing inequalities in access to sports and recreational facilities and preventing aggression and violence through sports activity. These include the following.

- “Sport for all children” is a programme led by the Ministry of Sport and Tourism to promote physical activity and sport among children and youth. Its activities in 2009 focused on purchasing and distributing sports equipment and organizing sport and recreation events, youth camps and personnel training.
- “The close sports field” is a joint venture involving local government, the Ministry of Sport and Tourism and the biggest insurance company in Poland, the PZU Capital Group. It is a medium-scale intervention in comparison with “My sports field – Orlik 2012”, but its aim is similar – to provide modern sports facilities, mostly within renovated school playgrounds.
- Two programmes support sports facilitators on the “My sports field – Orlik 2012” and “Children and youth sport” programmes. These are hosted by the Ministry of Sport and Tourism and are carried out and funded by the School Sport Association in all 16 Polish provinces. Programmes are focused on supporting the employment of qualified instructors or coaches to work with children after classes.
- “Action against aggression and morbidity among children and young people” is a recent joint government programme which includes the Ministry of National Education, Ministry of Sport and Tourism, Ministry of Health, Ministry of Interior and Administration and organizations such as the Association Against Aggression and Morbidity among Children and Young People, the School Sport Association and the Physical Culture Development Foundation. The main purpose of this project is to reduce aggression and morbidity among young people through sport and healthy lifestyle promotion.

### “Safer together” programme

The “Safer together” programme, initiated by the Ministry of Interior and Administration to reduce crime and antisocial behaviour during the period 2007–2015, is a good example of an initiative that engages all administrative levels. The programme reflects the national development strategy 2007–2015 priority of “building an integrated social community and promoting its safety”.

The programme team consists of representatives from all Polish ministries. At administrative levels, the teams are composed of the heads of relevant levels and the “uniform” services (police, fire service and city guard). Civil organizations and religious associations are involved as partners in its implementation.

The programme engages local communities and promotes local initiatives to improve safety in key areas such as:

- safety in public places and in family residences
- violence in the family
- safety at school
- safety in public transport facilities
- road traffic safety
- safety in businesses
- protection of national heritage.

Each year, communities have an opportunity to request a project they want to put into action in their region. The programme is aimed at prevention of intentional injuries, but some communities also have concerns about unintentional injuries, especially those occurring on roads. Support for measures to improve road safety is drawn from a range of government policies.

“Safer together” actively promotes the exchange of good practice through a “bank of good practices” (BGP), which contains ideas for robust programmes. Initiatives are placed in the BGP only if their effectiveness in relation to programme objectives and their results are evaluated (<http://razembezpieczniej.mswia.gov.pl/portal/rb/>).

### Other programmes and partners

It is possible to identify a number of other programmes related to injury prevention, promotion of physical activity or reduction in social inequalities in Poland. It has to be emphasized that these are initiated and implemented not only by government partners, but also by various NGOs and commercial companies. The idea of public–private partnership or corporate social responsibility is becoming more and more popular in Poland and manifests in a series of programmes aimed at improving traffic safety (such as promotion of reflective devices), refurbishing playgrounds and teaching first aid skills.

Activity in the area of health promotion for children and young people is usually educational or legislative (child traffic safety has been greatly enhanced by the requirement to use children’s car seats, for instance) and there are numerous examples of programmes that influence the environment.

The activities of the Wielka Orkiestra Świątecznej Pomocy (WOSP) [Great Orchestra of Christmas Charity], one of Poland’s biggest charity organizations, should be mentioned. In its 17-year history, the WOSP has collected money for child victims of accidents on four occasions, and one of its largest medical programmes is the “CPR for schools” programme, based on the United States model. Many parallel CPR programmes are implemented in Poland by, for instance, the Polish Red Cross, World for Children Foundation and regional programmes.

### Physical activity promotion

Undoubtedly, the biggest success of the various initiatives described above in relation to physical activity is the increase in the number of hours of physical education at Polish schools. Issues concerning physical activity among children and young people generate great interest, which manifests in the implemented education programmes, published curricula and appointed committees.

Initially, education activities were dominant. The core school curriculum developed by the group of experts cooperating with the Ministry of National Education, for example, is very progressive on a European scale. However, much attention is now being turned to environmental factors and ensuring equal access to sports and recreational facilities, especially in more-disadvantaged regions.

### Injury prevention

The major success in injury prevention in recent years has been the improvement in children's safety in traffic and in water, but Malinowska-Cieslik (13) has stressed that programmes devoted to the prevention of injuries among children and young people should also include other categories of injuries, especially those sustained by young children at home and when at play. Unlike other countries, Poland has no strategic national programme aimed at child and adolescent injury prevention, and no institution is responsible for monitoring and coordinating preventive actions.

At present, there is greater awareness of the need for a combined public health approach involving education, engineering and environmental actions, legislation and enforcement of standards and regulations. A number of regional and local programmes are being developed and the growing involvement of NGOs and corporate/commercial organizations such as insurance companies may fill the gaps arising from a lack of government programmes.

### Tackling health inequalities

Initiatives at regional level are assuming ever-greater importance in activities aimed at reducing social inequalities. Many regional programmes have been developed following Poland's accession to the EU.

The idea of social inclusion is grounded in the *National strategy report on social protection and social inclusion* (10). Actions relating to promoting sustainable development of regions may contribute to the reduction of health inequalities, and other national programmes from the strategy should reach children from poorer families.

The construction of multifunctional sports fields that are generally accessible to children and young people is an example of good practice in the area of social inclusion. It is expected that the number of young people who are active during their free time will increase and new methods will be enabled to combat social pathologies. Modern technologies will be applied in the construction of sports fields, so it is expected that the number and severity of sports injuries will decrease. It is too early to assess the impact of interventions on health inequalities, but future evaluation studies should take into account different social groups, as a positive overall health benefit does not necessarily mean that health inequalities will be reduced.

HBSC data were very valuable in enabling a better understanding of the broader determinants of schoolchildren's health across many health indicators (14). Although health inequalities among Polish adolescents vary according to health outcome measures and social indicators, a social gradient is clear in most cases. There is also evidence that a high level of physical activity may be considered a protective factor against poor health outcomes.

### Intersectoral cooperation

Lifestyle and socioeconomic and environmental factors influencing health are determined by a broader social context, so intersectoral cooperation is necessary.

In Poland, health issues are incorporated in many strategies developed beyond the health sector, which reflects the *Health in all policies (15)* concept. Many examples of intersectoral cooperation could be cited, especially involving sectors with compatible interests (health, social policy, education and sport, for instance). Many determinants of health inequalities are beyond the scope of the health sector, but it can cooperate with other sectors in developing new initiatives, or at least advocate with them for the reduction of health inequalities. The “ownership” of programmes by a single sector or institution is considered a barrier to effective action.

The most recent Polish report (16) on the CEHAPE (17) showed that intersectoral collaboration in Poland functions better at local level, between research institutes or with private partners. This case study has presented examples of cooperation among government agencies and between different levels of administration. More and more programmes are initiated and co-financed at regional and local community levels, and NGOs and other stakeholders actively join some of them.

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## United Kingdom (England): *The play strategy and social inequalities*

Richard Vaughan,<sup>1</sup> Bhupinder S Bhoday,<sup>1</sup> Ciarán Hayes,<sup>1</sup> Alison Venner Jones,<sup>1</sup> Amanda Barrett,<sup>1</sup> Robert Clogher,<sup>1</sup>  
Antony Morgan<sup>2</sup>

<sup>1</sup>Department for Children, Schools and Families, London, United Kingdom Government

<sup>2</sup>National Institute for Health and Clinical Excellence, London, United Kingdom

### Executive summary

The Government's central objective is to make United Kingdom the best country in the world for children to grow up in. In December 2007, the Government published *The children's plan: building brighter futures (1)*. This is a 10-year strategy outlining the Government's approach to improving the lives of children and young people.

The children's plan builds on the *Every child matters (2)* reform programme to improve outcomes for all children and young people to ensure they:

- stay healthy and safe
- secure an excellent education and the highest possible standards of achievement
- enjoy their childhood
- make a positive contribution to society and the economy
- have lives full of opportunity, free from the effects of poverty.

*The play strategy (3)* is a government policy, led by the Department for Children, Schools and Families (DCSF) and the Department of Culture, Media and Sport. It aims to develop new and improved play areas and child-friendly public spaces across England, providing all children with increased opportunities for play and informal recreation. This case study describes the details of the policy, the motivation and evidence base for action and the social and policy context in which the policy was developed.

### Background

Play is a vital part of a happy and healthy childhood and has been identified as an important part of children's policy as a result of the following.

- The FairPlay consultation, took place over the summer of 2008 and elicited responses from 9400 children and young people (of whom 12% were disabled) and over 200 adults. The consultation revealed clear support for increased investment in play facilities.
- A view has been adapted that children enjoy play and that this is an end in itself, as well as a right as defined in Article 31 of the United Nations Convention on the Rights of the Child (4).
- Strong evidence that play is important for emotional and physical well-being and wider development.
- Evidence shows that there are decreasing opportunities for play due to the disappearance of green open spaces, poor quality of existing play facilities, concerns of parents about child safety (despite increases in child safety over recent years) and the attitudes of other adults to children playing. Furthermore, there is evidence that children from families with lower incomes have less access to open green areas.
- Play strengthens social cohesion by fostering networks of children and parents.

The idea that children should enjoy childhood and grow up prepared for adulthood is central to government policy. As play is crucial to a happy and healthy childhood, the Government believes that play should be an integral part of its wider policies

for children and young people. As a result, *The play strategy (3)* has been developed to invest in play, embed play as a priority for local authorities and national bodies and make play an integral part of policy networks. The vision is for all children to enjoy a range of safe and exciting places close to where they live by 2020.

To create quality places for children to play, the Government is:

- investing £235 million to develop up to 3500 public play areas by the end of March 2011;
- providing 30 “Pathfinder” local authorities with around £2 million capital funding over two years to develop at least 28 play spaces and at least one staffed adventure playground, targeted at children most in need of improved play opportunities;
- providing the remaining 122 local authorities with at least £1 million capital funding to develop at least 22 play spaces, targeted at children most in need of improved play opportunities;
- working with local authorities to ensure sites are stimulating, exciting and attractive to children through closely involving children, families and communities in planning and design;
- providing clear guidance on developing interesting and fun places to play; and
- emphasizing the importance of maintaining sites.

To support this investment, one needs to look at the broader context to identify barriers to play. Children must be able to play safely without concerns relating to bullying, crime or road safety. Public perceptions of play need to be improved by increasing parents’ knowledge of the risks and benefits of play and addressing negative perceptions of children.

Attempts to embed and sustain play were confirmed in the creation of a play-related national indicator (NI), NI 199, which was introduced in April 2009. This clarifies roles and responsibilities for play within central and local government policy networks and professionalizes the play workforce by ensuring that 4000 playworkers achieve a level 3 “playwork” qualification by the end of March 2011.

The Government is also encouraging play throughout childhood from “early years” and children’s centres to school and physical education and youth settings, and by making public spaces more child-friendly by instituting guidance and training for all the key professionals involved in the planning, design, building and management of public spaces.

NI 119 monitors the success of the policy. It measures children’s satisfaction with parks and play areas locally. The goal is to have 100 000 more children every year rating their local parks and play areas as “good” or “very good”.

Success in embedding *The play strategy (3)* locally will in part be evidenced through two child obesity NIs. A preliminary qualitative survey is being undertaken which showed children’s and parents’ satisfaction with recently improved play areas, along with a longer-term evaluation of the impact that the DCSF capital “Pathfinder” and “Playbuilder” programmes are having locally.

## Evidence base for action

The main body of evidence used to determine *The play strategy (3)* was the FairPlay consultation over the summer of 2008, with 9400 responses from children, 12% of which came from disabled children, and over 200 from adults. There is also a clear view that improved outdoor play opportunities are good for children, families and communities, a view that is backed by a strong emerging evidence base on the importance of play for emotional and physical health and wider development.

Evidence that availability of play spaces is lower for children in lower-income groups, which implies that they are missing out on the various benefits that play brings, is also an important driver for action.

## Benefits of play

### Children enjoy play

Children have a right to play, as enshrined in Article 31 of the United Nations Convention on the Rights of the Child (4).

Research for Playday 2006 (<http://www.playday.co.uk>) showed that 80% of children surveyed preferred to play outside. In a separate survey, 86% of parents agreed that “on a nice day, their children would prefer to go to the park than watch television” (5).

### Play is essential for children’s well-being and development

Children learn how to manage risk through taking risks while playing, helping them to stay safe. Play develops learning skills and is essential to the development of the skills that children and young people need as they become adults and move on in education or into work (6).

Playing allows children to develop a sense of well-being, develops their emotional responses (7,8) and improves their interpersonal skills. It involves exploration and creativity (9), helping children to think in a flexible manner (10) and developing the creative process, language skills (11) and learning and problem-solving skills (6).

Playing in natural spaces is particularly beneficial as natural spaces provide different opportunities for play, such as allowing children to construct dens in trees or shrubs.

### Play is beneficial to children’s physical health

Research has found that doing 15 minutes of moderate exercise (enough to get a child a little out of breath) lowers children’s chances of being obese by almost 50%. Active play is one of the best ways for children to expend calories; consequently, increasing the amount of time children spend playing could contribute to reducing obesity.

Active play will be a significant contributor to the delivery of two NIs on child obesity (NI 55 and NI 56). The cross-government strategy *Healthy weight, healthy lives* (12) requires every primary care trust to have a plan to combat obesity in children under 11 years. One hundred and thirty local authorities have used child obesity as one of the measures by which their performance will be judged.

### Play strengthens community cohesion

Play strengthens community cohesion by:

- fostering relationships between children: research suggests that children playing outdoors and establishing relationships with other children in their community can also have a positive effect on community cohesion;
- improving parental perceptions of safety: the more social networks children have in a neighbourhood, the greater the confidence parents have in the safety of that area;
- developing support networks among adults: parents establish their own networks through their children, meaning that play also supports community cohesion among adults – in Finland, for instance, over 70% of parents saw their play park to be somewhere where they could get support and help with issues concerning their children; and
- integrating communities: communities have a role in providing activities and places to go which encourage greater interaction among people, fostering a stronger community culture.



## Lack of opportunities for play

Prior to the introduction of *The play strategy (3)*, there was evidence that opportunities for play – particularly child-led, outdoor play – were diminishing. This is in part due to parental attitudes to road traffic safety, bullying and harm from other children and/or adults when at, or travelling to and from, play areas.

Children and young people today are, in many ways, safer than in previous generations. For instance, 87% of young people responding to the “Staying safe” consultation thought children were safe. Rates of accidents, including road accidents, are down. Rates of deaths from injury fell from 11.1 deaths per 100 000 children per year around the 1981 census to 4.0 deaths per 100 000 children per year around the 2001 census (13). Data from the Department for Transport show that by 2006, the number of children aged 0–15 years killed or seriously injured in road accidents had fallen by 52% compared to the average for 1994 to 1998.

The safety records of play areas and parks seem to be relatively good. While a significant minority of young people have been victims of crime, it is unlikely that the offences they have been subjected to will have taken place in a park or other open space. Likewise, of the 2 million or so childhood accident cases treated by hospitals each year, less than 2% involve play area equipment (14).

However, parental attitudes do not reflect this. Three-quarters of parents said in 2004 that they thought “children today are more at risk than children five years ago”. Around one in three parents will not allow children aged 8–15 to play outside of their house or garden, and the average age at which children are allowed outside unsupervised has risen from around seven years in the 1960s and 1970s to just over eight years in 2006. Research suggests that in 2005, as many as one in four children aged 8–10 had never played outside without an adult. Those parents who do not allow their children to play outside most commonly cite concerns about traffic and threats by other adults as their reasons.

Parents increasingly prescribe how their children should use their activity time, but structured use of leisure time inhibits child-initiated play and impedes child development from being creative in play. This particularly affects children from affluent backgrounds: 80% of children from middle-class urban areas participate in organized activities, compared to 60% from low-income areas.

The negative attitudes of adults to children playing can impede opportunities for play in public spaces. In 2004, 85% of adults agreed that it was important that children could play safely in the street, but a high proportion would not park their cars an extra 50 m away to facilitate this. Similarly, a quarter of adults have told a child other than their own to stop playing in the area near their home and over half of children have at some point been told to stop playing in an area near their homes.

Designating specific areas in which children can play was considered to be the best way to prevent them being stopped from playing for no reason. Children also thought that it would help if their neighbours were more tolerant and if playworkers, particularly those closer to their own age, were present.

The lack of availability and the poor quality of existing play facilities is a key barrier to outdoor, child-initiated play. Estimates suggest that there is much less play space available per child than standards recommend. New-build housing densities doubled between 1997 and 2005, often at the expense of green space. In 2001, Play England estimated that there was only 2.3 m<sup>2</sup> of play space per child, although acknowledged standards stipulated a minimum of 24 m<sup>2</sup> play space per child. New planning guidance for London proposes 10 m<sup>2</sup> per child. It has been argued that play needs are often marginalized in planning and design considerations.

Many play facilities are inaccessible to disabled children because of lack of funds, transport and appropriate facilities, including suitable toilets and changing facilities (15).

In addition, the needs of children have not always been taken into account when public spaces were designed. A “lack of clean and safe places to go and things to do” was the main reason children said they did not play outside, followed by concern for their own safety, the cost of play activities and a preference to stay at home. Other reasons included bad weather, their parents’ and carers’ reluctance to allow them out to play, difficulties in travelling to play areas and a lack of people to go with. Children

wanted to have more interesting things to do, such as better play equipment and activities, places to meet friends and school grounds to use outside school hours. Children also have more sedentary options for their leisure time, although the impact of technologies such as television on unsupervised play is uncertain.

Parents were generally unhappy with the quality of play facilities and want to see them improved. In 2006, under half of parents said that the facilities in their area were “good” or “very good” (16). When asked how facilities could be improved, over half of adults cited quality issues, identifying the need for a better variety of equipment and cleaner grounds.

Parents living within easy walking distance of good-quality play facilities are significantly more likely to use them frequently; having poor facilities nearby does not increase the likelihood of outdoor play.

Children from poorer backgrounds have had less local access to play space. Most families have some play facilities within easy walking distance, and this isn’t generally affected by the family earnings. However, access to a well-maintained green space does appear to be related to household income – just under half of households earning under £10 000 per year do not have access to this type of space.

Children who live in the most overcrowded homes tend to be those most in need of safe, free, outdoor places to play. New research commissioned by Shelter from the survey of English housing<sup>8</sup> (17) revealed that in 2007/2008, around 1 009 000 children were living in overcrowded accommodation, an increase of nearly 100 000 since 2003. This means that around 10% of the children in England now live in overcrowded homes. The rate for families renting social housing was discovered to be far worse at 22%, and London was the most affected region with an overall rate of 22%.

Evidence collected in 2006/2007, prior to the initiation of *The play strategy* (3), suggested that 25% of children in the poorest fifth of households (compared to 4% in the richest fifth) did not have access to outdoor space or facilities to play (18).

Safety has been a particular issue for children living in disadvantaged areas, with the risk of injury by traffic being more likely (19), and children living in an area with disorder problems being twice as likely to be a victim of crime as children in other areas. Clearly, even if play facilities are available, it has been more dangerous for children in disadvantaged areas to access them. This implies that children from lower-income backgrounds have not been getting the same benefits from play as children from more-affluent families.

## National policy context: *The children’s plan*

The United Kingdom Government has a clear overarching aim: to give every child the best start in life. Realizing this vision involves much more than investment and reform of services. It involves deep and broad cultural change which places children and young people at the heart of policy-making, empowers young people to take their place as valued members of society, and supports the wider community to embrace and celebrate the contribution young people make.

In England, the creation of the DCSF on 28 June 2007 has enabled a coherent focus on achieving these objectives. In December 2007, the DCSF published the *The children’s plan: building brighter futures* (1). This ten-year strategic document outlines the Government’s approach to improving the lives of children and young people, building on the *Every child matters* (2) reforms. For the first time, the plan brings together all national policy for 0–19-year-olds and is underpinned by the United Nations Convention on the Rights of the Child (4).

The children’s plan vision prioritizes the following:

- securing the well-being and health of children and young people;

<sup>8</sup>The latest estimate of the number of overcrowded households in England was published in January 2009 as part of the *Survey of English housing preliminary results 2007/08* (17) and is 565 000. This is based on the average of three years of the survey from 2005/2006 to 2007/2008. Overcrowding is defined according to the bedroom standard.

- safeguarding the young and vulnerable;
- achieving world-class standards and closing the gap in educational achievement for disadvantaged children;
- ensuring that young people are participating and achieving their potential to age 18 and beyond;
- keeping children and young people on the path to success; and
- driving forward system-wide reforms in the way services for children and young people work together.

The plan includes: the announcement of the largest ever central government investment in children's play; commitments on improving the skills of teachers and those working in early years; the vision of the 21st century school as a place offering support to all children to achieve their potential; and announcements of a series of reviews in a number of key policy areas affecting children (including sex and relationship education, the effect of commercial activity on children, and child and adolescent mental health services).

A great deal of progress has already been made in delivering the vision set out in the children's plan. Within months of its launch, the government published a number of key policy documents, including the consultation on a strategy on play, the youth crime action plan and the youth alcohol action plan. In December 2008, the Government published *The children's plan: one year on (20)*, which set out progress and next steps on each of the commitments made.

The idea that children should enjoy childhood as well as growing up prepared for adulthood is central to the the children's plan. As play is crucial to a happy and healthy childhood, the government believes that play should be an integral part of our wider policies for children and young people.

In order to support play throughout childhood, Government has:

- given children the opportunity to learn through play in early years;
- made proposals to increase the support for play offered by "Sure start" children's centres;
- set out how we propose to support play through schools, including a focus on improving play facilities on school sites;
- given children and young people more opportunities for physical activity, physical education and sport;
- emphasized creativity in play;
- set out the importance of play for children visiting parents in prison;
- emphasized links between play-based activities and other provision for young people; and
- set out how provision must support the inclusion of disabled children.

## Policy implementation/intervention

The Government's ambition is to make England the best country in the world for children to grow up in. Children and young people need to enjoy their childhood and grow up prepared for adult life, and play is a vital ingredient of a happy and healthy childhood.

*The play strategy (3)*, published in December 2008, sets out the Government's plans to take play policy forward in the future. The vision is to ensure that:

- there is a variety of supervised and unsupervised places for play, free of charge, in every residential area;
- local neighbourhoods are – and feel like – safe, interesting places to play;
- routes to children's play spaces are safe and accessible for all children and young people;
- parks and open spaces are attractive and welcoming to children and young people and are well maintained and well used;

- children and young people have a clear stake in public spaces and their play is accepted by their neighbours;
- children and young people play in a way that respects other people and property;
- children and young people and their families take an active role in the development of local play spaces; and
- play spaces are attractive, welcoming, engaging and accessible for all local children and young people, including disabled children and children from minority groups in the community.

To realize this vision, the Government is committed to creating more high-quality places to play by investing £235 million to deliver 3500 new or refurbished play areas, plus 30 staffed adventure playgrounds, by 2011. By April 2009, over 500 play areas had been built or refurbished. All 152 local authorities are in receipt of funding, with all top-tier local authorities getting at least £1 million and the 30 “Pathfinders” getting on average £2.5 million to build new (or significantly refurbish existing) play areas. Investment must be targeted at children in most need.

The Government is also:

- informing parents and children of local play opportunities;
- working with local authorities to ensure sites are stimulating, exciting and attractive to children through closely involving children, families and communities in planning and design;
- providing clear guidance on developing interesting and fun places to play;
- emphasizing the importance of maintaining sites; and
- providing funding to adventure playgrounds run by the voluntary sector.

It is important to help children play safely and enable them to travel to and from play areas in a safe manner. The Government is supporting this by:

- introducing guidance on tackling bullying outside school, including play and leisure settings;
- issuing guidance on risk–benefit assessments;
- encouraging local authorities to continue to work with their partners to improve safety from crime on the streets;
- improving road safety in a number of ways, including a focus on improving skills and behaviour and creating a safer street environment; and
- increasing the availability of supervised play, with local authorities working with the voluntary sector to test new infrastructures to support play.

The focus on communicating the risks and benefits of play is being achieved through increasing parents’ knowledge and understanding of the risks and benefits of play, taking action to address negative perceptions of children and young people, and investigating whether excessive health and safety fears can cause local authorities to buy unstimulating and unpopular play equipment.

Ensuring that the investment in playgrounds has a lasting effect, it is proposed that play is sustained and embedded by:

- introducing a play indicator to the NI set to encourage all authorities to prioritize delivery of better play opportunities;
- using our new funding to drive high-level planning and partnerships on play locally, including the routine involvement of communities;
- recognizing play as an element of the responsibilities of children’s trusts, directors of children’s services and local authority chief executives and highlighting how local strategic partnerships can support play;
- providing guidance for children’s trust partners and local strategic partnerships on embedding *The play strategy (3)* to ensure the longevity of the capital investment;

- gathering and disseminating good practice across local authorities on an ongoing basis with a rolling delivery of briefing papers and guidance together with photographs and DVDs showcasing completed play areas;
- professionalizing the play workforce by ensuring that 4000 playworkers achieve a level 3 “playwork” qualification by 2011; and
- working with play “Pathfinders” to test potential solutions to barriers to play.

A range of measures are being introduced to make public spaces more child-friendly. DCSF and the Department for Culture, Media and Sport are working with the Department for Communities and Local Government, the Department for Transport and others to include a stronger focus on spaces suitable for play in the planning system, including continuing to improve parks and green spaces. Play England has been contracted to support, train and provide guidance to local authorities and manage the third sector programme.

In addition, a communications toolkit has been developed for local authorities. This is an online resource which provides strategic communications guidance, practical support and materials on how to plan, deliver and launch communications activities relating to their new and refurbished play areas.

Other initiatives focusing on making public spaces more child-friendly include:

- publishing of *Design for play: a guide to creating successful play spaces and managing risk in play provision (21)*;
- offering play training to every local authority through a “playshaper” programme aimed at professionals who have a strategic role in the planning, design, building and management of public spaces where children play to help them understand the importance of play and their role in supporting it through the development of child-friendly neighbourhoods;
- working with the social housing sector and regulators to ensure that play is supported in some of the most-deprived areas;
- working with the Commission for Architecture and the Built Environment, local authorities and the housing development industry to deliver residential developments and new housing growth areas that meet children’s needs and interests; and
- making play a focus of flagship developments such as eco-towns, healthy towns, growth points and the Olympic Park.

Communities are being empowered to support children to play through support for local community ownership of space suitable for play. This is being achieved by harnessing the Department for Communities and Local Government’s community empowerment agenda through establishing a community play programme, which should ensure local residents, communities and community groups are fully engaged with *The play strategy (3)* in each area and maintain this engagement over the longer term to ensure play areas are maintained and sustained. Specialist advisers support local authorities and the community sector to work in partnership.

In addition, grassroots grants and community spaces are published and more positive relationships between adults and children in public spaces supported through the *Aiming high for young people strategy (22)*.

## Evaluation

A number of evaluative tools have been developed to enable local authorities to monitor the impact of their local play provision (funded through their DCSF capital allocations and any other matched funding) and to then make improvements based on feedback. This should help to achieve the long-term goal of providing all children and young people with world-class play and recreation spaces near to where they live, within child-friendly communities.

### NIs

NIs are used by central government to monitor the performance of local authorities in delivering a range of services for their local communities. The DCSF introduced NI 199 for play in April 2009 to measure children’s satisfaction with parks and play

areas in their local areas. Information for NI 199 is collected via the school-based TellUs survey (which also provides data for a number of other NIs) and provides data at local level collected from a sample of children in years 6, 8 and 10. The goal is to have 100 000 more children every year rating their local parks and play areas as “good” or “very good”.

### **The national evaluation of the “Pathfinder” and “Playbuilder” capital programmes**

The “Pathfinder” and “Playbuilder” capital programmes are being independently evaluated to ensure that the aims of the programmes are being met. In particular, the evaluation is looking to ensure that play areas are stimulating, exciting and attractive to children and young people of both genders, minority ethnic communities and those with different abilities, and are also providing value for money. The final report will be delivered in 2011.

### **Preliminary survey**

Ipsos MORI was commissioned to carry out some early qualitative research with parents and children before the main evaluation fieldwork, with the aim of improving understanding of their experiences of recently improved play areas.

The improvements at these sites were based around 10 good practice principles of designing successful play spaces, as outlined in the *Design for play* guidance document (21). “Pathfinders” and “Playbuilders” are encouraged to take account of these 10 principles and young people’s consultation responses on how they want their DCSF-funded play areas to be developed when planning how to best meet the needs of local children.

In-depth interviews with parents and children were carried out in October and November 2008, based on the experiences of seven play areas across England that had recently been improved by “BIG lottery” or “Sure start” funding. This qualitative research is based on a small number of interviews, and while it provides useful insights into the views of children and their parents of newly improved play areas, it is not representative of all users. Children and parents were nevertheless overwhelmingly positive about the improvements made and the new approach to design and felt they had benefitted from them. They suggested that the improvements increased their enjoyment of the play areas and encouraged them to stay longer for each visit. Children and parents were also positive about supervised play areas, with some children associating these with a sense of freedom, as they were away from their parents.

### **Local authority evaluation of delivery of DCSF “Pathfinder”/“Playbuilder”-funded play areas**

There is an expectation that local authorities will undertake their own local evaluation to monitor the impact that the improvements made to play spaces have had on children’s and young people’s levels of satisfaction with their local play provision and levels of usage.

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### MEETING PROGRAMME

#### WHO/Health Behaviour in School-aged Children (HBSC) Forum, Siena, Italy, 19–20 October 2009

**Monday, 19 October 2009**

##### *Registration*

##### Welcome and opening

Welcome by Ms Leda Nemer (WHO Regional Office for Europe) and Mr Alex Kirby, Forum facilitator (former BBC environment correspondent)

Opening statements by Tuscany Region

Dr Alberto Zanobini on behalf of Dr Enrico Rossi, Regional Minister of Right to Health, General Direction of Right to Health, Tuscany Region, Italy

Dr Paolo Morello Marchese, General Director, University Hospital of Siena

Professor Mariano Giacchi on behalf of Professor Silvano Focardi, Dean, University of Siena

Mr Antony Morgan, HBSC Policy Development Group

Welcome by WHO Regional Office for Europe and the WHO/HBSC Forum in the Context of the Fifth Ministerial Conference on Environment and Health

Ms Francesca Racioppi, Head of Office, WHO European Centre for Environment and Health

European Commission contribution to work on socio-environmentally determined health inequities in youth

Mr Michael Hübel, Head of Unit, Health Determinants, European Commission Health and Consumers Directorate-General

Opening presentation on Forum 2009 – setting the scene

Mr David Pattison, Head of International Development, NHS Health Scotland

##### Session I: The scientific evidence base

Environmental inequalities among children and adolescents: a review of the evidence and its policy implications in Europe  
Ms Martina Kohlhuber, Department of Environmental Health, Bavarian Health and Food Safety Agency

Injury and physical activity in context: findings from the HBSC study

Dr Michal Molcho, Lecturer, Department of Health Promotion, National University of Ireland, Galway

Discussion/question and answer

##### Session II: Interview round

Interview rounds with country case study authors

Presentations of seven case studies

##### Session III: Interview round

Interview rounds with country case study authors + wrap up

Presentations of three case studies

##### Afternoon event

Depart for Siena with tour guide

Official opening ceremony and welcome by Siena authorities at Santa Maria della Scala

**Tuesday, 20 October 2009**

#### Welcome and opening

Welcome by Mr Alex Kirby

#### Session IV: Panel - involving youth

Tuscany Region's "Di Testa Mia" Project (with a four-minute film)  
Mr Samuele Fischetti, Tutor, Regional Project "Di Testa mia"

CEHAPE youth involvement initiative  
Ms Ildikó Almási, CEHAPE youth delegate, Hungary

World Health Youth Environment and Health Communication Network (WHY) journalists  
Ms Dalia Lenkauskaite (Lithuania) and Mr Amund Trellevik (Norway)

Child and youth participation in environment and health  
Mr Leonardo Menchini, UNICEF Innocenti Research Centre, Florence, Italy

Question and answer/discussion with audience

#### Session V: How to work across sectors

"Good places, better health", a United Kingdom (Scotland) approach to working intersectorally for environment and health  
Professor George Morris and Dr Sheila Beck, NHS Health Scotland, a WHO collaborating centre for health promotion and public health development

Question and answer/discussion with audience

#### Session VI: Parallel workshops on four Forum aims

Parallel workshops

Interview round with workshop facilitators or notetakers, Mr Alex Kirby

General conclusions – draft Forum outcomes statement and key messages to policy-makers  
Ms Francesca Racioppi and Mr Alex Kirby

Main issues to be discussed:

What do we want to say in Forum outcomes statement?

What are the key messages we want to deliver to decision-makers in Parma?

Official closing

## ANNEX 2

### MEETING ORGANIZERS AND TASK FORCE MEMBERS

#### WHO/HBSC Forum organizers

Professor Mariano Giacchi

Ms Giorgia Knechlin

Dr Katalin Majer

Ms Leda Nemer

Mr David Pattison

Ms Francesca Racioppi

Dr Benedetta Rotesi

Mr Christian Schweizer

Ms Rita Simi

Dr Alberto Zanobini

#### WHO/HBSC Task Force members

Professor Candace Currie

Ms Ana Isabel Fernandes Guerreiro

Professor Mariano Giacchi

Dr Katalin Majer

Dr Michal Molcho

Mr Antony Morgan

Mr David Pattison

Dr Benedetta Rotesi

Mr Fabrizio Simonelli

Dr Alberto Zanobini

Ms Cara Letsch Zanotti

#### WHO Regional Office for Europe

Ms Vivian Birgitte Barnekov

Ms Theadora Koller

Dr Erio Ziglio

**ANNEX 3****PARTICIPANTS**

Dr Emanuela Balocchini  
Head of Public Health Area  
General Direction of Right to Health  
Tuscany Region  
Florence  
Italy

Mrs Emilija Bugailiskiene  
Senior Specialist  
Department of Children and Youth Socialization  
Ministry of Education and Science of the Republic of Lithuania  
Vilnius  
Lithuania

Professor Franco Cavallo  
Department of Public Health and Microbiology  
University of Turin  
Turin  
Italy

Dr Lucia Corrieri Puliti  
Head of Health Promotion  
Health Promotion  
Local Health Unit ASL 2  
Lucca  
Italy

Mr Einar Flaa  
Adviser  
Public Health and Welfare, Physical Activity  
The Norwegian Directorate of Health  
Oslo  
Norway

Ms Annamaria Giannoni  
Technical Officer  
Public Health Area  
General Direction of Right to Health  
Tuscany Region  
Florence  
Italy

Mrs Grete Haug  
Senior Adviser  
Norwegian Directorate of Education and Training  
Oslo  
Norway

Ms Aagje Ieven  
Research Coordinator  
EuroHealthNet  
Brussels  
Belgium

Mr Mukhtar Darkembekov  
Assistant  
Centre of Injury Prevention and Safety Promotion  
Almaty  
Kazakhstan

Ms Aida Laukaitiene  
Head of Diseases and Injuries Prevention Division  
State Environmental Health Centre (under the Ministry of Health)  
Vilnius  
Lithuania

Dr Roberto Leonetti  
Coordinator of Youth Counselling Centres  
Local Health Unit ASL 10  
Florence  
Italy

Dr Marta Malinowska-Cieslik  
Institute of Public Health  
Jagiellonian University  
Krakow  
Poland

Dr Joanna Mazur  
Department of Child and Adolescent Health  
Institute of Maternal and Child Health  
Warsaw  
Poland

Dr Federica Monti  
Director  
U.O. Organizzazione e Applicativi  
Informativi Area Sistemi Informativi e Innovazione  
ASL7  
Siena  
Italy

Mr Antony Morgan  
Honorary Research Fellow  
Child and Adolescent Health Research Unit  
The Moray House School of Education  
The University of Edinburgh  
Edinburgh  
United Kingdom of Great Britain and Northern Ireland

Ms Nina Strand Oelnes  
Adviser  
Public Health Welfare, Physical Activity  
The Norwegian Directorate of Health  
Oslo



## Norway

Ms Veronika Ottova  
Research Assistant  
Department of Psychosomatics in Children and Adolescents  
University Medical Centre  
Hamburg  
Germany

Dr Gabriella Páll  
Department of Child Health Information and Research  
National Institute of Child Health  
Budapest  
Hungary

Ms Stefania Polvani  
Head of Health Promotion  
Local Health Unit ASL 10  
Florence  
Italy

Dr Tommaso Pucci  
Research, Development and Labour Protection Area  
General Direction of Right to Health  
Tuscany Region  
Via T. Alderotti, 26/n  
50139 Florence  
Italy

Dr Lisa Pursell  
Lecturer in Health Promotion  
Health Promotion Research Centre  
National University of Ireland  
Galway  
Ireland

Professor Oddrun Samdal  
Faculty of Psychology  
Research Centre for Health Promotion  
University of Bergen  
Bergen  
Norway

Dr Sergey Sargsyan  
Head  
National Centre for Child Health Care Organization and Methodology  
Institute of Child and Adolescent Health of Armenia/Arabkir Joint Medical Centre  
Yerevan  
Armenia

Ms Margarete Seiwert  
Senior Scientist  
II 1.2 – Toxicology, Health-related Environmental Monitoring  
Federal Environment Agency  
Berlin

Germany

Dr Riccardo Senatore  
Head of Health Promotion  
Local Health Unit ASL 9  
Grosseto  
Italy

Dr Gainel Ussatayeva  
Senior Lecturer  
Department of Health Policy and Management  
Kazakhstan School of Public Health  
Almaty  
Kazakhstan

Ms Dora Eszter Varnai  
National Institute of Child Health  
Kaeszy Gyula Technical School  
Budapest  
Hungary

Professor Hanke Wojciech  
Research Director  
Department of Environmental Epidemiology  
Nofer Institute of Occupational Medicine  
Lodz  
Poland

Professor Apolinaras Zaborskis  
Head of Laboratory for Social Paediatrics  
Institute for Biomedical Research  
Kaunas University of Medicine  
Kaunas  
Lithuania

Ms Cara Letch Zanotti  
HBSC Research Communications Officer  
HBSC International Coordinating Centre  
University of Edinburgh  
Child and Adolescent Health Research Unit (CAHRU)  
The Moray House School of Education  
Edinburgh  
United Kingdom of Great Britain and Northern Ireland

Dr Alma Zhylkaidarova  
National Centre for Healthy Lifestyle Development  
Almaty  
Kazakhstan

### Temporary advisers

Mr Goof Buijs  
Netherlands Institute for Health Promotion (NIGZ), WHO collaborating centre for school health promotion  
SHE Network  
Woerden  
The Netherlands

Mr Alex Kirby  
Freelance Journalist  
East Sussex  
United Kingdom

Ms Martina Kohlhuber  
Environmental Health  
Bavarian Health and Food Safety Agency  
Oberschleissheim  
Germany

Dr Michal Molcho  
Lecturer  
Department of Health Promotion  
School of Health Sciences  
National University of Ireland, Galway  
Galway  
Ireland

Mr David Rivett  
CEHAPE International Youth Participation Network Coordinator  
Copenhagen  
Denmark

#### Regional project, Tuscany Region

Mr Samuele Fischetti  
Tutor  
Regional Project “Di Testa mia”  
Tuscany Region  
Grosseto  
Italy

#### Youth representative

Ms Ildikó Almási  
Bekescsaba  
Hungary

#### World Health Youth (WHY) Environment and Health Communication Network journalists

Ms Dalia Lenkauskaitė  
Lithuanian News Agency  
Vilnius  
Lithuania

Mr Amund Trellevik  
Dagsavisen  
Oslo  
Norway

## WHO collaborating centres

### NHS Health Scotland WHO collaborating centre for health promotion and public health developments

Mr David Pattison  
Head of International Development  
NHS Health Scotland  
Edinburgh  
United Kingdom

Professor George Morris  
Consultant in Ecological Public Health  
NHS Health Scotland  
Glasgow  
United Kingdom

Dr Sheila Beck  
Principal Public Health Adviser  
NHS Health Scotland  
Glasgow  
United Kingdom

## WHO collaborating centre for health promotion

### Capacity building in child and adolescent health

Ms Ana Isabel Fernandes Guerreiro  
Researcher  
Health Promotion Programme  
A. Meyer University Children's Hospital  
Florence  
Italy

Mr Fabrizio Simonelli  
Director  
WHO collaborating centre for health promotion capacity building in child and adolescent health  
A. Meyer University Children's Hospital  
Florence  
Italy

## Representatives from other organizations

### UNICEF

Mr Leonardo Menchini  
Programme Specialist, Social Policy  
Socioeconomic Policy Unit  
UNICEF Innocenti Research Centre  
Florence  
Italy

## Forum hosts

### **Tuscany Region**

Mrs Serena Consigli  
 Technical Officer  
 Human Resources, Communications and Health Promotion Area  
 General Direction of Right to Health  
 Florence  
 Italy

Ms Benedetta Rotesi  
 Technical Officer  
 International Health Relationships  
 General Direction of Right to Health  
 A. Meyer University Children's Hospital  
 Florence  
 Italy

Dr Alberto Zanobini  
 Head  
 Human Resources, Communications and Health Promotion  
 General Direction of Right to Health  
 Florence  
 Italy

### **University Hospital of Siena**

Dr Paolo Morello Marchese  
 General Director  
 Siena  
 Italy

Professor Mariano Giacchi  
 CREPS Department of Physiopathology, Experimental Medicine and Public Health  
 Siena  
 Italy

Dr Giacomo Lazzeri  
 Researcher  
 CREPS Department of Physiopathology, Experimental Medicine and Public Health Medicine  
 Siena  
 Italy

Dr Michele Martiello  
 Doctorate on Human and Environmental Health Promotion  
 CREPS Department of Physiopathology, Experimental Medicine and Public Health  
 Siena  
 Italy

Ms Rita Simi  
 Technical Officer  
 CREPS Department of Physiopathology, Experimental Medicine and Public Health  
 Siena  
 Italy

## WHO Regional Office fore Europe

Ms Vivian Birgitte Barnekow  
Technical Officer

Mr Matthias Braubach  
Technical Officer, Living Environments and Health

Ms Giorgia Knechtlin  
Secretary

Ms Theadora Koller  
Technical Officer

Ms Annalisa Marianecci  
Secretary

Ms Leda Nemer  
Technical Officer, Children's Health and Environment

Ms Francesca Racioppi  
Scientist, Accidents, Transport and Health

Ms Cristiana Salvi  
Technical Officer  
Mr Christian Schweizer  
Technical Officer

Mr Vitali Shkaruba  
ICT Assistant (telecommunications)

Ms Isabel Yordi Aguirre  
Technical Officer, Gender and Health

## Observers

Dr Pina Frazzica  
Director General  
Centre for Training and Research in Public Health – CEFPAS  
Regions for Health Network  
Caltanissetta  
Italy

Ms Brenda Dionisi  
Fondazione INTOSCANA.IT  
Florence  
Italy

Ms Michela Lupo  
Fondazione INTOSCANA.IT  
Florence  
Italy

Mr Daniele Magrini  
Fondazione INTOSCANA.IT  
Florence  
Italy







There is ample evidence to show that young people living in poorer circumstances are more likely to be at risk of unintentional injuries and lack of physical activity than those from more affluent families. Unintentional injuries are the leading cause of death in children aged 5–19 years in the WHO European Region, with road traffic, drowning and poisoning ranking among the top 15 causes of death in 0–19-year-olds. Deaths in countries with the highest injury rates are almost seven times those in countries with the lowest rates, with five out of six child injury deaths taking place in poorer countries. Physical inactivity in childhood and adolescence is recognized as having profound negative implications for the health of young people as they grow into adulthood, and is also subject to socio-environmental influences. The WHO/Health Behaviours in School-aged Children (HBSC) Forum 2009, the third in a series designed to promote adolescent health, was held on 19 and 20 October 2009 in Siena, Tuscany Region, Italy. It concentrated on action on socio-environmentally determined health inequities among children and adolescents. This publication presents the summary of outcomes from WHO/HBSC Forum 2009. It also features two background papers on injuries and physical activity and environmental inequalities among children and young people which set the context and present a summary of the evidence on the topics, and 10 country case studies describing national experiences.

## **World Health Organization**

### **Regional Office for Europe**

Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark

Tel.: +45 39 17 17 17

Fax: +45 39 17 18 18

E-mail: [postmaster@euro.who.int](mailto:postmaster@euro.who.int)

Web site: [www.euro.who.int](http://www.euro.who.int)

## **The WHO Regional Office for Europe**

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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