

Changing patterns of health risk in adolescence: implications for health policy



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Adolescence is a time of physical, cognitive, social, and emotional development. This period is a very sensitive developmental window; environmental exposures, the development of health behaviours (eg, smoking and physical activity), and illness during adolescence can have implications for lifelong health. In the UK and other high-income countries, the experience of adolescence has changed profoundly over the past 20 years. Smoking, drug use, and alcohol consumption have all been in long-term decline. At the same time, obesity and mental ill health have increased and are now common among adolescents, with new risks (ie, vaping, psychoactive substances, and online harms) emerging. In this Viewpoint, we describe these and related trends in England and the UK. Although previous work has explored these changes in isolation, in this Viewpoint we consider them collectively. We explore what might be driving the changes and consider the implications for practice, policy, and research.

Introduction

Adolescence, the period between 10 years and 24 years of age, is a time of physical, cognitive, social, and emotional development, with lifelong implications.¹ Key formative social influences on health—peers, schools, communities, and workplaces—add to family life in shaping the individual.¹

Increasing autonomy in decision making, together with psychosocial development, contribute to behaviours in adolescence that will influence health throughout adult life. These behaviours include physical activity, dietary patterns, disease self-management, and risk-related behaviours such as smoking, alcohol use, and illicit drug use.

Taking risks and challenging social rules are often considered as immutable adolescent behaviours,^{2,3} but striking change has occurred in the past 20 years in many countries, including England.⁴ Smoking, drug use, alcohol consumption, and teenage pregnancy have each been in long-term decline.^{4,5} At the same time, obesity and mental ill health have increased among adolescents.² More recent concerns are the increases in psychoactive substances, vaping, and online harms. These changes require rethinking the nature and meaning of health risk for today's adolescents, exploring what is driving these changes, and considering the implications for adulthood. Although previous work has explored these changes in isolation,^{4,6} here we consider these trends collectively. We reflect and build on the work of the *Lancet* Commission on adolescent health and wellbeing that drew attention to the importance of adolescence for health and the emerging challenges for today's adolescents.^{1,7}

Changes in adolescent health risk

In England, smoking, alcohol consumption, illicit drug use, and teenage pregnancies have been on a downward trend since the year 2000 (figure 1). Between 2000 and 2018, the percentage of school students (aged 11–15 years) who smoked fell from 9% to 2% (a 77% reduction) in England,⁸ the percentage of school students (aged 11–15 years) who had drunk alcohol in the previous week

fell from 25% to 9% (a 64% reduction) in England,⁸ and teenage conceptions in England and Wales fell from 43.9 to 16.8 per 1000 women aged 15–17 years (a 62% reduction).⁹ The percentage of adolescents aged 15 years who reported ever having had sexual intercourse fell from 38% in the 2001–02 school year to 20% in 2018 in England (a 47% reduction).^{10,11} The picture for drug use is less clear. The percentage of adolescents aged 11–15 years reporting drug use in the previous month fell from 12% in 2001 to 6% in 2014, before rising to 9% in 2018 (a 25% reduction for the period 2001 to 2018).⁸

Cross-national data show similar trends in other high-income countries. There are downward trends in smoking, alcohol use, and early sexual initiation in Australia, New Zealand, the USA, and Europe, from 1990 to 2019.⁴ Use of cannabis is more mixed, with downward trends in Australia, New Zealand, and the Netherlands specifically, but a rise followed by a downward trend or plateau in the USA and Europe overall.⁴

Additionally, in the UK, road traffic accident rates have fallen markedly over this period (73 per 100 000 adolescents aged 11–15 years were killed or seriously injured in road traffic accidents in 2000 vs 34 per 100 000 in 2018, a 53% reduction; figure 2), although accidents in general remain the leading cause of death among people aged 10–19 years.¹⁴

In contrast to these downward trends among adolescents, obesity and mental ill health have worsened. The prevalence of obesity among people aged 11–15 years in England was 24% in 2019, compared with 5% in 1990 (4.8-fold increase).¹⁵ The incidence of depression increased from 81 to 189 per 10 000 person-years for girls (2.1-fold increase), and from 26 to 89 per 10 000 person-years for boys (3.4-fold increase), between 2003 and 2018 in the UK among people aged 13–16 years. The incidence of anxiety increased from 48 to 225 per 10 000 person-years (4.6-fold increase) for girls and from 23 to 78 per 10 000 person-years (3.4-fold increase) for boys. Self-harm showed a similar trend, increasing from 58 to 117 per 10 000 person-years (1.9-fold increase) for girls and from 11 to 32 per 10 000 person-years (2.9-fold increase)

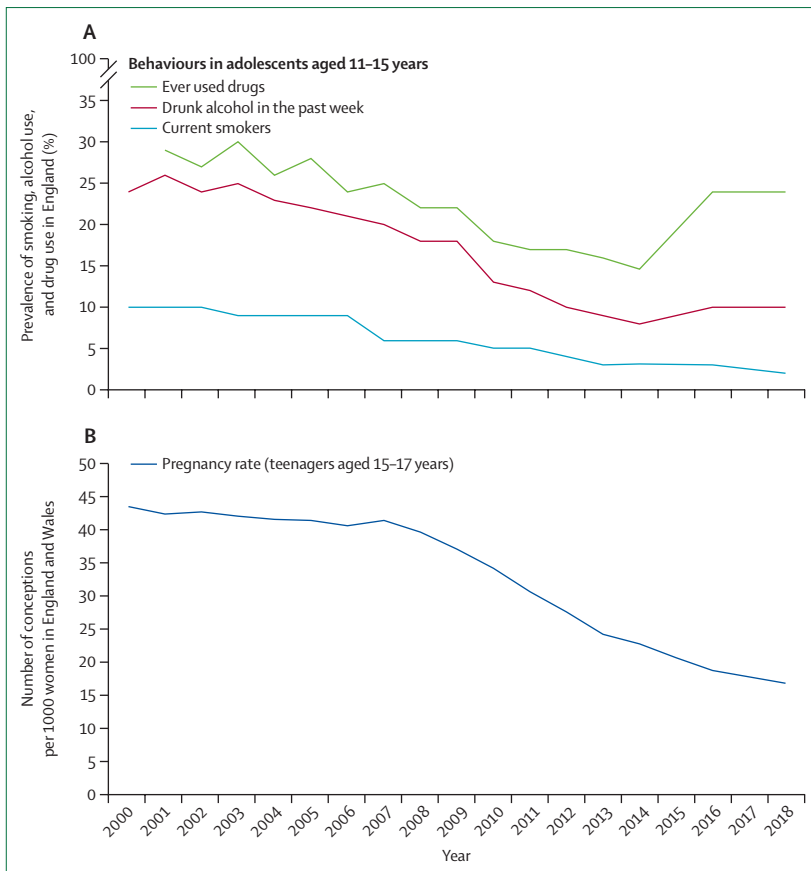


Figure 1: Trends in selected health-related behaviours among young people
Data are from the Office for National Statistics.^{8,9}

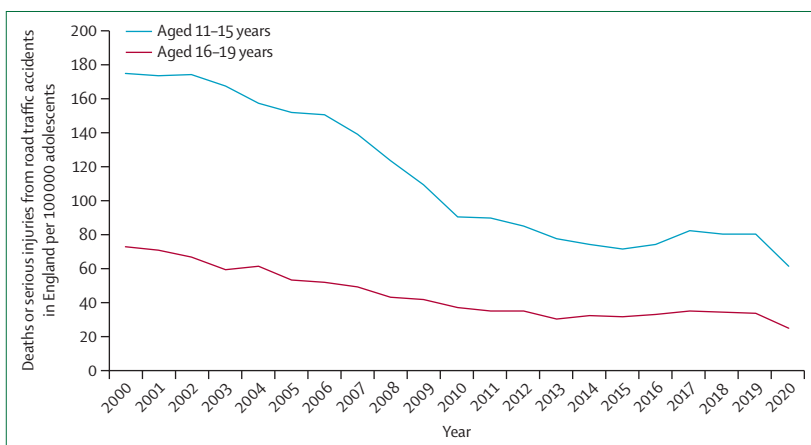


Figure 2: Road traffic accident rates among adolescents
Data are from road traffic statistics, published by the Department for Transport and Office for National Statistics mid-year population estimates for England.^{12,13}

for boys.⁶ Again, increases in obesity and mental ill health in adolescents have been reported across many high-income countries.^{1,16}

More recently, other new risks have emerged. Novel psychoactive substances have, in part, contributed to

recent increases in reported substance use among adolescents.⁸ Vaping is now common in the UK, with 21% of people aged 11–17 years having vaped in the past year.¹⁷ Vaping can cause acute lung injury, exacerbate asthma, cause facial burns, and might act as a gateway to smoking.^{18,19} Moreover, the impact of the online world and social media on adolescent mental health and social development is also concerning.²⁰

In choosing these data, we sought to identify the important changes during this period and limited ourselves to figures from before the COVID-19 pandemic to eliminate any pandemic-specific effects. Data are absent or incomplete for some behaviours or risks. Crude figures might mask important differences between socioeconomic and ethnic groups and might not reflect changes in the intensity of harm. Consequently, our description of changes might be incomplete; however, collectively, the changes in the experience of adolescence in the space of one generation are profound. Health risks for young people today are very different to those of their parents.

Implications of the changes for adolescent and adult health

Adolescence is a time of adoption of behaviours that bring health benefits or risks that can persist throughout life. Profound changes in the brain, including in the prefrontal cortex, occur during this period and are important for judgement, impulse control, and self-regulation.¹ These changes affect how adolescents consider factors including peer influence, novelty seeking, and health consequences when making decisions. As a result, adolescence can be a particularly vulnerable period for the initiation of risk behaviour; smoking initiation often occurs during adolescence, and those that do not start smoking during adolescence are very unlikely to smoke for the rest of their lives.²¹ As behaviours adopted during adolescence can persist for many years or throughout life, changes in adolescence can be crucially important, with effects from reductions in smoking, alcohol use, and drug use, and effects from increases in mental ill health and obesity, continuing into adult life.

Those effects can also extend to the offspring of today's adolescents. Maternal (and paternal) risk factors (eg, smoking, drug and alcohol use, and obesity) affect the health of babies, and parental behaviours influence the adoption of health-related behaviours among their children.¹

A new adolescence?

Traditionally, both researchers and popular culture have understood adolescence to be a time of risk taking and rebellion.^{2,3} Modern neuroscience provides some support for this view, with the developmental mismatch theory suggesting a discrepancy during adolescence between the prolonged maturation of brain regions involved in

judgement and self-regulation, and more rapid growth of regions involved in sensation seeking and emotion processing.²²

Superficially, the so-called biologically determined appetite of adolescents to take risks might seem to be diminishing; however, even if the phenotypic expression as reflected by typical risk behaviours is changing, the underlying genotype is unlikely to have changed. Expression is affected by environmental factors and social context. The opportunities permitted by society to engage in exploratory or risk behaviours have changed. Although tobacco control measures have reduced opportunities to smoke, new opportunities for risky exploratory behaviours, vaping, new psychoactive substances, and an online world have emerged, with which adolescents have been quick to experiment, consistent with an underlying tendency to explore and challenge social rules. Opportunities or threats will continue to emerge. Since the second half of 2019 in the USA, for example, availability of illicit fentanyl has led to a rise in drug overdoses among adolescents (despite falling rates of substance use).²³

The expression and associated risks of adolescence have changed.

The search for an explanation: understanding environmental drivers of change

First, it is important to consider whether these changes to adolescence reflect wider societal changes that affect all age groups. Although these societal changes might account for some changes to adolescence, such as rising obesity or the increasing age of first-time mothers accounting for the decline in teenage pregnancy rate,¹⁶ the adolescent pattern is strikingly different to the adult pattern for some risks. For example, reductions in smoking and drinking are more pronounced among adolescents. Between 2000 and 2018, the adult smoking prevalence fell from 24% to 18% (a 25% reduction, compared with a 77% reduction among children aged 11–15 years); the prevalence of adults who had drunk alcohol in the previous week fell from 72% to 62% (a 14% reduction, compared with a 64% reduction among children aged 11–15 years; figure 1, figure 3).²⁴ For drug misuse, the discrepancy is even more marked. In England and Wales, mortality from drug misuse increased among adults in midlife from 47.7 to 134.3 deaths per million people aged 40–44 years between 2000 and 2018, but fell among people aged 15–19 years during this same period from 23.5 to 13.1 deaths per million people in this age group.²⁵

These different age-related patterns might suggest either different effects of wider societal changes on adolescents (eg, due to differences in self-regulation and judgement or because adolescence is a period of behaviour initiation) or genuinely different influences on adolescents.

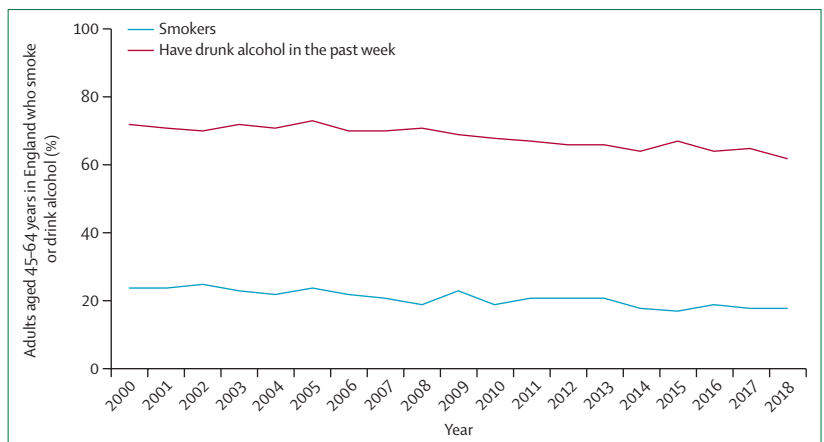


Figure 3: Prevalence of smoking and alcohol use among adults in midlife

Data are from Health Survey for England; smoker is defined as somebody who answers 'yes' to the question, "do you smoke cigarettes at all nowadays?"²⁴

Second, a single factor linking all these changes together seems unlikely. The time course of the trends is different. The rise in obesity started in the 1980s.²⁶ The decline in youth tobacco smoking is long-term, although has been much more rapid since approximately the year 2000. No long-term surveillance data exist on children and young people's alcohol and drug use before 2000, making it difficult to pinpoint when change began. The incidence of psychiatric disorders increased from approximately the year 2010 in the UK,⁶ albeit other data place the start of deterioration in adolescent mental health as far back as 30–40 years ago.²⁷

Some factors could drive several of the observed changes. For example, Ball and colleagues⁴ have proposed that a decline in unstructured face-to-face time with peers could be one factor driving declines in smoking, alcohol use, cannabis use, early sexual initiation, and juvenile crime. They have also proposed cascade effects, by which one behaviour triggers a change in another behaviour; for example, declines in smoking and alcohol use (being drivers for cannabis use) might subsequently contribute to declines in cannabis use.⁴ Commercial determinants could be seen as a shared factor across obesity, smoking, alcohol use, and the use of digital devices.

Third, some trend-specific factors can be identified. For example, the rise in obesity is driven by changes in the food and physical activity environments.²⁸ Reductions in smoking in the UK could be attributed to the steady introduction of tobacco control measures over the past 20 years, including advertising restrictions, smokefree workplaces, raising the legal age of sale of tobacco, pictorial health warnings on tobacco packaging, prohibiting the display of tobacco in shops, and plain packaging of tobacco products. Some of these measures were targeted at smoking initiation in adolescence;²⁹ however, much less attention has been paid to alcohol control in comparison with tobacco,³⁰ and yet large reductions in alcohol use have also been observed.

The explanations for changes in mental health are less clear. Explanations proposed for worsening mental ill health include changes in individual vulnerability (eg, timing of puberty and sleep), family and social circumstances, parenting behaviours, and broader socioeconomic and environmental factors (eg, rising inequality and climate change).^{1,27} Rising recognition and greater acceptability of mental ill health might also have a role.⁶ The influence of use of digital devices, and particularly social media through smartphones, on the rise of adolescent mental ill health²⁰ has not been examined by detailed longitudinal studies.³¹

No neat theory for the observed changes is available, but a set of factors, some cause-specific and some shared, seems likely to have led to the changes.

Implications for policy

The trends highlighted here have major implications for both clinical services and public health policy, now and for the future. Health-care services for adolescents and young people need a much greater focus on mental health services and on the complications of obesity. The shift in focus will need to continue as adolescents mature into adults.

Although preventive initiatives should continue to address alcohol, smoking, teenage pregnancies, and injuries among adolescents, these initiatives will need to give greater priority to mental wellbeing, physical activity, and healthy eating, and respond to emerging risks such as vaping. The ongoing maturation of the brain into early adulthood means that adolescents are more susceptible than adults to the sophisticated commercial techniques used to market food, electronic devices, and vapes.³² Companies might put disproportionate effort into marketing targeted at adolescents, in the hope of establishing brand loyalty to win consumers for life. Reflecting this, new measures to restrict marketing of vapes targeted towards adolescents and young people have recently been proposed by the UK Government.³³ Corresponding protections around food marketing are needed, and there are few restrictions on social media content.^{29,34} Historically, tobacco control measures provide an example of effective policies that could act at a general population level and provide protection for adolescent-specific vulnerabilities (which might account for the discrepant trends seen in figure 1 and figure 3). The Teenage Pregnancy Strategy is also another example from the UK of government policy contributing to major improvements in adolescent health.^{29,35,36}

As the tobacco epidemic recedes, policy responses and service delivery will also need to evolve. Targeted but also different policy responses are needed. For example, the UK Government is proposing to raise the legal age of sale of tobacco by 1 year each year until the ban applies to the entire population.³³

Non-health-care settings will also need to adapt. Schools have begun to do more to protect and improve

the mental wellbeing of children;³⁷ however, more is needed. The rise in obesity and mental ill health might have negative consequences on productivity and economic growth, but could also help spur needed changes in workplace culture and practice to better support wellbeing and inclusivity.

Implications for research and surveillance

In the UK, the Medical Research Council has announced a new adolescent health cohort study, recruiting 100 000 young people over a 10-year period,³⁸ a recognition of the importance of this period of life for health. Studying risk and health-related behaviours will be important not just in isolation, but also in terms of the links and interactions between behaviours, their biological and psychosocial determinants, and the sociodemographic patterning. Such cohort studies are much needed and will allow a much richer understanding of how adolescent behaviours and risk profile influence health-related behaviours and risk throughout life.

Research should be rebalanced away from traditional siloed research and towards the inter-relationships of physical and mental health, to reflect the changing needs in adolescence and adult life. The rises in obesity and mental ill health share some underlying drivers. Research to support the implementation of interventions needs to consider a holistic set of outcomes and needs to identify actions that improve both physical and mental health. Interdisciplinary research, research with adolescents, and the adoption of new analytic frameworks will all be needed.

Surveillance systems (eg, repeat cross-sectional surveys) can be late to respond to new changes. These systems need to be able to adapt to, respond to, and capture data on emerging trends, particularly given the vulnerability of adolescents to societal changes. In the UK, surveillance of adolescent weight status before 1995 was sparse. Monitoring of illicit drug use only started in 2000. In both cases, surveillance started after important changes in these risks had occurred. Since 2000, surveillance has been responsive, documenting the rise in the use of legal highs and vaping among adolescents,⁸ but surveillance to detect emerging potential harms around gambling, gaming, advertising, knife crime, and digital media use remains weak. Adolescents themselves are a valuable source of intelligence to help identify threats. In the UK, a gap around surveillance exists for older adolescents, aged 18–24 years. These years are easily overlooked, being seen as part of adulthood, but are a crucial part of adolescence, with brain maturation continuing and new social and workplace influences.

With an increasingly diverse society, surveillance systems also need to explore patterns within different sociodemographic groups.³⁹ In the UK, differences in weight status are commonly reported by deprivation

Search strategy and selection criteria

References for this Viewpoint were identified through searches of PubMed with the search terms “adolescent”, “adolescence”, “risk”, and “behaviour” from Jan 1, 1990 until April 14, 2024. Articles were also identified through searching reference lists and from the authors’ own records. Only papers published in English were reviewed. The final reference list was generated on the basis of originality and relevance to this Viewpoint.

group for primary school children (a large growing gap between the least and most deprived has been documented);¹⁵ however, this reporting is not routinely done for the equivalent datasets concerning smoking, alcohol use, and drug use,⁸ despite growing health inequalities.⁴⁰

Conclusion

Over the past 30 years, a profound shift has occurred in health-related behaviour and risks during adolescence. Given that adolescence is a crucial period for determining health risks in later life, this shift is likely to have substantial implications for the provision of preventive services, clinical health care, and wider society. Although societal changes and the opportunities and challenges they present will be driving the changing behaviours and health risks, our understanding of the factors driving the changes, the links and interactions between them, and the socioeconomic patterning is poor. A richer understanding of these factors, driven by research in partnership with adolescents, will lead to more informed policy responses and better provision of health-care and preventive services.

Contributors

OTM, FG, and RMV conceived this Viewpoint. OTM and FG identified the data. OTM drafted the Viewpoint. All authors reviewed and edited this Viewpoint.

Declaration of interests

FG was employed by the Department of Health and Social Care and was employed by the National Institute for Health and Care Excellence; the views expressed here do not represent organisational policy. All other authors declare no competing interests.

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