Substance use in young people 1

The increasing global health priority of substance use in young people

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Substance use in young people (aged 10–24 years) might disrupt key periods of transition that occur as the adolescent brain undergoes cognitive and emotional development, and key psychosocial transitions are made. Adolescence is the peak time for initiation of substance use, with tobacco and alcohol usually preceding the use of illicit drugs. Substantial variation is noted between countries in the levels, types, and sequences of substance use in young people, indicating that a young person’s use of substances depends on their social context, drug availability, and their personal characteristics. The Global Burden of Disease (GBD) 2013 study suggests that the burden attributable to substance use increases substantially in adolescence and young adulthood. In young men aged 20–24 years, alcohol and illicit substance use are responsible for 14% of total health burden. Alcohol causes most health burden in eastern Europe, and illicit drug burden is higher in the USA, Canada, Australia, New Zealand, and western Europe. Large gaps exist in epidemiological data about the extent of drug use worldwide and much of what we know about the natural history of substance use comes from cohort studies in high-income countries undertaken decades ago, which hinders effective global policy responses. In view of the global epidemiological transitions from diseases of poverty to non-communicable diseases, the burden of disease and health risks among adolescents and young adults is likely to change substantially, in ways that will no doubt see substance use playing an increasingly large part.

Introduction

Different cultures have used different substances to experience their intoxicating, euphoric, disinhibiting, or relaxing effects for thousands of years. Until industrialisation for production of beer and spirits, mostly in the mid to late 18th century in Europe, use of substances was constrained by their restricted and often seasonal availability. Nowadays, alcohol and tobacco are legally and readily available to adults in most countries. These are typically not legally available to young people below a specific age; however, the minimum ages and the extent to which they are enforced varies substantially across countries.1 Illicit drugs are defined as those drugs whose non-medical use has been prohibited by international drug control treaties because of the belief that they pose an unacceptable risk to the health of adult users.34 These include plant-based substances (eg, heroin, cocaine, and cannabis) and synthetic substances, such as amphetamine-type stimulants and pharmaceutical opioids (eg, oxycodone, buprenorphine, and methadone). In this Series paper we focus on use of alcohol, tobacco, and illicit drugs (panel 1).

Substance use in young people (defined in this paper as aged 10–24 years; panel 1) has been the cause of increasing concern to parents, friends, communities, and policy makers. This concern underlines the fact that adolescence and early adulthood are key periods of transition. Substantial changes occur in the adolescent brain, including great cognitive and emotional development.6 Some have suggested that this period might, in itself, be a crucial time of susceptibility for the development of substance dependence.7 This period is also one in which key psychosocial transitions are typically made: completing education, transitioning to employment, forming sexual relationships, and transitioning to marriage and parenthood. Use of substances during these years is of concern to the extent that it might impair these transitions.8

Increasing attention has been given to substance use in young people across communities, countries, and global organisations. Young people were particularly noted in WHO’s global strategy on alcohol,9 which was endorsed in 2010 by consensus at the 63rd session of the World Health Assembly (Geneva, May 17–21). WHO’s Framework Convention on Tobacco Control,10 which has 168 signatories, noted that access to tobacco by young people was an issue. For both the alcohol and tobacco strategies, numerous policy levers are available to prevent and reduce use and harms, the strongest of which involves legislation to restrict the availability, use, and sales of these substances.1 However, there is concern that low-income and middle-income countries do not have the capacity to implement these10 in the face of promotional activities by the alcohol and tobacco industries.

In April, 2016, the UN General Assembly will convene a Special Session to review progress made against the 2009 Political Declaration and Plan of Action14 to address illicit drug use and harms globally. A particular focus will be upon young people. The policy levers available for illicit substances are much more restricted than for alcohol and tobacco since their non-medical use is illegal. UN Member States' efforts are often centred upon policing supply and consumption, whereas efforts to reduce demand for illicit substances typically focus upon prevention. There is less focus on harm reduction and treatment of illicit substance use and dependence in young people.

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Adolescent: people aged 10–19 years (according to UNICEF, WHO, and UN Population Fund [UNFPA]).
Young people: people aged 10–24 years (according to UNICEF, WHO, and UNFPA).
Youth: people aged 15–24 years (by UNICEF, WHO, UNFPA, and UN Secretariat), or 15–32 years (by UN Habitat [youth fund]).
Child: people aged <18 years (UNICEF, on the basis of the Convention on Rights of the Child).
Alcohol: a psychoactive substance that has both intoxicating and relaxing effects. It has been used widely in many cultures for thousands of years.
Tobacco: a green leafy plant, the leaves of which are dried, ground, and used in various ways. The most common use is via smoking in a cigarette, but it can also be smoked in a pipe or cigar, chewed, or sniffed (called snuff or snus). There are thousands of chemicals in cigarettes. Inhibition of monoamine oxidase activity by compounds in tobacco smoke has been suggested to combine with nicotine (thought to be the most important compound for psychoactive effects) to increase the addictive properties of smoking.
Cannabis: a generic term for preparations (eg, marijuana, hashish, and hash oil) derived from the Cannabis sativa plant, which contain many cannabinoids. Tetrahydrocannabinol is thought to be mainly responsible for psychoactive effects of cannabis, producing euphoria and relaxation, heightening the senses, and increasing sociability.
Amphetamine-type stimulants: synthetic sympathomimetic amines with powerful stimulant effects on the CNS. The most common types used are methamphetamine, amphetamine, and methylenedioxymethamphetamine.
Cocaine: an alkaloid derived from the coca plant that is a powerful CNS stimulant.
Opioids: derivatives from the opium poppy (eg, heroin and morphine) and their synthetic analogues (eg, oxycodone, methadone, and fentanyl). Opioids relieve pain and produce a feeling of euphoria.
Novel psychoactive substances or so-called legal highs: many different kinds of substances that include a range of stimulants (ie, cathinones or piperazines, which are usually in powder or tablet form) and synthetic cannabinoids (which are usually smoked). These are receiving increased attention but are used much less often than are other illicit substances.

This is the first in a Series of three papers that discusses substance use in young people. We will present data about the epidemiology of substance use and health burden in young people; discuss key issues associated with substance use in young people, particularly the stage in the life course for patterns of substance use, persistence of use and progression to dependent use, and differences in use between sexes; identify several at-risk populations of young people; and discuss emerging trends in the availability, contexts of use, and resulting effects of substance use in young people.
What is the extent of substance use in young people?

When does substance use begin?

Adolescence is the peak period during which substance use first occurs. This finding is consistently reported in surveys of drug use in young people and young adults. Levels and frequency of use begin to increase in mid-adolescence and peak in very early adulthood, as reported in long-running US cohorts.15

The age of onset in prospective cohorts is similar in high-income countries.16 Figure 1 shows the age-of-onset curves for use of substance use in people using specific substances in the World Mental Health Surveys (WMHS), cross-nationally.16 Among those who have used substances, the age-of-onset curves were strikingly similar across countries. For alcohol, median age of onset was 16–19 years for all countries, except South Africa (20 years), and the same age for tobacco in all countries.
except Nigeria (21 years) and China (20 years). Median age of onset of illicit substance use was slightly older in all countries (cannabis median age of onset 18–19 years; cocaine median age of onset 21–24 years).16

The age range for initiation was also consistent across countries in the WMHS.16 Half of people who had ever used alcohol began between ages of 14 years and 21 years. The IQR of age-of-onset distributions was typically 15–21 years for tobacco, 16–22 years for cannabis, and 19–28 years for cocaine.

Many policy makers have argued that delaying the onset of substance use is important to reduce the risk of developing problematic use of that substance later in life.7 However, in 2014 a systematic review18 reported an absence of high quality prospective research on alcohol. Only five prospective cohort studies, undertaken in the USA and Norway, met the review’s inclusion criteria, and their findings were mixed on associations between age of onset of alcohol use and later problematic alcohol use.18 Studies that did note an association typically reported elimination or substantial attenuation of the association once confounding factors were included.18 Delaying of the age of onset might still be an important strategy to reduce risks associated with acute intoxication and other health and social harms associated with early-onset alcohol consumption.10

Is there a consistent order in initiation of substance use?

Studies in countries with quite high prevalence of cannabis use have often reported a typical temporal order of drug initiation: alcohol and tobacco first, followed by cannabis and then other illicit drugs. Early initiators and regular users of any of these drugs are most likely to progress to use the next drug in the sequence. This pattern, which persists after control for confounders,19–21 has led to some drugs being labelled so-called gateway drugs (eg, cannabis as a gateway drug for the use of other illicit drugs). However, this pattern is not consistent across all countries.22 Use of other illicit drugs is more common than cannabis in some countries (eg, Japan), and the association between initiation of alcohol, tobacco, cannabis, and other illicit drug use is stronger in some countries (eg, the USA) than others (eg, the Netherlands).22

These variations in patterns of drug use initiation between countries and cultures suggest that a young person’s entry into illicit drug use might be representative of their social context, illicit drug availability, and their personal characteristics and social settings that facilitate or deter drug use. This conclusion is supported by the range of social and contextual factors associated with the initiation of substance use (table 1).

Geographical variation

Figure 2 presents the latest data reported by UN agencies that monitor tobacco, alcohol, and cannabis use by young people (WHO25,26,51 and the UN Office on Drugs and Crime;7 appendix). Substantial cross-national variation is visible in the levels of substance use reported by UN Member States (figure 2). Tobacco use is most common in western Europe and African countries; levels of past year alcohol use and of recent heavy episodic alcohol use are high in eastern Europe, Australasia, western Europe, and North America; and lifetime cannabis use is high in Australasia, North America, and several countries in western Europe.

Large subnational variations are shown in substance use, particularly of illicit drugs where availability is often concentrated in large cities. Even in particular geographical areas, substantial variations are noted in levels of use in young people who differ by sociodemographical characteristics that increase or decrease their risk of substance use (table 1).
Figure 2: Prevalence of substance use in young people

Prevalence of current tobacco use (A), past year alcohol use in young people aged 15–19 years in 2010 (B), and prevalence of lifetime cannabis (C) and cocaine (D) use. Data are from WHO’s Report on the Global Tobacco Epidemic 2013 (A),\(^{25}\) WHO’s Global Information System on Alcohol and Health (B),\(^{26}\) and the UN Office on Drugs and Crime’s 2015 World Drug Report (C and D).\(^{27}\) Substantial differences are noted in countries and substances in the age ranges included, years of data collection, coverage of the survey, and available details of the studies’ methodology (appendix). Prevalence of lifetime amphetamine and opioid use is shown in the appendix.
Data reported to UN agencies by Member States have several limitations. First, these include variations in the year of collection, age ranges of people covered, use of subnational surveys, and the definitions of substance use (panel 2). One of the greatest issues, however, is the little information available about survey sampling, fidelity of assessment, and how consistent measurements are within countries, across years, and across countries. Finally, there are large gaps in the data available in some countries on the extent of substance use in young people (panel 2).¹²

WHO’s WMHS initiative analysed data from 17 countries about the prevalence of substance use at ages 15 years and 21 years (in people aged 22–29 years at the time of surveying) and the age of onset of substance use (appendix).⁶ Substantial differences were reported in substance use in young people between countries (appendix). Most young adults in the Americas, Europe, Japan, and New Zealand had used alcohol by age 21 years, with smaller proportions having used alcohol in the Middle East, Africa, and China by the same age. Use by age 15 years was lower, but had a similar country pattern.⁶

**Panel 2: Limitations of cross-national data about substance use in young people**

Large gaps exist in the data reported to UN agencies about substance use in young people (an issue in many areas of global reporting on the health and wellbeing of young people). The appendix has details about UN data collections.

Some of the key difficulties facing the development of an accurate and timely picture of national, regional, and global substance use in young people include:

- Incomplete reporting of data by Member States to UN agencies responsible for collating these data;
- Differences across countries in the years of data collection, sampling frames (eg, school vs community), coverage (eg, subnational vs national), and method of assessment;
- Reliance on school surveys, meaning that young people not in school are not questioned (which can be a large proportion of young people in the later years of education);
- Less emphasis to obtain accurate estimates of prevalence of less common or more stigmatised patterns of substance use (typically more regular, risky, or problematic patterns of use), which need the use of indirect prevalence estimation methods rather than surveys;⁶
- A reliance on measurements of lifetime or past year use with few estimates of the proportion of young people who might be engaging in more regular or dependent patterns of use, which are arguably the patterns of greater concern;
- Differences in the measures of use assessed;
- Little monitoring, in most countries, of levels and trends in substance use by at-risk groups of young people, who might begin using new substances sooner than most young people or be at greater risk of experiencing harms;
- Differences in the age ranges assessed (eg, many estimates for tobacco use are for 13–17 year olds, but some refer to those aged 10–19 years, 15–16 years, and so on);
- Differences in the fidelity of surveys to the study design;
- Few repeat measures of use across years in most countries, which would permit a more evidence-based assessment of trends over time in use by young people.

**Differences between men and women**

Drug use is consistently more common in men than women.⁵⁶,⁵⁷,⁵⁸,⁵⁹,⁶⁰,⁶¹ Different differences might partly represent sex differences in the opportunities to use substances in North American and Latin American countries, in which men have greater opportunities to try substances than women do.⁵⁴,⁶² The WMHS reported large variations between countries in sex differences in the opportunity to use drugs and in progression to use.⁶³

In some countries, differences between sexes were small at both stages (particularly for alcohol) whereas in other countries they were apparent at both stages; and in the remainder, men had a much higher chance of being offered substances (particularly illicit drugs) than women, accounting for sex differences in use. In no country were alcohol or drugs more available for women or were women more likely than men to take up the opportunity to use substances.

**Substance use patterns**

**Regularity and quantity of use**

We need to be clear about what we mean by substance use (panel 1). In adolescents, use of substances is typically sporadic, often experimental and opportunistic, with many young people taking advantage of opportunities to use substances and experiencing both the desired and the less positive effects. As adulthood approaches, an increasing number of young people have income from employment and increased independence in the ways in which they spend their time. Some young people begin to use drugs more frequently than before. A small number of young people progress to regular use and a subset of these develop dependent use, typically during young adulthood. Further details about different patterns of substance use are listed in panel 1.

A fairly consistent picture has emerged from prospective cohort studies and modelling of epidemiological data, in which substance use begins in adolescence and peaks in young adulthood (age 20–24 years). Clear differences are noted between substances in whether use continues, ceases, or progresses to problematic or dependent use. In an early and highly valued study charting substance use through childhood, adolescence, and young adulthood, Chen and Kandel showed that the use of most substances peaked in late adolescence and early adulthood. Sharp decreases were reported in monthly cannabis use from the mid-20s and more gradual decreases in the use of other illicit drugs. By contrast, much smaller reductions were noted in monthly use of alcohol and tobacco by the late 20s. When the focus was on people who had used substances at least ten times in their lifetime, the proportion of tobacco users who used every day increased as the cohort aged. This proportion remained stable from about 20 years of age for alcohol users, but decreased from the mid-20s for cannabis users. The decrease in daily cannabis use particularly has been associated with changes in social roles as young...
people enter relationships, marry, have children, undertake further education, and enter the workforce. A failure to make these transitions is associated with persistent use of cannabis. 

The natural history of other types of illicit drug dependence has been less well studied than cannabis in prospective cohorts, largely because of their much lower prevalence of use. A study of initiation of use and progression to dependence in 17 WMHS countries noted that drug dependence was more likely to develop in those with a more extensive substance use history (use of more substances and earlier onset of use) and a history of externalising and internalising disorders before the age of 15 years. Similar findings have emerged from cohort studies in high-income countries in which early involvement with substances and mental health problems increased the risk of problematic substance use. 

Cohort studies of people who use less common illicit drugs (eg, cocaine and heroin) often include adult users seeking treatment for dependence or entering the criminal justice system. Little examination of these types of illicit drug use has been undertaken in representative cohorts of young people. This evidence suggests that a small number of people will no longer meet criteria for dependence a year after receiving a dependence diagnosis. 

**Effect of changes in social roles and transitions**

All of the evidence we have reviewed so far was historical. Data for the initiation, trajectory, persistence, and progress of substance use are, in many cases, from cohorts of young people first interviewed several decades ago. Since that time, massive changes have occurred in the types of substances used, levels of use, and age of onset of use across many countries. Simultaneously, large shifts have also occurred in social features of adolescence and young adulthood in high-income countries. In many low-income and middle-income countries, the social position of women is changing, with increasing autonomy and participation in education and employment. In many countries, marriage and parenthood occur at older ages than was previously the case. The acquisition of adult roles is delayed in many high-income countries. The effect that these shifts have on the initiation and persistence of substance use is not yet known. However, delays in transitions to adult roles and responsibilities will be likely to allow substance use to persist, increasing the opportunity to develop problematic or dependent use and increasing the length of time that young people are exposed to the risks of drug-related health and social harms. 

**Risk and protective factors**

Many studies examining risk and protective factors for substance use in young people have been cross-sectional. This design makes it difficult to identify which factors might play a causal role in development of risky patterns of substance use. Nonetheless, a growing number of studies, mostly in high-income countries, have used prospective cohort study designs to disentangle the potential causes of the initiation and progression to regular substance use in young people. The most informative of these studies identified risk factors for and pathways into regular alcohol, tobacco, and cannabis use in high-income countries. Few studies have examined whether risk factors for drug dependence differ between countries, but, so far, similar risk factors seem to predict early cannabis use in high-income and low-income and middle-income countries.

Risk and protective factors for adolescent substance use can be grouped in various ways. We use the classification in one systematic review that characterised risk and protective factors as contextual risk factors, fixed markers of risk, and individual and interpersonal risk factors (table 1). These types of risk factors have different implications for population-level and individual targeted prevention interventions. 

First, the major contextual factors that affect the likelihood of use are the availability of the substance (eg, the density of outlets selling tobacco or alcohol, and the availability of illicit drugs) and social norms that are tolerant of substance use. Second, fixed risk markers include being a man, parental and sibling substance use, and potential genetic factors, all of which increase an adolescent's risk of use. Additionally, parental conflict increases the likelihood of a young person using substances. People from socially disadvantaged backgrounds have an increased likelihood to use illicit drugs, but structural risk factors such as poverty, social, and cultural factors have been assessed in few studies. 

Finally, individual and interpersonal risk factors include novelty and sensation seeking, oppositional behaviour and conduct disorder in childhood, poor school performance, low commitment to education, and leaving school early (ie, before mandatory education is completed). Family factors associated with an increased risk of drug use during adolescence include: parenting styles, poor quality of parent-child interaction, and parent-child relationships. Affiliation with antisocial and drug-using peers is one of the strongest predictors of adolescent substance use, independent of other risk factors. 

Many risk factors frequently co-occur. Young people who initiate substance use at an early age have often been exposed to social and family disadvantages, and come from families with marital difficulties and a history of parental substance use. They are also often impulsive, have performed poorly at school, and are affiliated with delinquent peers. Young people with many of these risk factors often start alcohol, tobacco, and illicit drug use at an early age and develop problematic drug use. 

Particular groups of young people exist who might also be at an increased risk of substance use, substance use problems, or adverse resulting effects of use (panel 3).
Panel 3: Populations of young people at risk for substance use and associated problems

UN organisations have identified most at-risk populations for becoming infected with HIV.74 We adopted a similar logic to identify at-risk groups of young people who might: be at an increased risk of engaging in early-onset substance use; have increased levels of risky or problematic patterns of substance use if they have started using; and be at an increased risk of experiencing adverse effects of use once they initiate use.

Young people with mental health problems
- About 10–20% of children and adolescents,22 and an even greater proportion of young adults,19 are estimated to have at least one mental health problem in a year.
- Young people with common mental disorders (eg, depression or anxiety) have substantially higher rates of substance use, dependence, and harms than those without such disorders.70,72 Common mental disorders typically precede substance use disorders in young people.79
- Young people with psychosis are at an increased risk of substance use. Research has suggested that in young people susceptible to psychotic disorders, substance use is associated with subclinical psychotic symptoms10 and perhaps transition to first-onset psychosis.10,13
- For young people with previous mental health problems, substance use might worsen or trigger a recurrence of symptoms.10 Evidence suggests that once young people with mental health problems start using substances, they might be at a greater risk of progressing to problematic or dependent use.84,85

Young people who identify as lesbian, gay, bisexual, transgender, and questioning (LGBTQ), or same-sex attracted
- A 2011 UK survey46 estimated that 2.7% of young people aged 16–24 years identified as lesbian, gay or bisexual; an Australian study46 noted that 6% of young people aged 16–18 years reported same-sex attraction.
- LGBTQ young people have high rates of substance use and associated problems.83,84 A systematic review noted that although all substances were more likely to be used by LGBTQ young people, the strongest associations of sexual orientation in young people were typically with less common patterns of drug use (eg, cocaine or injecting drug use) and problem use.83
- A systematic review noted that substance use in LGBTQ young people was associated with victimisation, negative experiences of disclosure of their sexuality, and a lack of supportive environment.75

Young offenders
- About 1.4% of adolescents were convicted of a criminal offence in Australia in 2007–08; 0.4 per 1000 adolescents were detained in juvenile detention.90
- Prevalence of substance use disorders is greatly increased in young people in contact with the criminal justice system.91–93
- Debates surround whether substance use and crime are causally linked.10

Indigenous young people
- Substance use in indigenous young people has been reported to be high in many populations—eg, Native Americans13 and Maori10 and indigenous young people in the Arctic14 and Australia.97
- The types of substance use both within and across communities of indigenous young people are varied. Alcohol has often been a substance of particular concern in indigenous communities.
- Indigenous young people are in many cases susceptible to misuse because of social and economic disadvantage and high unemployment, homelessness, incarceration, and familial disruption.51,58

(Continues on next page)
e-cigarettes in others, and the use of the internet to supply illicit substances. The second concerns changes in the regulatory environment, both for licit and illicit substances. As alcohol and tobacco become increasingly marketed to young people in low-income and middle-income countries, some governments might struggle to use the policy mechanisms that effectively reduce alcohol and tobacco use in young people in high-income countries. Some countries are considering changes in the legal control of cannabis. This amendment could lead to changes in substance use in young people and provide governments with new policy levers to reduce use and harm.1

The consumption of alcohol and tobacco by young people is increasing in some low-income and middle-income countries.25–29 Cigarette smoking has substantially increased in China and the Middle East, and there is concern about possible increases in Africa.30 Alcohol consumption is thought to have increased in China and India.31

One issue associated with these shifts is the way in which alcohol and tobacco are available and sold. A large proportion of alcohol consumption in these regions is unrecorded, meaning that alcohol is produced and sold outside of government control and therefore untaxed. This unrecorded production could partly be from traditional methods of alcohol production but could also represent illicit production or smuggling across country borders.32 As a result, the traditional policy levers of taxation, control of outlets, and legal minimum age for consumption are not available to governments for these substances.32,33 Other issues include the restricted capacity of low-income and middle-income countries to deal with the alcohol and tobacco industries and with those who trade in illicit products. These policy levers can be very effective in reducing consumption of these substances by young people.1

Manufacture of amphetamine-type stimulants and new psychoactive substances, and changes in use of e-cigarettes and legal status of cannabis

Amphetamine-type stimulants are the second most widely used group of illicit drugs after cannabis.34 Added to these are an increasing number of new psychoactive substances (NPSs). NPSs mimic the stimulant effects of amphetamines, cannabinoids, and other drugs but are not under domestic or international control by the 1961 or 1972 UN Conventions on Narcotic Drugs.35 Of those experimenting with NPSs, young people are over-represented, although these substances are more typically used by experienced drug consumers. NPSs have been identified in 96 countries worldwide; the largest variety has been reported in Europe and North America.36–38 More than twice as many NPSs have been reported as there are substances currently controlled under the UN Conventions.39 Stockings and colleagues’ discuss regulatory responses to these substances.

Regulation of e-cigarettes, which have been advocated for their potential as a tobacco harm reduction strategy in people already smoking, is greatly debated.31–34 Increases in use in young people35 have led to concern that e-cigarettes might act as a gateway to tobacco smoking and undermine the success of tobacco control policies by normalising tobacco smoking again; although, currently little research supports this concern.

Several countries are considering or have changed the legal status of medical and non-medical cannabis use. Opponents of medical cannabis laws argue that legalisation will increase adolescent cannabis use by increasing access to cannabis, increasing the social acceptability of its use, and reducing its perceived risks.39–42 The potential effect of allowing the medical use of cannabis has been examined in the USA, where nearly half of states have legalised its medical use. Data from the US Monitoring the Future Surveys on cannabis use among adolescents between 1991 and 2014 compared changes in rates of past month cannabis use in the 21 states that legalised medical cannabis use with states that had not.43 The analysis controlled for social, economic, and demographical differences between the states and schools. The survey reported that states that permitted medical cannabis use had higher rates of 30 day cannabis use before they changed their laws than states that did not (15·9% vs 13·3%). However, no
## Table 2: Health burden attributable to alcohol and illicit drug use in people by region in 2013, DALYs per 100 000 people* (% total DALYs)

<table>
<thead>
<tr>
<th>Region</th>
<th>Age 10–14 years</th>
<th>Age 15–19 years</th>
<th>Age 20–24 years</th>
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</thead>
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<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td></td>
<td>Alcohol use</td>
<td>Illicit drug use</td>
<td>Alcohol use</td>
</tr>
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<td>Pacific (high income)</td>
<td>36 (0.6%)</td>
<td>5 (0.1%)</td>
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<tr>
<td>Central</td>
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<td>7 (0.1%)</td>
<td>1999 (8.8%)</td>
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<tr>
<td>East</td>
<td>89 (1.2%)</td>
<td>7 (0.1%)</td>
<td>1096 (10.0%)</td>
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<tr>
<td>Sub-Saharan Africa</td>
<td>56 (0.5%)</td>
<td>4 (0.1%)</td>
<td>1207 (5.5%)</td>
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<tr>
<td>South</td>
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<td>1234 (8.5%)</td>
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<tr>
<td>Global</td>
<td>78 (0.7%)</td>
<td>6 (0.1%)</td>
<td>1098 (8.5%)</td>
</tr>
</tbody>
</table>

*Data are n (%). No burden is attributable to tobacco use between the ages of 10 years and 24 years. Data are from the Global Burden of Disease Study 2013. DALKy=disability-adjusted life-year; combines disease burden due to premature mortality (years of life lost) with that due to disability (years of life lived with disability). *Number of DALYs attributed to alcohol or illicit drug use per 100 000 men or women in that age group, but there is much uncertainty with respect to these figures, 95% uncertainty intervals have been modelled in the appendix. Percentage of all DALYs in that age or sex group that were attributed to either alcohol or illicit drug use. ‡Countries included in these regions are according to the 2015 Global Burden of Disease Geographies (appendix).
Changes were reported in adolescent cannabis use in states before and after medical cannabis use was legalised (before: 16·3% vs after: 15·5%). In fact, a reduction was noted in the states that permitted medical use in rates of cannabis use in 8th grade students (aged 13–14 years), suggesting that availability for medical use did not lead to increased non-medical use by young people in these US States.

Concerns about the internet as a potential source of illicit substances

The internet has become an increasingly important part of everyday life for young people. It is used to exchange information about the types, effects, and ways to use substances. However, there is increasing concern that it might also be used to sell illicit substances. Substances can be sold on the surface web (indexed websites accessible via search engines, with illicit drugs sold as being not for human consumption), but an increasing amount of substances are being sold via the so-called dark web (domains that are only accessible through anonymised connections). Surveillance of websites selling substances on dark web marketplaces has shown an increasing number of retailers selling legally available and illicit substances in these markets. The much publicised closure of the Silk Road (one of the more well known dark web marketplaces) by the US Federal Bureau of Investigation in 2013 saw many of the operators shift to other internet marketplaces.

The extent to which the internet will become a dominant source for substances is unclear. For example, studies suggest that the internet is a minor source for pharmaceutical opioids. Although the internet started out as a major source of NPSs, legislation in many jurisdictions now imposes similar penalties for importation of NPSs as for other illicit substances. Data also suggests that dark web markets are used mainly to purchase traditional illicit substances rather than NPSs.

Conclusions

Our capacity to respond appropriately to substance use in adolescents is limited by the scarcity of evidence about the nature and extent of harms, extent of substance use, and shape of this problem. In this Series paper we focused on the nature of substance use. Without good coverage of high-quality data for the extent of substance use and the harms associated with it, policy responses will be poorly targeted and potentially might fail to address the most commonly used substances or the biggest causes of health burden. To improve policy responses, the amount, quality, regularity, and consistency of data about substance use in young people need to urgently increase. These should include not only the general population of young people but also at-risk or sentinel groups of young people who might begin involvement of problematic patterns of substance use, or types of substance use earlier than their peers, and in whom baseline risks of harm are already increased.

Search strategy and selection criteria

We searched Project Cork bibliographies, PubMed Clinical Queries, Scopus, MEDLINE, MEDLINE-in-process, Embase, and PsycINFO for reviews that examined the epidemiology of substance use in young people and of associated health and social consequences published between Jan 1, 1990, and April 23, 2015. The appendix has the full list of search terms used, including “substance”, “adolescent”, and “health”. We also reviewed several major international sources of data and information about substance use in young people: UN’s Office on Drugs and Crime’s 2015 Annual World Drug Report; WHO’s Global Information System on Alcohol and Health from which WHO’s Global Status Report on Alcohol and Health 2014 was compiled; and WHO’s Report on the Global Tobacco Epidemic, 2013.

We also used information from published analyses of data from WHO’s World Mental Health Survey initiative, which includes data for substance misuse from representative community surveys of the population assessed with a standardised survey in more than 30 countries. We also report some results from the 2013 Global Burden of Disease Study’s modelled estimates of health burden attributable due to tobacco, alcohol, and illicit drugs, arising from the comparative risk assessment exercise.

References


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