

2 Physical health trends in childhood

Establishing good physical health and healthy behaviours in childhood and adolescence is essential for well-being, education and health outcomes later in life. The last half century has seen a number of improvements in child and adolescent health on average across the OECD, notably the reduction of rates of accidental death and injury and a decline in alcohol consumption, smoking and teenage pregnancy. On the other hand decreasing rates of physical activity and rising levels of obesity continue to be a challenge.

Education, along with individual, community and society level factors, affects these trends. This chapter explores physical health trends in childhood, their modifiers, and some qualities of effective interventions in education. It covers knowledge gaps and research limitations, and high priority challenges faced by OECD and partner countries.

Introduction

According to the World Health Organization (WHO) “health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity” (WHO, 1946^[1]). Good physical health can help children and adolescents to learn in the classroom and participate in society. School, home and community-based interventions to teach and support children and families to engage in healthy lifestyle behaviours have the potential to reduce and over time reverse trends in poor physical health among children and adolescents. Education is uniquely placed to positively influence the health of students and their families while they are in the school environment, establishing and routinising healthy lifestyle behaviours for long-term physical health and well-being (Aston, 2018^[2]).

While some trends in physical health and health behaviours are improving, such as lower rates of accidental child mortality, drinking alcohol and smoking tobacco, other trends paint a less promising picture. Obesity rates are increasing and physical activity is decreasing. Diseases like cardiovascular disease and type II diabetes, generally thought of as diseases of adulthood, are now being diagnosed in children as young as two years old (Van Buren and Tibbs, 2014^[3]).

It is essential to promote healthy habits in childhood and adolescence, as many health-promoting (or undermining) behaviours persist into adulthood. For instance, regular physical activity is associated with improved working memory, and among young children it is also associated with improved academic outcomes (Felez-Nobrega et al., 2017^[4]). Individuals who have poor physical health are more likely to spend time away from school and work and tend to be less productive overall than their healthier peers (Felez-Nobrega et al., 2017^[4]).

This chapter will provide an overview of some physical health trends in children (for a fuller review see (Aston, 2018^[2])). It will explore mediators of these trends, followed by a brief discussion on improving health and well-being. It concludes with a look at high priority challenges facing education systems in OECD and partner countries.

Physical health and well-being trends and patterns

Children move less and weigh more

There is an abundance of literature demonstrating the benefits of physical activity. In the early years, physical activity, especially activity that is at least moderate-to-vigorous, is associated with motor development, fitness, and bone and skeletal health (Carson et al., 2017^[5]). For children of all ages the rule of thumb generally seems to be that more is better when it comes to physical activity and the effects on health outcomes (Carson et al., 2017^[5]; Janssen and LeBlanc, 2010^[6]).

The WHO advocates for 60 minutes per day of moderate-to-vigorous physical activity (e.g. brisk walking, playing basketball or football, bike riding etc.) for children. However, only 19% of adolescents achieve this, and according to the Health Behaviours in School-aged Children (HBSC)¹ study, activity levels have been declining since 2014 (Inchley et al., 2020^[7]), although the prevalence of insufficient physical activity has slightly decreased in boys since 2001 (Guthold et al., 2020^[8]). Only 49% of boys and 35% of girls participate in vigorous physical activity (e.g. running or playing an intense match of football or hockey) four or more times a week (Inchley et al., 2020^[7]). Active transport (walking, cycling etc.) to and from school or work has steadily declined since the early 2000s, contributing to a loss of incidental physical activity (Bassett et al., 2015^[9]; Booth, Rowlands and Dollman, 2015^[10]; Roblin, 2007^[11]).

Between 2000 and 2016, the proportion of overweight or obese children (age 5-19) doubled from one in ten children to one in five (UNICEF, 2019^[12]), although the increases in rates of obesity have plateaued since around 2000 in high-income countries (Abarca-Gómez et al., 2017^[13]). Obesity has been correlated

with depression in children and youth, with females at a higher risk than males (Quek et al., 2017^[14]). Overweight and obese youth have an increased risk of being overweight in adulthood (Singh et al., 2008^[15]), and a resulting risk of comorbidities and impact on healthcare systems in the long term.

Their eating habits have changed

According to UNICEF, “Millions of children are eating too little of what they need, and millions are eating too much of what they don’t need” (UNICEF, 2019^[12]). Poor dietary habits and nutrition are linked to health outcomes such as overweight and obesity and malnutrition, and they are also implicated in education outcomes (Behrman, 1996^[16]). Healthy diet may be predictive of quality of life and better mental health (Jacka et al., 2011^[17]). Despite increasing rates of fruit and vegetable consumption in some OECD countries (OECD/European Union, 2016^[18]), almost half of children in the HBSC study do not eat fruit or vegetables daily, and rates of breakfast consumption are declining (Inchley et al., 2020^[7]).

The proliferation of ultra-processed foods, which tend to be highly palatable and energy dense, and their consumption has been hypothesised as one of the driving factors contributing to obesity rates. A study of empty calorie (i.e. foods with little nutritional value per calorie) intake in the United States found that half of all empty calories in children’s diets came from six main sources: “soda, fruit drinks, dairy desserts, grain desserts, pizza, and whole milk” (Reedy and Krebs-Smith, 2010^[19]). Empty calorie consumption tends to be higher in older than younger children (Banfield et al., 2016^[20]). In some settings empty calorie consumption is declining: in Denmark the overall prevalence of daily sugar sweetened soft drink intake decreased from 10% to 6% between 2002 and 2018 (Holstein et al., 2020^[21]). However on average 16% of adolescents still consume them every day (Inchley et al., 2020^[7]).

They are drinking and smoking less, but illicit drug use remains stable

From 1994 to 2014 the consumption of alcohol (weekly alcohol consumption and repeated drunkenness) declined (Aston, 2018^[2]), although overall the levels of alcohol use have remained stable since then (Inchley et al., 2020^[7]). Boys are more likely than girls to have consumed alcohol in their lifetime, and about one in five 15-year-olds had been drunk twice or more in their lifetime, with one in seven having been drunk in the last 30 days. Alcohol exposure in adolescence, especially when repeated, has negative associations with attention, memory and brain development (Spear, 2018^[22]).

Similarly, tobacco use has been declining and projections for 2025 show continued reductions for most OECD countries (Aston, 2018^[2]). Since 2014, lifetime prevalence rates of smoking tobacco decreased by four percentage points for 13-year-olds and seven percentage points for 15-year-olds. Prevalence rates are similar for boys and girls, with 15% of boys and 13% of girls reporting having ever smoked cigarettes, and 7% reporting having smoked within the previous month (Inchley et al., 2020^[7]).

Despite reductions in both smoking tobacco and drinking behaviours, rates of cannabis use (which is the most popular drug used by adolescents) have remained relatively stable. Although there have been reductions in use in boys and girls in some OECD countries such as Estonia, France and Poland. About one in seven adolescents have used cannabis in their lifetime (Inchley et al., 2020^[7]). In 2015, 6% of 15-16 year-olds on average in European Union countries had reported using at least one other illicit drug (ESPAD Group, 2016^[23]). Most children who have used cannabis have also consumed alcohol and tobacco (OECD/European Union, 2018^[24]). There is a concerning growth in the use of synthetic opioids (e.g. fentanyl and related drugs) by adolescents, particularly in North America.

Box 2.1. A growing problem: Fentanyl and synthetic opioid overdoses

Fentanyl is 100 times stronger than morphine and is the strongest opioid available for medical use in humans (Chodoff and Domino, 1965^[25]). It is a legal drug, used as an anaesthetic and to treat severe pain. A synthetic opioid, this category of drug also includes Carfentanil, estimated to be about 10 000 times more potent than morphine. Carfentanil is intended for veterinary use on large animals (Janssen, 1982^[26]) and is not approved for use in humans.

In the 1970s and 1980s, products containing fentanyl and analogues appeared on the illicit drug market. The illegal manufacturing of fentanyl and analogues like carfentanil has recently risen to unprecedented levels, with the required materials for manufacture readily available online, at a low cost (UNODC, 2017^[27]). The resulting product can be shipped to market anywhere in the world.

A minuscule amount of pure fentanyl (about the size of a pinch of salt) can be fatal. In the last few years numbers of overdose deaths have risen rapidly, particularly in Canada, the United States and some European countries (OECD, 2019^[28]). This has been exacerbated by the COVID-19 crisis, with social distancing increasing isolation and making it more difficult to access services.

The prevalence of use by youth and children is not fully known. In the United States, drug overdose death rates in 15-24 year-olds increased from 3.2/100 000 to 12.6/100 000 between 1999 and 2017 (NCHS, 2019^[29]). Given these stark numbers and the fact that two in three adults treated for opioid use disorder first used opioids when they were younger than age 25, there have been increasing calls to develop a specific strategy for adolescents and young adults (Uchitel et al., 2019^[30]). Efforts include raising awareness of the problem, highlighting the specific needs of youth and young adults, and developing campaigns and outreach strategies, such as the community health tips and tools for youth and parents in Vancouver, Canada (Vancouver Coastal Health, 2020^[31]).

Children don't sleep enough or well enough

Across many countries, children are not getting sufficient sleep or sufficient good sleep. HBSC data suggests that on school days children sleep on average between 7:47 to 9:07 hours, and on non-school days this ranges from 9:31 to 10:22 hours, and in general older adolescents tend to sleep less and go to bed later than their younger counterparts (Garipey et al., 2020^[32]). On weekend days, young people tend to go to bed two or more hours later than during the week despite getting more sleep overall (Gradisar, Gardner and Dohnt, 2011^[33]). In terms of sleep quality, using data from Finnish children from the mid-1990s through the first decade of the 21st century, children reported more frequent insomnia symptoms (i.e. issues in falling asleep or staying asleep) and increased levels of tiredness (Kronholm et al., 2014^[34]). 24% of respondents in the HBSC survey reported difficulty in getting to sleep, one of the highest individual health complaints alongside nervousness and irritability (Inchley et al., 2020^[7]).

Violence, fighting and bullying are prominent risks in childhood

Violence and bullying are high on the policy agendas in many countries, with rates of bullying higher than rates of physical fighting in children (Elgar et al., 2015^[35]). Rates of bullying have declined slightly in recent years, although the overall proportion of children reporting being bullied has remained the same (Inchley et al., 2020^[7]). Violence against children can result in a number of adverse health outcomes apart from death and injury. It is linked to children engaging in risk behaviours (e.g. using drugs and alcohol) and can negatively affect child development. A number of factors influence violence against children as it is a multifaceted issue (for more on this topic see Chapter 11), but some contributing factors include low social cohesion, low education, socio-economic disadvantage, identifying as LGBTQ+ or having a disability (WHO, 2020^[36]).

Factors affecting child health and health behaviours

Gender and age

Gender differences are noted across a number of physical health trends and patterns. Boys are more likely than girls to do more physical activity, but they are also more likely to be overweight or obese. Boys are more likely to bully or cyberbully others, and while the proportion of boys and girls who are victims of traditional bullying is similar, girls are more likely to be cyberbullied (Inchley et al., 2020^[7]). While boys are slightly more likely to use cannabis than are girls (although this varies across countries and in some like Portugal and the Slovak Republic the difference is negligible), the gender gap in the use of different types of illicit drugs has narrowed slightly in recent years (OECD/European Union, 2016^[18]).

Age is also a significant modifier of trends and patterns. As children move through adolescence, they are more likely to drink alcohol and smoke tobacco than their younger counterparts. They also tend to sleep less, and they engage in less physical activity; rates of physical activity may start declining from as early as age seven (Farooq et al., 2017^[37]). Physical fighting also tends to decrease with age (OECD, 2019^[38]).

Socio-economic status

Poverty and deprivation have an impact on child health. In general, children and adolescents from more affluent families have healthier eating habits, are more likely to eat breakfast every day, sit down at the table together as a family for meals, and eat fruit and vegetables every day. Children in poorer households are less likely to eat fruit, vegetables or protein every day than their more advantaged counterparts (OECD, 2018^[39]), and have lower rates of breakfast consumption (OECD, 2017^[40]). Socio-economic status also affects physical activity levels, with children from low-affluence families engaging in less activity than their more affluent peers (Inchley et al., 2020^[7]). Across the OECD, almost one child in seven lives in income poverty.

In addition, lower levels of income and educational attainment are linked to obesity (Ahrens et al., 2014^[41]). Individuals from socio-economically disadvantaged backgrounds also have a greater tendency to engage in risky lifestyle behaviours and are more likely to have reduced access to services (cost, location, transportation) including safe facilities for physical activity and green space (OECD, 2014^[42]; OECD, 2015^[43]; OECD, 2010^[44]; Sassi et al., 2009^[45]).

Box 2.2. Green spaces for physical activity

The environment in which children live shapes opportunities for their engagement in physical activity (Wolch et al., 2011^[46]). Walkable neighbourhoods, proximity of things to do and accessible green areas together with infrastructure that permits walking and cycling are all particularly important for children as they are not able to move as far and as easily as adults (Arup, 2017^[47]). The importance of green spaces for children's health is internationally recognised in the Parma Declaration which commits to providing children with access to healthy and safe environments.

Despite potential risks such as exacerbating symptoms of asthma or allergies, green spaces may promote increased physical activity and reduced rates of obesity (Dadvand et al., 2014^[48]). It is therefore important for policy makers and urban planners to rely on objective and comparable indicators to identify the impact of such spaces on health and develop targeted interventions if necessary. Three aspects of green spaces are key (WHO, 2010^[49]):

- availability – define neighbourhood green spaces, without specifying their public or private accessibility and their proximity

- accessibility – define green spaces proximity to residences or communities, public accessibility and points of access
- use – define actual use of green spaces by individuals.

To fully enjoy both the built and natural aspects of children’s environment, it is crucial to engage children, parents and the wider community to express their views and participate in the planning and evaluation of the spaces in which they live (Arup, 2017_[47]).

Relationships and families

Good relationships are good for people. Social support and a sense of belonging have been positively correlated with health perceptions and fewer physical symptoms of ill health (Hale, Hannum and Espelage, 2005_[50]), while loneliness has been associated with premature mortality and adverse mental health outcomes (Finkenauer et al., 2019_[51]).

Parents and family environments play a big role in children’s health and development. For example, parents spending more time outside of the home in employment or commuting to work mean that more children are eating pre-prepared food outside of the home, which is generally related with obesity prevalence (Roblin, 2007_[11]). Early food experiences are predictive of nutrition and eating behaviours later in life, and children with poor dietary habits are thus at risk of perpetuating these throughout life (OECD, 2017_[40]; Roblin, 2007_[11]). Parents can also be barriers or enablers of physical activity. Parents who lack time and resources to role model healthy habits for their children and participate in activities together, as well as being unable to provide active opportunities serve as barriers to physical activity (Hesketh, Lakshman and van Sluijs, 2017_[52]).

Digital technologies

The increasing use of technology and changing society and family structures have also affected physical health trends (see Chapter 3 for a discussion). Research suggests use of digital technologies may have some effect on outcomes such as sleep, physical activity and dietary habits (in (Gottschalk, 2019_[53])). For example, high exposure to alcohol-related content posted by peers on social media has been correlated with higher alcohol consumption in teens (Pegg et al., 2018_[54]). However it is important to keep in mind that it is difficult to ascertain causation in these studies as they are often cross-sectional in nature and tend to rely on self-report measures which can be biased. The notion that digital screen time displaces other, more health-promoting activities is seriously contested in scholarly circles (Kardefelt-Winther, 2017_[55]).

Education

Education is an important modifier of health, and can act as a buffer against other determinants of health such as socio-economic disadvantage (Aston, 2018_[2]). It can improve both public health and health equity. As it promotes important skills such as reasoning abilities, problemsolving, and social and emotional skills it can increase individual agency, helping students feel a sense of personal control that can encourage adopting healthy habits (Hahn and Truman, 2015_[56]; Mirowsky and Ross, 2005_[57]). This can create a virtuous cycle, helping children achieve and stay in school, which is in turn linked to a series of positives: a greater likelihood of pursuing further education, having an occupation with a good income, and thus moving into a higher socio-economic strata and enjoying the health benefits associated with this (provided they still engage in healthy lifestyle behaviours) (Solar and Irwin, 2010_[58]).

Box 2.3. COVID-19, school closures and child health

In 2020, the WHO announced that COVID-19 had reached global pandemic status, triggering wide-spread school closures. By early April 2020, over 1.6 billion learners were affected by school closures across 56 countries (UNESCO, 2020^[59]).

In addition to disrupting learning, school closures affected student health. Many children rely on free or subsidised meal programmes at school, and the ways in which children typically obtain physical activity during the day including active travel to school, physical education and recess, organised sports and spending time in playgrounds were seriously curtailed (Guan et al., 2020^[60]). School closure also affected social connectedness and was linked with increases in loneliness and exposure to higher levels of domestic violence (OECD, 2020^[61]). As schools open again, ensuring access to in-school health services, resuming physical education curriculum and meal programmes and providing adequate opportunities for children to reconnect with friends are important to reinforce healthy habits.

UNICEF, the WHO and the International Federation of Red Cross/Red Crescent have produced guidelines for protecting student health in schools while COVID-19 is still a threat. These include ensuring sick children and staff do not attend school, regular and proper hand washing and promoting physical distancing. Suggested distancing practices include staggered start and end times of the school day, leaving one metre between student desks, and cancelling events like sports matches and assemblies that could create crowded conditions (UNICEF, 2020^[62]).

Effective interventions for health

In general, interventions to improve attitudes towards healthy behaviours that involve parents/caregivers in modelling healthy behaviours build healthy school environments and deliver health promotion messaging have positive effects. Specific features of intervention designs that can directly improve overall effectiveness include (Aston, 2018^[2]):

- *Community involvement in intervention design and implementation* can improve the relevance and appropriateness of the intervention to the target group, and enable intervention designs to utilise existing infrastructure and/or resources.
- *Targeting multiple behaviours and change strategies*: addressing mutually beneficial behaviours, such as dietary habits and physical activity simultaneously, can improve overall indicators such as overweight/obesity more quickly.
- *Coordinating efforts across sectors*: interventions that involve collaboration among professionals, such as health professionals and educators, can be more effective for sustained behaviour change.
- *Using digital technology*: digital resources allow for more flexible delivery and can be tailored to individuals' readiness to change their behaviours.

Health Promoting Schools

Recognising the important links between health and education, the WHO's Health Promoting Schools (HPS) framework recommends a whole-of-school approach to promoting health. HPS seeks to strengthen capacity to promote healthy living, working and learning conditions, while providing responses to the health needs of students and they focus on non-communicable risk factors for health such as diet, alcohol and tobacco use and physical activity (WHO, 2017^[63]). Some of the main features of the framework include:

- engaging diverse actors such as teachers, teacher unions, students, parents, health professionals and the community in making the school a healthy place and in promoting health in the wider community.
- providing a healthy environment with opportunities for physical activity and access to programmes for nutrition, social support, health services etc.
- providing effective skills-based health education.

HPSs aims to improve children's health by improving metrics for non-communicable health risk factors (WHO, 2017^[63]), and there is some evidence of its effectiveness (Langford et al., 2016^[64]).

Knowledge gaps and research limitations

Despite the deep body of literature, there are still elements of the interactions within and between education, physical health and well-being that are unclear and require further study.

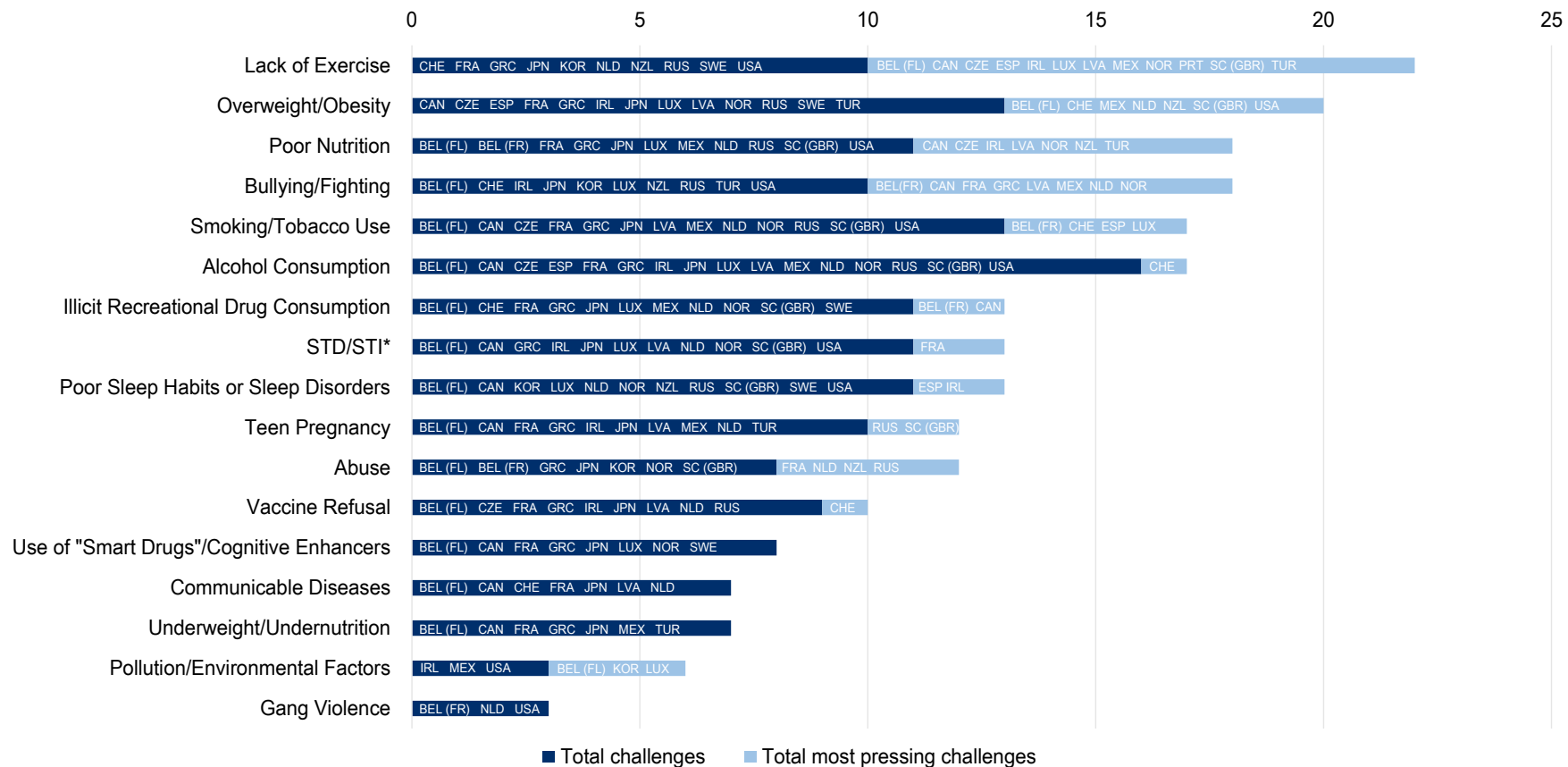
- External variables including family structure and the school environment influence physical health and well-being, yet there is an absence of data that documents the degree or magnitude of how these variables affect physical health outcomes.
- There are few published examples in the literature of intervention design and implementation plans, despite the importance of implementation on the intervention effect. There is also a paucity of longitudinal research on interventions.
- There is a need for more high quality data on how digital technologies might have an effect on physical health outcomes such as sleep and overweight, and whether they can be operationalised to improve health outcomes (i.e. active videogames or augmented reality requiring movement).
- We do not know to what degree the use of technology and the involvement of school, family, community and the broader government can maximise intervention effectiveness independent of other features of intervention design and implementation.
- Large scale national and international data often relies on self-report data from children or their parents. This can be problematic for health behaviours and other indicators such as screen time as people often have difficulty accurately reporting how much time they spend engaging in this behaviour (Boase and Ling, 2013^[65]; Orben and Przybylski, 2020^[66]).

High priority challenges in OECD countries and systems

The 21st Century Children Policy Questionnaire surveyed some of the challenges education systems around the OECD and partner countries face in terms of the physical health of children, and which of these are considered high priority in terms of policy relevance (see Figure 2.1). Systems highlighted issues such as lack of exercise, poor nutrition and overweight/obesity. These were often identified together (see Figure 2.2). Other pressing challenges include bullying and fighting, as well as smoking/tobacco use.

Fewer systems indicated that underweight/undernutrition was a concern. This is a pressing challenge in many non-OECD countries: UNICEF reports at least one in three children under the age of five is not growing well due to malnutrition (UNICEF, 2019^[12]).

Figure 2.1. Overview of physical health challenges across countries and systems



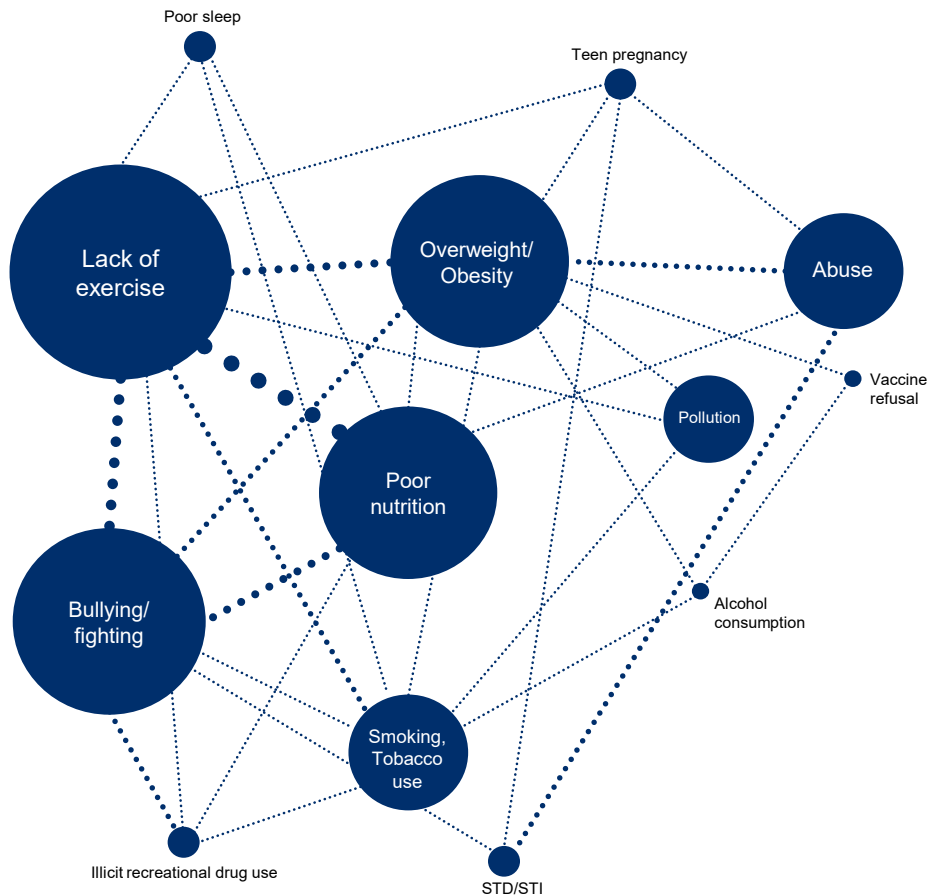
Note: 23 of 26 systems responded to this question. X-axis is the number of systems indicating this was a challenge/pressing challenge. Number of challenges was unlimited; most pressing was limited to three options.

*STD/STI=Sexually transmitted diseases/infections

Source: 21st Century Children Policy Questionnaire

Figure 2.2. Links between most pressing challenges in physical health

As identified by Ministries of Education or relevant system-level educational authority



Note: The width of the connectors reflects the number of times the respective challenges were selected together. The size of the circles reflects the number of times each challenge was selected as pressing.

*STD/STI=Sexually transmitted diseases/infections

Source: 21st Century Children Policy Questionnaire

In sum

On a number of measures the physical health of children and their health behaviours are improving. However, rising rates of obesity and decreasing physical activity are cause for concern and demand effective policy action. Different stakeholders such as educators, parents and caregivers, policy makers and primary care providers play a role in supporting children's physical health. Effective co-ordination of policy action across these different groups and within the greater community is essential to promote healthy environments for children that are conducive to good health. Building capacity through teacher education and forging strategic partnerships is required to ensure all children have access to the resources and information they need to get the healthiest start in life.

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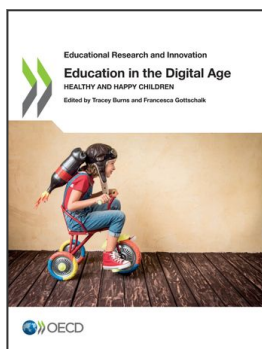
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Note

¹ The 2018 HBSC report presents key findings from 227 441 young people from 45 countries and regions across Europe and Canada.



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