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Prevention of addictive behaviours

Updated and expanded edition
of *Prevention of substance abuse*

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for Drugs and Drug Addiction

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| Foreword to the English version

Few would disagree that preventing problems before they occur is better than addressing them once they have become established. This being the case, prevention has always been a cornerstone of drug policy in the EU and elsewhere. That said, in recent years, drug prevention has arguably attracted less attention from both policymakers and the public. There are a number of possible reasons for this, for example the fact that the impact of prevention measures becomes visible only in the longer term. It is, however, also likely that the limited evidence of effectiveness available for some common prevention approaches is important here, as is the corresponding argument that it is better to target scarce resources on areas such as treatment, where more robust evidence of effectiveness is available.

The drugs field is atypical in this respect. The recent trend in public health policy in areas such as smoking, obesity and cardiovascular disease is to explicitly recognise the considerable health gains that effective early prevention measures can deliver. One has only to look at the evidence in relation to smoking-related diseases and the fact that prevention policies in this area have delivered considerable beneficial behavioural change for evidence of the success that such approaches can have.

Our understanding of prevention approaches in the area of drugs has also been growing and is supported by a greater understanding of the structural support needed to ensure the effective implementation of prevention efforts. Overall, prevention science has progressed significantly in recent years, and has been informed by developments in areas such as neuroscience, crime prevention and policy research.

The EMCDDA published *Prevention of substance abuse* (EMCDDA Insights No 7) in 2007; the studies included had been published before the end of 2005. In 2015, almost a decade later, the evidence base had grown considerably and there was a pressing need to revisit this topic.

It was fortuitous in this regard that the German Federal Centre for Health Education (BZgA) had recently produced, in German, a state-of-the-art review of prevention science, which we were keen to publish in English. While the original audience for this review was experts and decision-makers in Germany, the evidence base addressed was global in its scope. The review was also broad in its considerations, covering not only the main topic of drug abuse but also alcohol and tobacco, as well as behavioural addictions, such as gambling. Both the EMCDDA and the BZgA are therefore delighted to have the opportunity to make this excellent piece of research available to a wider audience. We are both convinced that the evidence presented here is a valuable resource for informing the development, targeting and implementation of future drug prevention efforts across the EU.

Wolfgang Götz

Director, EMCDDA

Dr Heidrun M. Thaiss

Executive Director, BZgA

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The project was managed at the BZgA by Michaela Goecke. The authors, Dr Anneke Bühler and Dr Johannes Thrul were based at the IFT (Institut für Therapieforchung) in Munich. The publication was edited by René Zey in Frechen. Overall supervision of the publication was managed by Elisabeth Pott, former Director of the Federal Centre for Health Education (BZgA).

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| About the Federal Centre for Health Education

The Federal Centre for Health Education (BZgA) is a governmental authority within the portfolio of the Federal Ministry of Health and is based in Cologne. In the field of health promotion the BZgA carries out tasks with regard to information and communication (i.e. an educational function), as well as quality assurance, which entails clearing and coordination.

Its information and communication functions include education about topics of particular importance to health. In cooperation with various partner agencies it runs campaigns on, for example, AIDS prevention, addiction prevention, sex education and family planning. The BZgA is currently concentrating on promoting the health of children and young people. Key quality-assurance functions include establishing scientific foundations, developing guidelines and conducting market research about media and measures in selected fields.

Part of this work involves carrying out research projects, commissioning experts' reports and studies and organising conferences on current health-education issues. Most of the relevant results and documentation appear in the BZgA's scientific publications, making them accessible to interested readers across the health promotion spectrum. The specialist series entitled 'Research and Practice of Health Promotion' — like the subject-specific series 'Research and Practice of Sex Education and Family Planning' — is intended as a forum for scientific debate. Published in both German and English, the series aims primarily to further the dialogue between researchers and practitioners and to provide a basis for successful health promotion.

Summary

Aim and target readership

The aim of this expert report is to assess the effectiveness of existing interventions to prevent addiction by means of high-quality studies (reviews and meta-analyses). For the purposes of this expert report, effectiveness is defined as preventing, delaying or reducing consumption of tobacco, alcohol, cannabis or other illicit psychoactive substances through universal or selective approaches. Furthermore, the effectiveness of approaches to the prevention of problematic gambling behaviour is also assessed. Because of the low number of intervention studies that have been conducted thus far, the current status of prevention of prescription drug abuse and Internet addiction is explored, but no conclusions are drawn. Both behavioural and environmental prevention interventions are assessed. An attempt is made to draw conclusions about the effectiveness of established measures in various settings, as well as conclusions regarding specific substances and gambling. All conclusions are allocated strength-of-evidence ratings.

In addition to this main task, theoretical principles are presented that are currently under discussion in various areas of addiction prevention. Moreover, the literature on specific target groups (migrants, the elderly) and prevention efforts in Germany are explored. This expert report is aimed at decision-makers in addiction prevention at all political levels, as well as those in charge of developing and/or implementing preventive measures.

Methods

The literature search was conducted in the period between October and November 2012 in international databases (The Cochrane Library, The Database of Abstracts of Reviews of Effects (DARE), PubMed, PsycINFO, Psycindex, Web of Science) and was restricted to studies published between 2004 and 2012. For the current report, different and more recent studies were assessed than those examined for the expert report published in 2006. From over 5 000 results of the literature search and other relevant publications, 64 studies were selected, including 17 meta-analyses and 38 systematic reviews.

Results

In total, 91 conclusions were drawn regarding universal and selective prevention of substance abuse and problematic gambling behaviour. Because reviews on the effectiveness of prevention of prescription drug abuse and Internet addiction, prevention with migrant groups and the elderly, and prevention efforts in Germany are not currently available, it was not possible to draw conclusions on these topics.

Universal addiction prevention

Universal prevention measures are aimed at people who, as an overall group, display an average risk of later substance abuse (e.g. the general population, school classes). Parental training and family programmes, in particular with regard to alcohol use, are to be recommended as an effective universal approach in the family setting.

Proven universal school-based prevention programmes to prevent alcohol misuse include alcohol-specific, behavioural interventions as well as specific life skills programmes and a classroom-based behaviour management programme. In the area of

tobacco prevention, the evaluation results are no longer as homogeneous as they were in the 2006 expert report. The interventions (life skills programmes, interventions based on the social influences approach, class competitions) have effects on the smoking behaviour of all schoolchildren in these classes, irrespective of previous smoking experience. However, an effect in particular on preventing children from starting to smoke cannot be achieved by the interventions examined. For school-based tobacco prevention, it is recommended that behaviour-related programmes are put in place, focusing on social influences on tobacco use or on life skills — ideally combined with measures in a community environment. Provision of information is still not recommended as a stand-alone measure. Skills-oriented, comprehensive programmes for drug use prevention based on interactive methods should be used for prevention of cannabis and other illicit drug use. Finally, measures to change the school as a social setting, implemented by school action teams or through the improvement of the school social environment, are effective.

Specific effective universal approaches in the leisure/recreational setting (e.g. sports clubs, nightlife, peer and mentoring programmes) have still not been identified. In this regard, relatively general reference must still be made to high-quality programmes to improve personal and social skills, implemented in a non-school setting. With regard to (mass) media interventions, there is now evidence for the effectiveness of Internet- and computer-based universal prevention programmes. There is further confirmation that measures for tobacco prevention implemented through the traditional mass media should be used only in combination with school-based programmes on tobacco and not as a stand-alone prevention measure. There is currently little research in the field of prevention in the healthcare setting; the few available studies show that effective universal approaches for the hospital and practice settings still need to be developed. With regard to addiction prevention in the community, there is now evidence that combined preventive measures in several settings are effective for alcohol and tobacco and occasionally for illicit drugs. The relevant projects consist mainly of school-based interventions in conjunction with training in the areas of parenting, communication and conflict resolution within the family. Systematic cooperation between community stakeholders and the implementation of local alcohol regulations could increase effectiveness in this area. Studies published since 2004 suggest that tobacco and alcohol control strategies that raise prices for alcohol and tobacco products; lead to increased controls and sanctions on sales of tobacco and alcohol to minors; impose restrictions on alcohol advertising; or curtail opportunities to smoke through smoking bans are effective.

Selective addiction prevention

Selective measures are aimed at people who, as a group, display an above-average risk of later substance abuse (e.g. children from families affected by addiction, children with behavioural problems, students, patients in hospitals). On the basis of the international literature reviewed, the following measures can be recommended:

- In the family: supervision and assistance of first-time parents by midwives; life skills training for children displaying problem behaviours and their parents; family programmes for families affected by addiction (alcohol).
- In schools: life skills programmes with additional indicated elements for older adolescents (16–20 years of age, alcohol) who have an individual high risk of illicit drug use.
- In colleges: personal, brief interventions, online and computer-based feedback and normative feedback, web-based programmes, gender-specific expectancy-challenge

interventions, multicomponent approaches consisting of providing information, motivational interviewing and feedback (alcohol).

- In leisure/community settings: mentoring programmes with teenagers (alcohol), multicomponent projects in the family and leisure settings with case manager (alcohol, illicit drugs).
- In healthcare settings: personal, brief interventions in the hospital setting (alcohol, cannabis).

No effective universal measures for the prevention of problematic gambling behaviour can be recommended on the basis of the literature evaluated in this report. In selective prevention with adults, it appears that a combination of educational materials and counselling sessions can influence gambling behaviour.

From a methodological perspective, the evaluation of reviews has both advantages and disadvantages. More conclusive publications could be identified for the current report than for the previous report, published in 2006.

However, when interpreting the results, it should be considered that our judgement of intervention effectiveness took a rather narrow perspective on evidence-based prevention; in our report, effectiveness means that a preventive measure's effect on consumption behaviour (rather than on risk or protective factors or consequences of behaviour) has been shown in studies with a certain design (randomised or controlled trials). In the final section, we discuss the limitations of this narrow approach to establishing evidence-based interventions. The scientific knowledge of the effectiveness of preventive measures reviewed here is designed to be a central, although not the sole, resource for the design and implementation of addiction prevention measures. This is even more the case because the research evaluated consists primarily of studies from the USA, and the dimensions of context and the value system are as important as that of scientific knowledge for evidence-based practice (Broesskamp-Stone, 2012).

There is still a lack of strong evidence for the effectiveness of addiction prevention programmes in Germany. In order to increase this knowledge, more high-quality evaluation studies are required that examine not only whether or not an intervention is effective but also with which target groups and why a measure achieves its aims. In addition, practitioners should conduct more evaluations. In conclusion, we propose a possible next step along the path towards 'evidence-informed' prevention practice.

1

CHAPTER 1

Introduction

State of the problem

Prevalence of substance use and abuse

Some 8.9 million people in Germany consume alcohol in a manner that poses a risk to their health (Kraus and Pabst, 2010). Tobacco is smoked on a daily basis by some 10.1 million German adults, of whom 3.6 million are heavy smokers. The number of citizens consuming cannabis on a (nearly) daily basis is 200 000; the current use of other illicit drugs is estimated at 330 000 people (Kraus and Pabst, 2010). The level of substance-related disorders that require treatment can be determined for adults pursuant to the diagnostic criteria of the → Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV) ⁽¹⁾. Estimates of those affected in the population of Germany are as follows: alcohol abuse, 2.0 million; alcohol dependence, 1.3 million; tobacco dependence, 3.8 million; prescription drug dependence, 1.4 million; cannabis abuse, 0.38 million; and cannabis dependence, 0.22 million. Problematic use of opiates and/or other illicit drugs, which is generally accompanied by abuse or dependence, is estimated to affect 138 000 to 180 000 German adults (Kraus and Bühringer, 2008). For the majority of those affected, the use and abuse of psychoactive substances begins in adolescence (initiation age, first use). On average, the first cigarette is smoked at the age of 14.3 years, alcoholic intoxication is first experienced at 15.9 years and cannabis is first smoked on average at 16.7 years (BZgA, 2012). Although overall such experiences are relatively uncommon, those who try other illicit drugs do so for the first time when they are between 16 and 18 years of age (BZgA, 2012).

In the following section, we report on the prevalence of indicators of risky substance use: binge drinking and alcoholic intoxication, daily and heavy tobacco use, consumption of illicit substances, use of multiple substances (polyconsumption) and the occurrence of substance-related problems. Because the period when most users begin to consume and regularly use most

psychoactive substances is during adolescence and young adulthood, prevalence is reported for the adolescent and young adult age groups. An exception is made in the case of prescription drug abuse.

Alcohol is the most widely consumed psychoactive substance among children and adolescents. This is indicated by all available epidemiological studies, including the current representative survey on substance use among adolescents and young adults, the Drug Affinity Study, in which a representative sample of more than 5 000 12- to 25-year-olds in Germany (BZgA, 2012) were surveyed. In the 2011 survey, the 12- to 25-year-olds' first experience of drinking alcohol was, on average, at the age of 14.5 years. Early alcohol use in younger age groups is characterised by the occasional use of small amounts of alcohol. Above this age, the proportion of regular consumers and the amounts of alcohol consumed increase. Depending on the type of alcoholic beverage, up to 5.6 % of 12- to 15-year-olds reported regular (i.e. at least weekly) alcohol use. Of the 16- to 17-year-old age group, up to 30.8 % already regularly drink alcohol; of the 18- to 21-year-old age group, 39.1 %; and of the 22- to 25-year-old age group, 40.4 %. Increasing prevalence rates from younger to older age groups are apparent for the regular use of beer and wine. With regard to drinking alcoholic mixed drinks and spirits, the highest prevalence rates are, by contrast, in mid to late adolescence (16- to 19-year-olds).

One indicator for a risky consumption pattern is episodic heavy drinking (excess drinking, binge drinking). Nearly one third of adolescents and young adults report having drunk five or more glasses of alcohol consecutively on at least one occasion within the previous 30 days (BZgA, 2012). While binge drinking among 12- to 17-year-olds is less widespread (15.2 %), 41.9 % of 18- to 25-year-olds binge drink. Frequent drinking to excess (four or more times within the previous 30 days) is reported by 3.7 % of 12- to 17-year-olds and 12.9 % of 18- to 25-year-olds. In the European School Survey Project on Alcohol and Other Drugs (ESPAD) (Kraus et al., 2012), in which more than 6 900 9th and 10th graders (15- to 16-year-old students) participated in Germany, within the previous 30 days 26.6 % of the schoolchildren questioned had drunk more

(1) Terms preceded by an arrow are explained in the glossary or refer to another place in the expert report.

than five units of alcohol once or twice on one single occasion, 16.2 % had done so between three and five times, and 10.1 % had done so at least six times. Risky drinking behaviour is more common in boys than it is in girls (BZgA, 2012; Kraus et al., 2012). Depending on indicator and age group, the proportion of those drinking to excess is 1.8 to 2.4 times higher in the males participating in the survey than in the females (BZgA, 2012).

Tobacco use is less widespread than alcohol use (BZgA, 2012). In 2011, 44 % of adolescents and young adults had never smoked. This is the lowest level of smoking prevalence, and therefore the highest proportion of non-smokers, since the observation period in 1979. Smoking continues to be correlated with age. The proportion of daily consumers of tobacco increases from 4.8 % in the 12- to 17-year-old age group to 23.1 % among 18- to 25-year-olds. Of adolescents, 2.0 % (11.7 % of smokers) smoke at least 10 cigarettes daily and 0.3 % at least 20 cigarettes daily. Among young adults, the proportion of heavy smokers is 16.5 % (at least 10 cigarettes daily) and 4.8 % (at least 20 cigarettes daily).

Children and adolescents are also exposed to illicit substances, but it is young adults in particular who are confronted with this issue. According to the Drug Affinity Study (BZgA, 2012), 17.6 % of 12- to 17-year-olds and 65.1 % of 18- to 25-year-olds have been offered an illicit substance on at least one occasion, while 7.2 % of adolescents and 39.8 % of young adults have tried an illicit substance. One in every hundred adolescents and 3.7 % of the 18- to 25-year-olds surveyed reported regular use (more than 10 times in the previous 12 months). The illicit substance most frequently tried, by far, by adolescents and young adults is cannabis: 4.6 % of 12- to 17-year-olds and 13.5 % of 18- to 25-year-olds have tried only hashish or marijuana and no other illicit substances. In contrast, only 1.0 % of adolescents and 2.8 % of young adults have consumed other psychoactive drugs, such as amphetamines (adolescents, 0.4 %; young adults, 1.6 %), psychoactive plants or mushrooms (adolescents, 0.4 %; young adults, 0.7 %), ecstasy (adolescents, 0.2 %; young adults, 1.0 %), cocaine (adolescents, 0.2 %; young adults, 0.9 %), LSD (adolescents, 0.2 %; young adults, 0.3 %) or inhalants (adolescents, 0.1 %; young adults, 0.2 %).

Consequences of substance use

One in two people who smoke regularly in their youth will be dependent on tobacco by the age of 34 (Wittchen et al., 2008). By this age, approximately 44 % of boys who regularly consumed alcohol in their youth fulfil the

criteria for alcohol abuse; for girls, the figure is 17 %. One in five males and one in fourteen females regularly consuming alcohol will fulfil the criteria for alcohol dependence by age 34.

One long-term negative consequence of a risky consumption pattern is the development of clinically relevant substance abuse or dependence. However, consumption can also have more immediate negative consequences. Substance use is thus associated with health, legal and financial risks for individuals. In the ESPAD study (Kraus et al., 2012), 15- and 16-year-old schoolchildren were asked about alcohol- and drug-related problems. It was revealed that 13.2 % of those surveyed reported problems with their parents as a result of alcohol use, 14.8 % reported problems with friends and 7.0 % problems with the police; 3.0 % had been the victim of a theft and/or violence; 2.0 % had been admitted to hospital or a casualty department in the previous 12 months as a result of alcohol use; and 7.6 % had experienced a negative effect on their sexual behaviour (e.g. a sexual encounter that they later regretted). According to the items of CRAFFT^(?), which identifies problematic alcohol use in adolescents and young adults, 33.1 % of boys and 31.5 % of girls report alcohol-related memory impairments within the previous 12-month period. Boys have more often operated a motor vehicle under the influence of alcohol (34.8 %) than girls (20.9 %), they drank more frequently alone (29.0 % vs. 16.9 %), were more often told within the family to reduce their alcohol use (24.5 % vs. 16.6 %) and more often came into conflict with others after alcohol use (21.8 % vs. 15.2 %) (Kraus et al., 2012).

The lifetime prevalence of prescription drug abuse in mid-adolescence is 2.3 % for tranquilisers and sedatives and 0.9 % for anabolic steroids (Kraus et al., 2012). The prevalence is higher for boys than for girls in this age group. Of those who have used these substances without a doctor's prescription, the majority report not having done this more than one to five times. Of those who have consumed such substances, between 20 % and 30 % admit to a more frequent use over their lifetime (tranquilisers and sedatives: 15.3 % between 6 and 19 times, 7.6 % 20 times or more; anabolic steroids: 26.3 % between 6 and 19 times, 5.5 % 20 times or more) (Kraus et al., 2012). In the adult age group, 4.0 % of the overall population are estimated to use prescription drugs in a problematic way; in relation to all users of prescription drugs, this is 6.2 % (Pabst et al., 2010). Because women generally use more prescription drugs than men (for painkillers, for example, the figures are 69.1 % vs.

(?) CRAFFT is an acronym for a comprehensive screening instrument for problematic alcohol consumption among adolescents and young adults, comprising six items (Knight et al., 1999, cited in Kraus et al., 2012).

54.3 %), when considering the overall situation, the estimate of problematic prescription drug use is slightly higher for women than for men (4.3 % vs. 3.6 %). When only consumers of prescription drugs are considered, the proportions are equally balanced (approximately 6 % for both men and women). For people aged 40 and over, there are higher prevalence figures for daily prescription drug use and problematic use. The highest prevalence of risky use can be observed in the 50- to 59-year-old consumer age group (9.3 %). However, one in twenty people in the third decade of their life is affected.

The aim of the 2010 KOLIBRI study (Robert Koch Institut, 2011) was to estimate the extent to which performance-enhancing drugs are taken in the general population. Of those practising sport, 7.1 % admitted using prescription drugs (including doping agents). Doping agents, more narrowly defined, were predominantly used by women and men in young adulthood (18 to 29 years, 2.2 % and 1.9 %). A total of 1.5 % of the population reported improving their cognitive performance by using so-called neuroenhancers. Neuroenhancement is observed in particular among 18- to 44-year-olds and people with an average working week of more than 40 hours (Robert Koch Institut, 2011). The HISBUS study, which was conducted on students, revealed that 12 % of those surveyed had taken one or more substances since the start of their studies in order to better cope with the demands of study (Middendorff et al., 2012). According to this study, approximately 5 % carry out pharmacological brain doping, and a further 5 % use 'soft enhancers' such as vitamin supplements and plant extracts. A total of 1.4 % of students reported frequently using both pharmacological and soft performance enhancers (Middendorff et al., 2012).

In summary, the epidemiological data on substance use and abuse reveal that, despite the general decline in prevalence over the previous 10 years, legal substance use in particular is still widespread among adolescents and young adults. There is also a substantial minority of young people who regularly consume cannabis and exhibit problematic use of prescription drugs. Substance abuse in adolescence poses critical health, legal and financial risks to the adolescent's psychosocial development and/or the well-being of others. Indicators of prescription drug abuse are particularly widespread among those aged 40 or over.

Spread of problematic gambling behaviour and excessive media use

There are reliable figures on the spread of problematic non-substance-related behaviour in the German

population in respect of gambling (BZgA study, ESPAD, PAGE) and excessive media use (JIM, PINTA, EXIF).

Over the previous year, nearly half of the population aged between 16 and 65 (50.7 %) had participated in some form of gambling (BZgA, 2012). This was primarily the German national lottery, other instant lottery games or private gambling. Sports betting was reported by 3.4 %, and playing slot machines or other gaming machines by some 2.9 %. Using an established assessment tool ⁽³⁾, it has been estimated that 0.49 % of the population exhibits pathological gambling behaviour and 0.51 % problematic gambling behaviour. Most strongly affected by these problems are young men aged between 21 and 25 years (2.4 %). The highest proportions of problem gamblers can be found among those participating in sports betting and playing slot machines and other gaming machines. The PAGE study estimates that 1 % of 14- to 64-year-olds will, during the course of their lifetimes, fulfil the criteria for pathological gambling according to DSM-IV; 1.4 % will fulfil the criteria for problematic gambling; and a further 5.5 % will fulfil the criteria for risky gambling (Meyer et al., 2011). Looking back on the previous year, 44.3 % of 9th and 10th graders (15- to 16-year-old students) admitted that they had participated in gambling for monetary stakes (Kraus et al., 2012). This largely involved purchasing scratch cards and playing card or dice games in private spheres. Slot machines and other gaming machines, Internet card games and lotteries were each played by 6.2 %. Frequent playing of games (at least six times in the previous 12 months) was reported by 1–3 % of those surveyed, depending on the type of game. Only private card and dice games were reported as being frequently played by a higher percentage, at 5 %.

In comparison with substance dependence and pathological gambling, the phenomenon of media or Internet dependence is relatively new, which is why the addictive potential of media or Internet use is explored herein, in addition to the provision of epidemiological data. In their review on pathological Internet use, Petersen et al. (2009: 265) describe the phenomenon as follows: 'Pathological Internet use is characterised by excessive use of the Internet and loss of control with regard to mostly specific forms of use: for example, online computer games, chat and messaging, consumption and/or production of pornographic web content. The central characteristics are behavioural excesses and the experience of a loss of control, so that some authors describe pathological Internet use primarily as learned deficient self-regulation processes.' Certain specific

⁽³⁾ The tool in question was the South Oaks Gambling Screen (SOGS), which uses criteria ranging from preoccupation with gambling to the commission of illegal acts in order to finance gambling.

characteristics of various Internet offerings are assessed as partially responsible for the development of behaviour resembling addiction. MMORPGs (massively multiplayer online role-playing games) have, for example, aroused strong concerns (Kammerl, 2012). The game *World of Warcraft*, for example, allows the creation of one's own game character according to one's own design and the opportunity to play in real time with thousands of other players from around the world and to become part of a community within the gaming community. This requires immersion in and commitment to the medium and thereby increases the game's 'addictive potential' (Kammerl, 2012). Kohring (2012) refers to the consequences of further technical development, which makes the Internet increasingly available at all times and in all places. 'Mobile gaming' requires greater self-regulation skills than games playable only on a stationary computer. Social networks are discussed less in terms of their addictive potential; the possible dangers are seen, rather, in the divulgence of extremely personal information, the breach of data protection, 'cyber bullying' and sexual victimisation (LMK Rheinland-Pfalz, 2012).

Mobile phones, the Internet and television are used by most adolescents aged between 12 and 19 years on a daily basis or many times each week (JIM study (Medienpädagogischer Forschungsverbund Südwest, 2012)). According to their own estimates, adolescents spend approximately 131 minutes online every day. Looking back over the previous two weeks, one in two adolescents reported having accessed the Internet using a mobile phone or smartphone. The daily player plays online games for an average of 56 minutes each weekday and 77 minutes per day at weekends. Among daily visitors to social networks, who represent approximately half of online users, 57 % check for new postings several times per day. On average, adolescents watch approximately two hours of television per day. Because no generally agreed definition exists, excessive media use is perceived to be widespread to a lesser or greater extent, depending on perspective. While parents are more sensitive to the perception of a problem in their children (22.8 % of parents of 14- to 17-year-olds), the perception of adolescents lies at the same level as scientific estimates arrived at using screening questionnaires (both 14 %, albeit in agreement in only half of the cases) (EXIF study (Kammerl et al., 2012)).

In the PINTA study published in 2011, using an established instrument ⁽⁴⁾, the prevalence of Internet dependence was determined at 1.5 % of the population

⁽⁴⁾ This instrument was the Compulsive Internet Use Scale, which comprises five indices: loss of control, withdrawal symptoms, improvement of mood, constriction of behavioural patterns and conflicts with other areas of life.

aged between 14 and 64 years (Rumpf et al., 2011). In the 14- to 16-year-old age group, 4.0 % were classified as Internet dependent (girls 4.9 % and boys 3.1 %).

Aim of the report and target readership

This report aims to assess the effectiveness of existing approaches to the prevention of addiction by drawing on → high-quality reviews (→ reviews, → meta-analyses). For the purposes of this expert report, effectiveness is defined as preventing, delaying or reducing the use of tobacco, alcohol, cannabis and other illicit psychoactive substances through universal or selective interventions ⁽⁵⁾. Furthermore, approaches to the prevention of problematic gambling behaviour are assessed and the current statuses of prevention of prescription drug abuse and Internet addiction are explored. Other non-substance-related addictions, such as workaholism, compulsive shopping, sex addiction and the eating disorder anorexia nervosa are not examined. Measures for both behavioural and environmental prevention are assessed. The main results of the work are conclusions that have been drawn on the basis of systematically sought out and selected literature on the effectiveness of various different measures. All conclusions are allocated strength-of-evidence ratings. In addition to this main task, the theoretical foundations that are currently discussed in the area of (addiction) prevention are presented. Moreover, the literature on other specific target groups (migrants, the elderly) and on the status of prevention in Germany is also explored.

The report is aimed at decision-makers in addiction prevention at all political levels, as well as those in charge of developing and/or implementing preventive measures.

The aim of this expert report is to improve evidence-based prevention practice by making the available

⁽⁵⁾ Prevention lies within the range of mental health interventions between health promotion and treatment (National Academy of Sciences, 2009). It has the aim of preventing new cases of psychological disorder. Universal measures are those which target the population in general (i.e. they are directed at ordinary, non-specific groups of people, such as school students). These measures are aimed at people irrespective of their risk of developing abusive behaviour patterns. By contrast, selective approaches are aimed at people who have an above average, current or future (empirical) risk of substance abuse as a result of their belonging to a particular group (e.g. children from a family suffering from an addiction). Similarly, some measures are aimed at high-risk individuals with minimal, but recognisable, indications or symptoms, but no clinical diagnosis. The promotion of mental health is not about prevention, but rather about the promotion of, for example, the achievement of developmental tasks, self-esteem, general coping skills, well-being, social integration and resilience in crises (National Academy of Sciences, 2009).

knowledge usable, so that stakeholders can implement preventive measures in all settings informed by the current evidence (see Broesskamp-Stone, 2012). This expert report therefore has different goals from studies which evaluate the evidence base in a more narrow (clinical, medical) sense. The conclusions of this report cannot, thus, be said to be evidence-based or not; rather, they have stronger or weaker strength-of-evidence ratings.

The theories behind addiction prevention measures

Addiction prevention can (and should) be supported by theory at three levels: with regard to (i) the content of measures undertaken; (ii) the methodology and didactics of their implementation; and (iii) the way they are introduced and embedded in practice (Pentz, 2003). Because the main features of key theories on addiction prevention were explored in the previous version of this expert report (EMCDDA, 2009), we will examine some additional aspects that are currently under discussion in the field of addiction prevention.

Social cognitive measures

Webb et al. (2010) present in their article a review of 10 current social psychology and health psychology theories of behavioural change and their potential uses for interventions in the field of addiction (including, in our view, preventive interventions). The authors organise the theories in a feedback loop model based on a framework of control theory (self-regulation theory).

In addition to social cognitive models (such as protection motivation theory, the theory of planned behaviour, the health belief model), which primarily assume that cognition (e.g. attitudes, perceived risk and control) guides behavioural intentions and the behaviour of individuals, Bandura's social cognitive theory of learning is also discussed. Goal-setting theory, which is based on the assumption that specific goals improve performance in attaining an objective, and the model of action phases, which dictates that specific intentions increase the likelihood of certain behaviours occurring, both examine the relationship between intentions/goals and behaviour.

A lesser known, but in our opinion useful, model is the prototype willingness model (Gerrard et al., 2008), which depicts two routes of social information processing. The first, 'reasoned', route is similar to the theory of planned

behaviour and is based on the assumption that attitudes and cognition lead to the formation of intentions, which in turn guide behaviour. The second route assumes that the perception of a 'prototype' person behaving in a certain way (e.g. the typical cool adolescent smoking) and the perception of one's own affinity with this prototype leads to willingness, and this willingness, in turn, leads to behaviour. This theory assumes that, even if a person himself does not intend to behave in a certain way, he has an increased willingness to engage in this behaviour in a risk situation where he positively perceives a prototype person for that behaviour.

Possible conclusions and further developments for prevention measures, as discussed in the literature (Gerrard et al., 2008; Gibbons et al., 2009), could be the introduction of additional intervention components. In addition to components that are intended to influence the direct path from intention to behaviour, which are generally already contained in existing programmes, the second path of willingness could also be considered for inclusion in interventions. This was attempted, for example, in the programme Strong African American Families (SAAF (Brody et al., 2004, cited in Gibbons et al., 2009)), in which the children of participating families were informed that most children of a similar age to them would not have a positive image of adolescents consuming alcohol. Furthermore, they were taught about the difference between intentional behaviour and behaviour that is based on willingness. In a study on this programme, it was found that children in the intervention group had a less positive image of drinkers than did children in the → control group, and that this image was associated with less willingness to consume, and less consumption of alcohol more than two years later (Gerrard et al., 2006, cited in Gibbons et al., 2009).

Although the development of preventive interventions based on this model is still in an early phase and despite the fact that further research is still required to comprehensively assess usefulness, this theory and interventions derived from it could optimise prevention practice in the future.

Environmental preventive measures

In addition to the classic methods of explaining legal sanctions (criminal justice theory, economic perspectives), as part of the focus on environmental preventive measures, several other theoretical approaches to the mechanism of action of environmental prevention have been discussed in the past few years (affordance of a situation, neurobiological development).

Affordance of a situation

According to Gibson (1982), physical objects have an affordance, prompting people to behave in a certain way. Environmental prevention can mean changing the affordance of an object and the prompting nature of a situation in such a way as to affect the use of a substance. According to these theoretical considerations, the fact alone that, for example, beer is served in larger rather than smaller glasses, or several glasses of hard liquor are served on a tray instead of individually, affects whether one drinks more or less alcohol. While Gibson asserts that affordances exist independently of the observer, according to other theorists the prompting nature of a situation is co-determined by the physical world and the needs of the person in the particular situation. Foxcroft (2014) proposed this theoretical approach to explain the effects of environmental prevention measures; we are not aware of a systematic empirical review.

Neuroscientific findings

Steinberg (2008) interpreted previous findings on neurological development in adolescents with regard to their significance for the prevention of risk-taking behaviour. He sees the specific neuronal development in the second and third decades of life as responsible for increased risk-taking in young people. From a neuroscientific perspective, a socioemotional network can be identified that processes social and emotional information. The cognitive control network, by contrast, regulates behaviour and decision-making and can

control socioemotional behavioural impulses. A developmental shift in the socioemotional network can be observed at puberty, whereas the cognitive control network develops gradually into the mid-20s. This leads to an imbalance in the regulation of behaviour. In addition, the presence of peers vigorously activates the socioemotional network, whereas the cognitive control network has less of an influence in peer situations. 'Irrational' behavioural impulses become dominant and therefore the likelihood of more frequent risk-taking behaviour within the circle of friends increases, even if such behaviour runs counter to 'better' judgement. Of course, adolescents also make rational decisions; however, this is more frequently the case when they are alone or not emotionally aroused. These processes are important for substance use in particular because there are neuronal overlaps between the socioemotional network and the so-called reward system, which plays a significant role in the development of dependence. Risk-taking is therefore normative, driven by biology, embedded in evolution, probably inescapable and can scarcely be influenced. 'Some things just take time to develop, and mature judgement is probably one of them' (Steinberg, 2008: 100). One can essentially only wait for the cognitive control network to mature. Steinberg sees starting points for the prevention of unhealthy risk-taking in adolescence in (a) the encouragement of the maturation of self-regulating ability, although there is no research on this, and (b) not relying on attempts to make adolescents 'wiser, less impulsive or less short-sighted' but instead restricting opportunities for 'immature' decisions and negative consequences through environmental preventive measures in society and the family.

CHAPTER 2

Methodology

Theoretical background

Substance use occurs in a social context; that is, the central tenet of the ecology-of-development approach. It is rare for a single factor to be the cause of complex behaviour such as substance use. This is because individuals live within a number of worlds (settings or social systems) which cross-influence one another (Bronfenbrenner, 1981). The various worlds are characterised by → risk factors and protective factors that affect the behaviour of children and young people (including their consumption patterns) either directly or through other members of the system. Systems in which young people are directly active are first of all the family, then the peer group and school. In the community, young people may also be active in churches and sports clubs or other leisure organisations. Interactive exchanges using new media are a further possibility in today's world. Society can be understood as an extension of the community, albeit less open to influence by individuals and their families. Individuals, family, community and social systems are all part of a broader ideological context, the elements of which are generally more abstract: for example, values, standards, sociopolitical rules, cultural patterns, social circumstances, etc. The extent to which a young person, a family or a school functions, and may be regarded as sound or competent, is influenced by the ideological context, by interaction among the different worlds in which it exists and by those worlds themselves.

This viewpoint is not restricted merely to the development of children and adolescents. Over a lifetime, different social contexts come and go or become more or less important, or other interdependencies develop. The contextual approach can therefore also be applied to the middle and later stages of life (Bronfenbrenner, 1981).

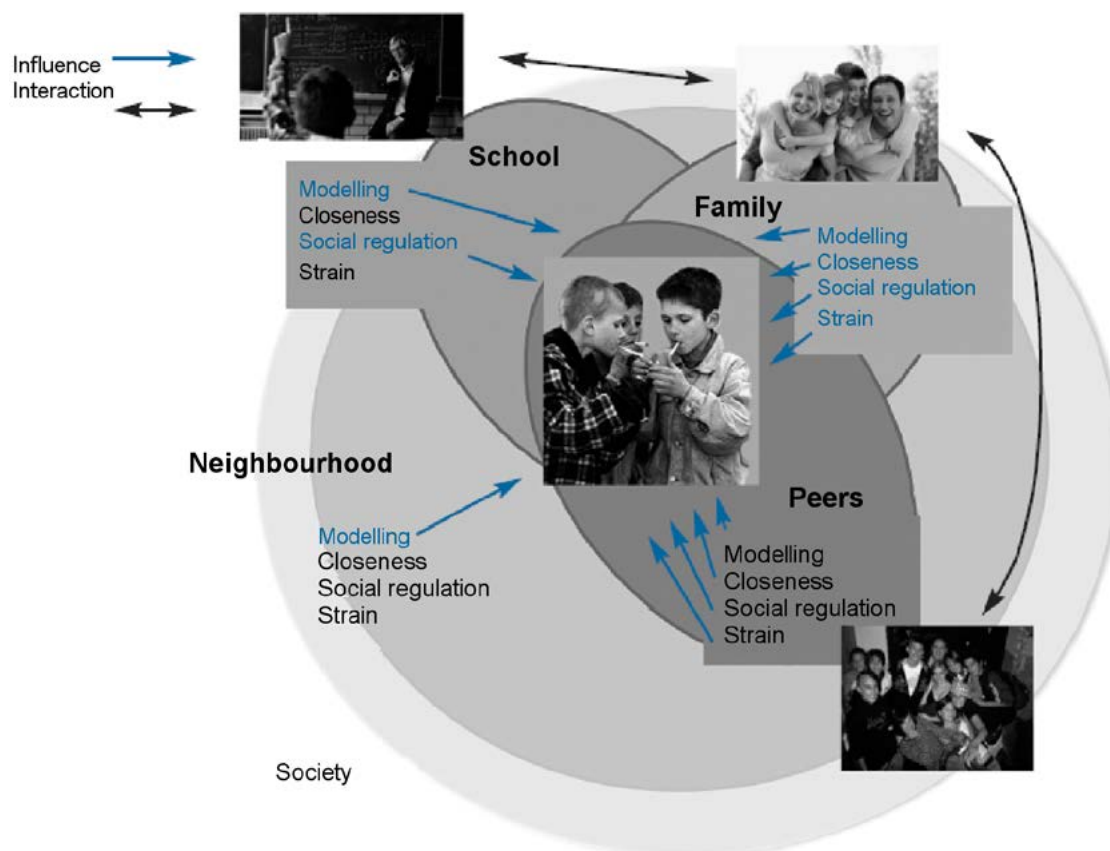
A more recent study from the USA demonstrated the importance of context when considering smoking behaviour in adolescents. Ennett et al. (2010) repeatedly surveyed more than 6 500 adolescents aged between 11 and 17 regarding their smoking behaviour. Using lists

of names of other pupils at the same school, they drew up friendship networks for the schoolchildren. Information from surveys of parents and from regional statistics was incorporated into the characterisations of the adolescents' families and immediate environments (neighbourhoods). The study examined the extent to which (a) the smoking of other people in the relevant context and/or (b) the feeling of closeness of the young people and/or (c) the social regulation exercised and/or (d) the degree to which the context was strained by problems were associated with taking up smoking or the intensification of smoking behaviour. The findings show that the social contexts of family, peers, school and neighbourhood all make independent contributions to smoking behaviour and, moreover, that their influences mutually exacerbate each other (see Figure 1). The most significant contexts were the family and peers. A negative family situation exacerbates the negative influence of peers. The most consistent predictor was the smoking behaviour of other people, that is, whether or not parents, siblings, peers, school colleagues or young people in the neighbourhood smoked. However, the influence of other people depended on how close the adolescent felt to them. As expected, there is a higher probability that one will smoke if one feels close to friends that smoke. It is interesting that a feeling of closeness to one's own family decreases the risk of smoking oneself, irrespective of whether family members smoke or not. With regard to smoking, these results suggest that preventive measures must also take into consideration the model character of people in family and peer contexts, and that an isolated intervention aimed at the individual alone will have less success.

The prevention measures assessed in this expert report are grouped according to the different social contexts in which children and adolescents spend time. Findings are summarised according to point of approach: family, school, leisure, media, community and legislation. This categorisation is also applied in many reviews and corresponds to the various settings that those responsible for addiction prevention can address. Healthcare was added as a new setting in the course of updating the expert report.

FIGURE 1

Social contexts for adolescents and influences on smoking behaviour (after Ennett et al., 2010)



Literature base

Bearing in mind the questions that the report addresses, the following criteria were established for the selection of studies:

- Types of study:** We began by selecting high-quality systematic reviews and meta-analyses. Unsystematic reviews and best-practice reports were then included where no high-quality review was found on a particular content area. The search was limited to studies published between 2004 and 2012, but publications that appeared before 2004 were included if they were not included in the expert report of 2006.
- Measures:** The studies present findings on the effectiveness of interventions aiming to prevent substance use and gambling addiction. They document research into the effectiveness either of environmental prevention efforts — such as the imposition of penalties or public order regulations on consumption and possession, controls on availability (including restrictions on sale), price regulation and other environmental measures (publicity drives and networking) — or of behavioural prevention in settings such as school, family, the media, leisure, healthcare or the community. Reviews concerning the treatment of people with pre-existing diagnosed disorders (including interventions for smoking cessation) were excluded.
- Target groups:** Studies were selected in which the subject groups were children, adolescents and young adults aged up to 25. With regard to gambling behaviour and prescription drug abuse, studies with older samples were also taken into consideration. Research concerning both the general population (i.e. universal prevention) and groups that are assumed to be at an increased risk of developing excessive behaviour (i.e. selective prevention) was included.
- Target behaviour:** The selected studies reported results on preventing initial use, on delaying initiation of use and on reducing use. Those studies on the prevention of problematic gambling behaviour focused accordingly on the prevention and delay of gambling initiation and on gambling reduction. No focus was placed on results regarding the prevention

of negative consequences from disorders of abuse or dependence, and these results are discussed only in exceptional cases. Not many reviews on the different settings focus on the prevention of negative consequences and, therefore, it is difficult to compare and integrate their results. The selected literature includes studies reporting the effects of preventive measures on the use of psychoactive substances such as tobacco, alcohol, cannabis and other illicit drugs.

Search strategy

The search strategy for the report entailed determining keywords and choosing databases for a literature search, followed by methodical implementation of the search itself.

Determining keywords

In line with the selection criteria (see Literature base), keywords were identified for a literature search covering six dimensions (target group, substance, measure, target behaviour, evaluation and type of study). Table 1 provides an overview of the keywords used. An additional search using the same keywords in German was also carried out in German databases (e.g. Psycdex). Additional literature searches were conducted for the topics of gambling behaviour, migrants and the elderly.

Selection of databases

The databases chosen for the literature search concentrate on reviews and meta-analyses and cover both international and national publications:

- The Cochrane Library
- Database of Abstracts of Reviews of Effects (DARE)
- PubMed
- PsycINFO
- Psycdex
- Web of Science.

Identifying and gathering the literature

The literature search took place between October and November 2012. The keywords (see Table 1), in different combinations, were entered into the various databases as search terms, with the search being confined to articles published between the years 2004 and 2012 (see Figure 2). In the case of the database PubMed, additional exclusion criteria were used because of the high volume of search results (see Table 2). The excluded terms were compiled by determining areas that were not relevant for this expert report, with the focus being in particular on viral and/or bacterial diseases, disorders that are treated using psychopharmacological

TABLE 1
Keywords

Target group	Substance	Measure	Target behaviour	Evaluation	Type of study
child*	substance	intervent*	use	evaluat*	meta-analysis
adolescen*	smok*	program*	misuse	success*	review
teenage*	tobacco	treatment*	abuse	effective*	
youth*	nicotine	campaign	onset	efficac*	
young people	alcohol	policy	reduc*	measur*	
early adult	drug	policies	prevent*	examin*	
young adult	marijuana	legislation	increas*	compar*	
	marihuana	educat*	decreas*	trial*	
	cannabis	promot*	chang*	rct	
	illicit	adverti*	cessation		
	ecstasy	counsel*	abstain*		
	amphetamine	teach*	stop		
	psychoactive	school	intoxicat*		
		family	uptake		
		community	addict*		

* Words associated with the keywords were also included; therefore, in some cases, the word stem was used as a search term.

treatments and treatments with medication. Bibliographical details for the literature found were compiled and managed using Reference Manager software.

Final selection of reviews

The final selection of the reviews and meta-analyses to be included in the study was a two-stage process. An initial rough selection was made by a junior researcher during the course of the literature search; this researcher identified for further checking only those publications that, on the basis of their titles, appeared to meet the necessary content and methodology criteria for acceptance. This first stage of selection identified 804 publications.

In a second stage, this data pool was further examined by the two authors (a junior and a senior scientist), who reviewed the abstracts of the publications and selected those that appeared to be relevant. In addition, the reference lists of the identified studies, expert reports and project reports were also examined to identify further relevant publications. One hundred and eighty studies were read through in full. In a final consultation process, the two authors selected the articles whose results form the basis of this updated expert report. The most common reasons for exclusion at this point were that the review summarised not only individual studies but also other reviews, or that the article was an unsystematic review in an area in which a systematic review was available.

The database-oriented literature search for studies on substances produced 48 publications and the literature search for studies on gambling produced a further two publications. The examination of the references in other publications (e.g. Babor et al., 2010; Bühler, 2009) led to the inclusion of 14 additional publications, resulting in a

total of 64 publications that formed the basis of this expert report. Two publications originated from 2002 and 2003, and all the others were published between 2004 and 2012. Three publications were relevant for several prevention settings.

Evaluation

To classify and assess the content of the studies included in the present report, the authors used a coding system and a system to determine strength of evidence that were developed for the previous expert report in 2006. The two authors, both familiar with this subject matter, examined the studies and independently classified them according to content and methodology.

Coding system

The descriptive dimensions of the coding system reflect the research questions that the report addresses. They cover content-related aspects of the work, such as the target group, the substance concerned, the measure used and the target behaviour, as well as methodological aspects. All reviews were described in terms of these dimensions. Table 3 sets out the key questions asked regarding each dimension.

Outcome variables of the expert report

The report's outcome variables are → preventive effects on consumption behaviour. The term 'preventive effects on consumption behaviour' covers the prevention, delay or reduction of consumption. In the case of gambling, this applies accordingly for indicators of problematic gambling behaviour. Several reviews, mainly in the area of alcohol, also report effects on the negative

TABLE 2

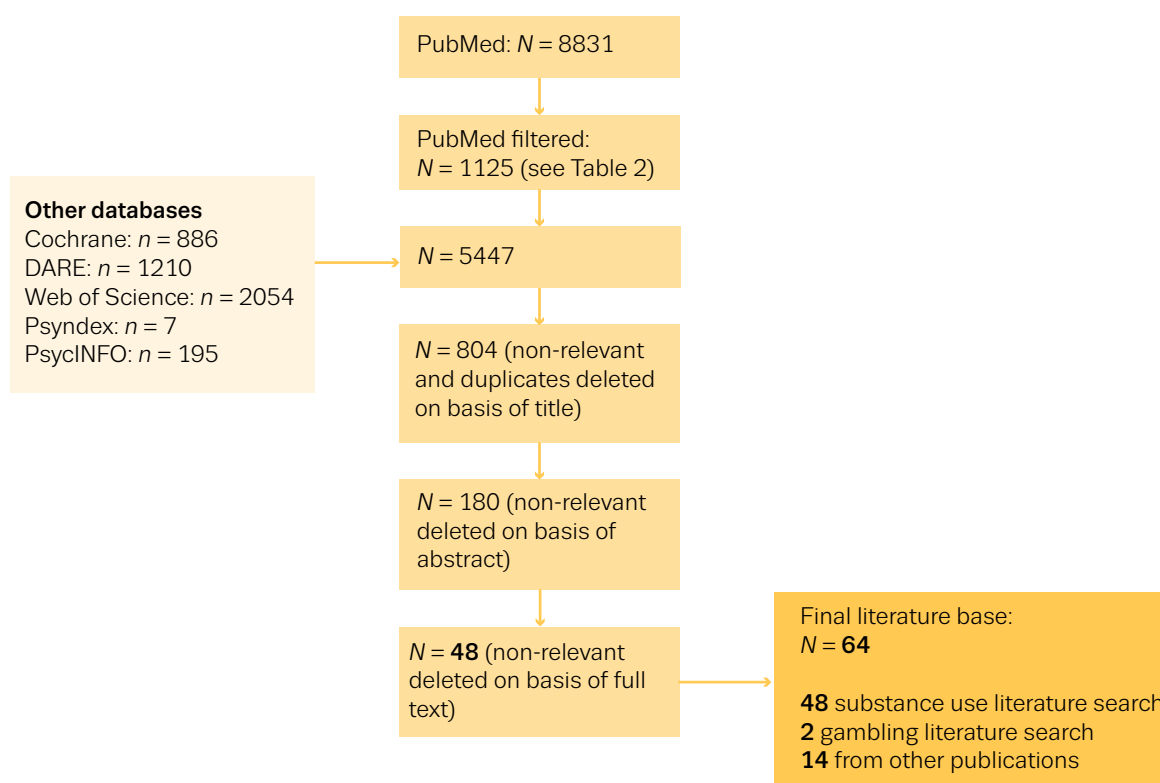
Words excluded from the PubMed search results

influenza	depression	hepatitis	SSRI	viral
allerg*	ADHD	leukemia	lithium	bacteria
otitis	schizophrenia	HIV	antibiotics	antiretroviral
asthma	epilepsy	malaria	beta-blocker*	arthritis
diabetes	multiple sclerosis	sickle cell	insulin	eclampsia
cardiovascular	tumour*	dermat*	chemotherapy	pharyngitis
stroke	cancer	sepsis	methylphenidate	diarrhea
obesity	carcinoma	inflammatory	atomoxetine	
herpes	Hodgkin*	tuberculosis	phenylephrine	

* Words associated with these words were also excluded; therefore, in some cases, the word stem was excluded from the results.

FIGURE 2

Literature search flow diagram



consequences of consumption. These effects are not covered by the term 'preventive effects' and explicit reference will be made to this fact in cases where they are reported in this expert report.

Strength-of-evidence rating

The strength-of-evidence rating system developed in the previous version of this report for the evaluation of the reviews was modelled on international standards (Helou et al., 2000). It meets the requirements of (a) systematic research into, assessment of and summarising of the best available scientific evidence (systematic reviews and possibly meta-analyses); (b) derivation of recommendations and conclusions based on scientific evidence; (c) detailed documentation of the connection between specific conclusions and the relevant evidential step; and (d) production of a background report to assure the quality of guideline development (after Helou et al., 2000).

However, for the assessment of reviews and the international prevention research in this expert report, it was not possible to use the clinical epidemiology evidence classification system that is widely used nationally and internationally (Shekelle et al., 1999).

TABLE 3

Dimensions of the coding system and key questions

Target group	Is the study concerned with a universal or a selective target group? Which age groups are covered? What is the background of the target groups?
Substance	About which psychoactive substances or groups of substances can information be drawn from the study?
Measure	What preventive approaches and/or procedures does the study cover?
Target behaviour	About what types of target behaviour can information be drawn from the study? Does the target behaviour involve actual substance use or the exertion of influence on risk factors and protective factors?
Type of study and method of implementation	Is the study a meta-analysis or a narrative review? How many individual studies does it cover? What is their quality level? Were the individual studies covered selected systematically or unsystematically? Over what time period were they conducted?
Evaluation of methodology	Is there a transparent process of selection and evaluation of the individual studies? Has a stringent and conclusive approach been taken in the aggregation of the study results, the selection of outcome variables and the choice of statistical procedures for assessing and deriving conclusions?

Under that system, only one category of strength of evidence is applicable for assessment of aggregated information: the strongest evidence (level I a) is considered to come from a meta-analysis of randomised controlled trials (→ high-quality individual studies). The next level identified is that of individual studies, a level that our literature does not cover: evidence level I b covers randomised controlled trials (RCTs). Level II a is the classification for evidence for which at least one non-randomised controlled study is available, and level II b is applied where at least one study uses a quasi-experimental approach (e.g. pre- and post-testing). Level III covers descriptive, comparative or case–control trials and, finally, level IV comprises the findings of expert committees or the opinions of respected authorities.

A classification following the example of clinical epidemiology would have produced a ceiling effect, given that RCTs are available in virtually every relevant area. Such a classification also fails to take account of the type of mixed or partly contradictory bodies of evidence which are found in addiction prevention and which reviews attempt to organise and assess.

For these reasons, we developed our own system for rating strength of evidence in the expert report published in 2006. Our conclusions are above all based on meta-analyses (M) and systematic reviews (S, in which every available study has the chance to be

included). Recourse was had to unsystematic reviews (U, in which the criteria for identifying and selecting individual studies are not clear), → best-practice surveys (BP, a specific presentation of effective measures) or individual studies (IS) only in cases where no meta-analyses or systematic reviews were available.

Table 4 presents a brief overview of the strength-of-evidence ratings, which are illustrated in more detail in the subsequent paragraphs.

High-quality individual studies were considered to be studies that used the most meaningful research design. Such studies entail comparison between a treated and an untreated group, preferably with random allocation of participants to the → treatment group and control group (randomisation). Data are then gathered from the groups at least before and after treatment and preferably also at a later date. This is the pattern for both RCTs and controlled trials without randomisation (CTs). An alternative type of study, the interrupted time series (ITS) study, can be used where comparison between a treated and an untreated group is not possible. In these studies, a given group is questioned, an interval then follows without treatment and the same questions are asked again. After a further interval in which treatment is given, the questions are asked for a third time. This permits comparison of how the same people progress with and without treatment.

TABLE 4
Strength-of-evidence ratings used in this expert report

Type of article	Strength of evidence	Wording of conclusions
A meta-analysis involving high-quality studies (RCTs, CTs or ITSs)	A	In five studies or more: 'has preventive effects' or 'has no preventive effects'. In fewer than five studies: 'can have preventive effects' or 'appears not to have any preventive effects'
A systematic review involving high-quality studies (RCTs, CTs or ITSs)	B	Half or more of studies positive: 'can have preventive effects'. Fewer than half positive: 'occasionally demonstrates preventive effects'. No studies positive: 'appears not to have any preventive effects'
A meta-analysis or systematic review covering all relevant studies	C	'May have preventive effects' or 'may not have any preventive effects'
An unsystematic review, expert opinion or best-practice survey	D	
An individual study	E	n/a
Contradictory findings between A and B	F	Positively or negatively formulated, dependent on study with greatest strength of evidence.

n/a, no conclusions were drawn based on individual studies.

The conclusions are rated for strength of evidence from A to F:

A: result derived from a meta-analysis involving high-quality individual studies (RCTs, CTs and ITSs);

B: result derived from a systematic review involving high-quality studies (RCTs, CTs and ITSs);

C: result derived from a meta-analysis or systematic review covering all studies;

D: result derived from an unsystematic review, expert opinion or best-practice survey;

E: individual study;

F: contradictory findings between reviews falling into categories A and B, with a conclusion formulated largely in accordance with the review with the strongest evidence.

An ITS study of this kind is 'high quality' if the phases of intervention and non-intervention alternate several times. Reviews do not always indicate the nature of the individual studies on which they draw; such information can thus be reported and considered only when it is available. In the event of a lack of information on the quality of the underlying studies, there is a conservative assumption that quality is low.

If we sought to compare this system — ignoring the different levels of analysis involved (reviews as against individual studies) — with the commonly used scheme for classifying clinical evidence, we would suggest that strength-of-evidence rating A most closely resembles level I a, although it includes all high-quality studies (RCTs, CTs and ITSs).

Strength-of-evidence ratings B, C and, to some extent, D (unsystematic reviews) coincide with levels I b, II a and II b. Level IV would correspond to our strength-of-evidence rating D.

As a result of the use of meta-analytical procedures, which have become more widespread since the previous report was published, and which are used to combine the results of merely two individual studies, the results, for example, from a meta-analysis of two studies will be compared with those of a systematic review of 15 studies. Therefore, an additional gradation of the conclusions is necessary. This gradation is implemented through the wording of the conclusions:

- 'has preventive effects', in the case of references to the effectiveness of a certain measure from the results of a meta-analysis involving high-quality individual studies (strength-of-evidence rating A) and a pooled significant effect over at least five individual studies;
- 'has no preventive effects', in the case of references to the ineffectiveness of a certain measure from the results of a meta-analysis involving high-quality individual studies (strength-of-evidence rating A) and a pooled significant effect over at least five individual studies;
- 'can have preventive effects', in the case of references to the effectiveness of a certain measure from the results of a meta-analysis in which the effect is pooled over fewer than five studies, as well as of reviews that summarise the quality of results of individual studies and report that at least half of the evaluated studies showed an effect;
- 'occasionally demonstrates preventive effects', in the case of references to the ineffectiveness of a certain measure on the basis of reviews that summarise the quality of results of individual studies and report that at least half of the evaluated studies do not show an effect, although there are also studies included that demonstrate an effect;
- 'appears not to have any effects', in the case of references to the ineffectiveness of a certain measure on the basis of the results of meta-analyses in which the effects are pooled over fewer than five studies, as well as of reviews that summarise the quality of results of individual studies and report that none of the evaluated studies demonstrated an effect;
- 'may have preventive effects' or 'may not have any effects', in the case of references to the effectiveness or ineffectiveness of a certain measure on the basis of meta-analyses and reviews covering all studies, unsystematic reviews and best-practice guidelines.
- 'has preventive effects', in the case of references to the effectiveness of a certain measure from the results of a meta-analysis involving high-quality individual studies (strength-of-evidence rating A) and a pooled significant effect over at least five individual studies;

CHAPTER 3

Results

This section presents an overview of the research results on universal and selective measures for addiction prevention, as well as on gender-specific research and on the negative results of addiction prevention. The results are organised by setting (family, school, leisure, healthcare, media, community and legislation). Furthermore, results that are relevant across settings in relation to the prevention of substance use or gambling behaviour are summarised and/or reported in each section. The individual results sections are uniformly structured.

Grouping of results

The results (effectiveness) are grouped according to the target group about which conclusions are drawn (universal, selective, undifferentiated), according to setting (family, school, leisure, media, healthcare, community and legislation) and according to substance (tobacco, alcohol, cannabis and other illicit drugs).

Because some conclusions of reviews do not differentiate between target group, setting or substance, but instead assess more than one target group, setting or substance jointly, there is a further category labelled 'undifferentiated'. The characteristics of each grouping are summarised in a standardised table. An example of this table is shown below. This example table indicates that the results reported in this section are for the school setting, for a universal target group and are undifferentiated for all substances with regard to the effectiveness of the addiction prevention measure.

Individual reviews

The discussion of each article from which conclusions have been derived has a heading indicating the article's particular focus. The summary then starts with a brief characterisation of the article, listing the following: author or authors; internal number of the article; date of publication; type of article (M: meta-analysis, S: systematic review, U: unsystematic review, E: expert opinion, BP: best-practice survey); number of studies on

which the addiction prevention results are based (if possible with reference to the design of the studies; period over which the studies were published; age of the target group). The description of each study is broken down into results and conclusions. Summarised in the results section are the results reported by the authors of the reviews that were deemed coherent and relevant to this expert report by the authors of this report. The conclusions reproduce the opinions and, mostly, the wording of the authors of the included articles; they are not the opinions of the report authors.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol Cannabis Other illicit drugs UNDIFFERENTIATED

Conclusions pertaining to the settings

The conclusions drawn by the authors of this expert report — in each case summarised under the heading 'Summary' — begin with information on the substances concerned in each setting, and an indication of whether or not German-speaking sample groups were examined. The summary also provides a condensed assessment of the methodological quality and the significance of the results on which the conclusions are based.

Next follow the conclusions, which, in the opinion of the authors of this report, summarise the reviews presented in that section. Each conclusion is followed by a letter and a reference to the internal number of the article, indicating the strength-of-evidence rating of the

conclusion and the work on which the conclusion is based.

Finally, where possible, the conclusions are followed by quantitative indications of the effectiveness of the measures concerned. These are derived from the articles and are intended merely as very broad estimates of the limits within which the effectiveness of the measures may fluctuate. They should not be interpreted as effects to be anticipated.

Conclusions that apply across different settings

Starting with the conclusions formulated for the individual settings, the conclusions are grouped again across all settings according to individual substances.

Evidence-based examples of practice from Germany

If available, at the end of each section on a setting, measures are presented that have proved effective based on a (randomised) controlled trial in Germany.

Family

Individual findings

There are many different preventive approaches in the family setting. To simplify things, we have called measures that work with parents, with children and also with families 'family programmes'. Otherwise, we talk of 'family-oriented interventions' (which can also include family programmes).

Focus: programmes that include parents

Petrie et al. (1-3; 2007; 5; 20 studies (RCTs and CTs); 1990–2003; under-18s) summarised in their review the results of addiction prevention programmes that include parents in the intervention in some way. In the 20 programmes identified, the parents participated in training sessions (seven studies), were involved in their children's prevention-related homework tasks (three studies) or received booklets (three studies) or home visits (one study), or there was a combination of these approaches (five studies). The programmes mostly subscribed to social or behavioural learning models and focused on teaching communication skills and

developing boundaries and problem-solving and refusal skills.

Results	Effectiveness
Target group	Universal Selective UNDIFFERENTIATED
Setting	FAMILY School Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol Cannabis Other illicit drugs UNDIFFERENTIATED

Results: The authors organised the programmes by target age group: primary school age (here two of the four studies showed significant effects), the transition from primary school to secondary school (here six of the eight studies showed significant effects) and adolescents (here five of the eight studies showed significant effects). The effective interventions for primary school age and early adolescence shared an emphasis on active parental involvement in the interventions, as well as on the development of skills in social competence, self-regulation and parenting techniques, instead of focusing exclusively on substances and substance use. One characteristic of the most effective interventions for adolescents was a focus on the development of social skills and a sense of personal responsibility among the young people themselves, and another was, once again, the active involvement of parents, either in face-to-face meetings or by telephone.

Authors' conclusions: The authors emphasised the high degree of heterogeneity of the programmes and the resulting difficulty of making a meaningful comparison between studies. In general, they saw the most effective programmes as being those that (a) focused on the development of a sense of personal responsibility in and the social skills of the young people, as well as addressing the issue of substance use, and (b) included active parental involvement. According to the authors, this broad psychosocial content and the active participation of parents and children were more important than whether or not the measure addressed only parents as a target group and whether it was school-based or provided for collaboration between home and school. The best point in time for such interventions seemed to be the transition from primary school to secondary school (in the USA, after 6th grade, comment by the report authors).

Stolle et al. (1-10; 2010; S; 15 studies (8 RCTs and 2 CTs); 1991–2009; 0–17 years) were looking for a model for a universal family programme and assessed 42 individual studies covering 15 programmes. Among these were eleven universal and four selective approaches, which differed greatly with regard to family involvement. For eight programmes RCT studies were available, for two programmes controlled studies and for the remaining measures lower quality studies.

Results: Seven of the eight RCT-tested programmes (six universal, two selective) showed effects over a period of at least two years. Five of the six universal measures showed effects on the substance use of children or (late) adolescents. Both selective programmes influenced behavioural problems in childhood. In the follow-up, one of these also showed effects on substance dependence in adulthood. Both programmes studied in non-RCTs (one universal and one selective) showed effects on behavioural problems (aggression, social withdrawal) for their young samples (aged up to nine years).

Authors' conclusions: Two programmes stood out as being well-established universal programmes: the Strengthening Families Program 10–14 and the Finding Good Choices Program. Despite several criticisms, the former was clearly the universal family-based prevention programme with the most thorough evaluation to date, continuing to have measurable effects up to six years after the conclusion of the intervention.

Focus: alcohol prevention

Foxcroft and Tsertsvadze (1-1; 2011a; S; 12 studies (RCTs); 1999–2009; 11–15 years) conducted a qualitative appraisal of 12 RCT studies on 10 programmes aiming to prevent alcohol misuse. These programmes worked with parents on their own (parental measures) and with parents, children and parent–child groups (family programmes). Four of the programmes were specifically for girls. In the programmes, both parents and children were made aware of the risks of alcohol. The content of sessions with children included the perception of consumption norms, attitudes towards alcohol, self-esteem, social relationships, resilience to peer pressure, problem-solving and decision-making. Sessions with parents addressed the topics of rules, monitoring and supervision, as well as parental support. Family sessions included training on communication and conflict resolution, as well as elements promoting the nurturing of relationships and the structuring of leisure time. The programmes lasted between three weeks and three years.

Results	Effectiveness
Target group	Universal Selective UNDIFFERENTIATED
Setting	FAMILY School Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

Results: Nine of the twelve studies show statistically significant prevention effects on alcohol use in children. Effects could be evidenced for up to eight years after conclusion of the intervention. All four of the measures that were specifically for girls prevented alcohol use.

Authors' conclusions: From the current status of research, the authors concluded that certain family-oriented programmes were effective and could be considered as options for policy and in practice. It was stressed that the more comprehensive approach to family-oriented programmes, namely the promoting of overall psychosocial development, could potentially also prevent other problem behaviours. Current research shows that family-oriented prevention achieved small but consistent and lasting effects in the medium- to long-term. Even small effects can result in significant cost savings.

Smit et al. (1-2; 2008; M; 18 studies (RCTs); 1995–2006; under-16s) produced a quantitative summary by means of a meta-analysis of the RCT results of six family programmes and three parental training programmes. With the exception of two, the studies overlap with those covered by *Foxcroft and Tsertsvadze (1-1, 2011a)*. The average → effect sizes were available for the evaluation of effects on initiation of use, current use and frequency of use.

Results: Preventive programme effects were observed for initiation of use (→ odds ratio (OR) = 0.71) and for frequency of use (effect size $d = -0.25$). The effects could be observed both for the parental training programmes and for the family programmes. The two most successful programmes had both parental and family elements and evidenced lasting effects for up to four years after the conclusion of the programme (OR = 0.53).

Authors' conclusions: The authors saw the main result of this meta-analysis as being that family-oriented

interventions have a greater probability of influencing the initiation of use and frequency of use of alcohol and that the effects can be maintained over an extended period. They discussed the question of whether or not families with younger children (mean age of 11 years) and/or children still inexperienced with alcohol were the main, or indeed only, ones who could benefit from these programmes.

Focus: tobacco prevention

Thomas et al. (1-4; 2007; S; 22 studies (RCTs); 1987–2006; 0–16 years) assessed 22 RCTs on programmes that included parents and aimed to prevent smoking among children and adolescents. These measures varied significantly in terms of their content and ranged from family education to family training programmes.

Results	Effectiveness
Target group	Universal Selective UNDIFFERENTIATED
Setting	FAMILY School Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

Results: The authors categorised the results according to five questions. (1) Are family interventions better than no interventions or usual interventions? In comparison with control conditions, four of nine programmes demonstrated preventive effects. These included one parent training programme, one family programme, one family–school cooperation and one educational programme, which involved the distribution of two leaflets containing parenting tips and suggestions for family activities, one children’s newsletter and one incentive. A further four programmes had no effect. By contrast, one programme had an inverse effect. This prevention measure consisted of three school-based hours educating children about the direct health effects of smoking and an educational pamphlet for both children and parents. (2) Are family interventions better than school interventions? In comparison with a school intervention, only one of five measures was more effective: the parent–child Iowa Strengthening Families Program. (3) Are combined family plus school interventions better than school interventions alone?

None of the seven studies found any additional tobacco prevention effects of family-based elements when carried out in conjunction with a school programme. (4) Does a family programme with explicit tobacco preventive messages work better than one without? Only one study examined this question, and it found no difference. (5) Does a combination of family-based interventions plus peer elements achieve better results than peer interventions alone? Evidence came from two studies, which sought to prevent risky behaviours in general and did not concentrate on tobacco-specific content. One study found an additional benefit and one study found no additional effect of the family intervention on tobacco use.

Authors’ conclusions: The authors concluded that the current evidence base did not enable any firm conclusions to be drawn about the effectiveness of family interventions and did not allow an assessment of whether or not the interventions were intensive enough to produce a sustained effect. Generally, programmes as part of high-quality studies appeared to be effective, which could possibly be the result of the extent of implementer training and fidelity of treatment implementation.

Gates et al. (2-3; 2009; S; 17 studies (RCTs); 1996–2004; 25 years and under) summarised the results of RCTs involving non-school measures for the prevention of illicit drug use. This included nine studies that were not conducted in a family setting.

Results: Of the eight family-based programmes studied in the RCTs, three programmes achieve preventive effects on cannabis use.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	FAMILY School Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Authors’ conclusions: The authors concluded that none of these interventions in non-school settings had been shown unequivocally to be effective, and cost-effectiveness was unknown. It was therefore difficult to recommend their use until more research had been conducted.

Summary

Substances: Alcohol, tobacco, illicit drugs
Geographical scope: No reviews of research using German-speaking samples
Conclusiveness of research: Evidence strength levels A and B (many high-quality individual studies and one meta-analysis).

1. Family-based measures that include parents or families in the intervention can have preventive effects on substance use (B 1-3, B 1-10).
2. Parental training and family programmes that include behavioural training with parents and children have preventive effects on alcohol use (A 1-2, B 1-1).
3. Alcohol preventive effects can be determined with regard to initiation and frequency of use (A 1-2).
4. Alcohol preventive effects through family programmes can be long term (> 4 years) (A 1-2, B 1-1).
5. Family-based interventions demonstrate occasional preventive effects on tobacco use (B 1-4) and cannabis use (B 2-3).
6. Effects can be observed for children and adolescents. The transition between 6th and 7th grade seems the most suitable point in time to intervene (B 1-3).
7. Active participation of parents and a comprehensive approach that includes both substance-specific elements and the promotion of children's psychosocial development seem to be particularly effective (B 1-3).
8. Family programmes that are specifically for girls can have preventive effects on alcohol use (B 1-1).

Quantitative indications

Family programmes and parental training in a meta-analysis: between OR = 0.71 for initiation of alcohol use and $d = -0.25$ for reduced alcohol use. Long-term effects up to four years, OR = 0.53.

Parental rules for prevention of smoking for their children (<http://www.zis-hamburg.de/projekte/projektetails/Elterliche-Regeln-fuer-das-Nicht-rauchen-Ihrer-Kinder>)

Target group: Parents of 11- to 15-year-olds.

Methods: 30-minute information programmes during the course of regular parents' evenings at schools; education, discussion on a non-smoking upbringing; information booklets; subsequent newsletters as reminders of the rules four months later.

Who conducts the programme? Trained specialists in addiction prevention as propagators

Content: Presentation of the connection between normative rejection of smoking by parents and non-smoking in children; detailed examination and discussion with parents on the subject of a non-smoking upbringing.

Duration: Providing information during a parents' evening, one-off newsletter (brief intervention).

Cost: Low levels of expenditure for costs and training (2–3 hours)

Evaluation study RCT: Kalke et al., 2011. Originally 80 classes (treatment group (TG)) and 75 classes (control group (CG)) from basic, intermediate, advanced and comprehensive schools (administrative districts and municipal districts in Schleswig-Holstein); parents of 12- to 15-year-olds (6th to 8th grade). Initial survey (before the intervention): $n = 1\,340$ parent surveys (TG), $n = 1\,178$ (CG); closing survey at the end of school year: $n = 1\,131$ (TG), $n = 1\,017$ (CG)

Evaluation results: Strengthening of parental influence through intervention (stricter observance of rules, stricter ban on smoking); after the intervention, there were significant differences between the groups with regard to prevalence and incidence; these were lower in the treatment group.

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School

Individual findings

School-based measures address not so much the school environment as individual factors: that is, the school system is primarily used as a setting for interventions targeted at individuals. However, there are also now

some studies that test system-related interventions that aim to change the school social environment.

Focus: measures that address the school system

Fletcher et al. (3-2; 2008; S; 4 studies (RCT, CT); 1985–2006; 10–16 years) examined the influence of factors within the school context on the use of alcohol, tobacco and drugs by schoolchildren. Four controlled intervention studies (of which three were randomised) were included in their analysis, as well as nine longitudinal observational studies. Three interventions went beyond individual-focused components and targeted changes to the schools' overall organisation, policies and their implementation, culture and the school social environment. These changes were implemented by school action teams addressing overall school organisation and ethos. In addition, individual teacher training was provided in order to promote a positive school environment. The fourth measure provided for the implementation of new school rules regarding substance use.

Results: Three of the four studies reported effects. One measure was successful in significantly reducing the rate of increase of alcohol, tobacco and cannabis use. A second study achieved this result for the use of drugs (other than cannabis) and alcohol, but only in boys.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol Cannabis Other illicit drugs UNDIFFERENTIATED

In the intervention study that also included new school rules regarding substance use, a comparison with the control group showed no effect on the number of students who had used cannabis at the end of the intervention (and those who had already used it tended to do so more frequently). However, students in the intervention group drank less alcohol and smoked less. The results of the observational studies give additional indications that a subjectively reported feeling of disengagement of students from their school is

associated with later consumption of tobacco, alcohol and drugs. Perceived support and fair treatment provided by teachers was shown to be a protective factor against later substance use.

Authors' conclusions: The intervention studies offered some evidence for a connection between interventions in the school environment and a reduction in students' substance use. The intervention studies suggested that action to improve the school environment and ethos could make a positive contribution to reducing substance use among students. Observational studies also indicated that good relationships with teachers and a strong feeling of connectedness with their school could have protective effects on students' substance use.

Focus: individual programme D.A.R.E.

West and O'Neal (3-9; 2004; M; 11 studies (RCTs and CTs); 1991–2002; 10–12 years) examined the effectiveness of the US prevention programme D.A.R.E. (Drug Abuse Resistance Education) for tobacco, alcohol and illicit drugs in a meta-analysis including 11 controlled studies. D.A.R.E. is the most widespread school prevention programme in the USA. It is conducted by police officers in the classroom and uses a combination of information-giving, emotional education and training in refusal skills. In contrast with the first meta-analysis of studies on D.A.R.E., conducted by Ennett et al. (1994), the authors drew only on articles from peer-reviewed journals for this meta-analysis and examined only studies with a follow-up period of 10 years or less. Evaluations of the revised version of D.A.R.E. were not available.

Results: The mean weighted effect size for D.A.R.E. in comparison with the control group was 0.023 (Cohen's *d*) and was not significantly different to 0, which is indicative of the ineffectiveness of the programme. Four of the included studies found no effect, one study found the programme to be less effective than the control condition. The other six studies showed, for the most part, small positive effects.

Authors' conclusions: The study confirmed the results attained by Ennett et al. (1994) and suggested that the D.A.R.E. programme is not effective.

Focus: (random) drug testing on schoolchildren

Two unsystematic reviews assessing the effectiveness of (random) drug testing as a preventive measure against alcohol and drug use by schoolchildren are available.

Drug testing in schools is based on the assumption that schoolchildren could be deterred from consumption as a result of the negative consequences that could result from the discovery of consumption. *Roche et al. (3-35; 2009; U; 5 studies; 2002–2004; no specified age)* and *Shek (3-36; 2010; S; 14 studies (1 RCT, 1 CT); 1990–2009; no specified age)* base their assertions exclusively (3-35) or mainly (3-36) on cross-sectional studies, which indicates a lesser degree of validity of the research results. Only one randomised intervention study is available and this study examined the observable effects of drug testing on the behaviour of athletes from the school's athletics team. Both reviews include studies in which alcohol and/or drug testing was carried out. In both reviews, it is made clear that the quality of the included studies is very poor. *Roche et al. (3-35)* conclude that there is little evidence for the effectiveness of drug testing in the prevention of substance use. *Shek (3-36)* admits that the evidence for the effectiveness of drug testing is inconsistent and that the question of effectiveness cannot be resolved on the basis of the existing evidence.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Behaviour-related alcohol preventive programmes

Foxcroft and Tsertsvadze (3-3; 2011b; S; 53 studies (RCTs); 1968–2010; 5–18 years) conducted a Cochrane Review on the effectiveness of universal school-based prevention programmes for alcohol misuse in young people. In this examination, they combined 27 studies that had already been discussed in an earlier Cochrane Review with more recent studies. Overall, they included 53 randomised controlled studies in their analysis; the studies targeted children and adolescents aged between 5 and 18 years. The focus of the review is on a comparison between programmes that concentrate solely on alcohol prevention and generic measures designed to prevent substance use and problem behaviour in general.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

Results: Six of the eleven trials evaluating alcohol-specific interventions showed some evidence of effectiveness compared with a standard curriculum. In 14 of 39 trials evaluating non-specific interventions — mostly longer-term than the alcohol-specific measures — the interventions demonstrated significantly greater reductions in alcohol use either through a main group or subgroup effect. The most commonly observed positive effects across both programme types were for drunkenness and binge drinking. As a result of the extensive heterogeneity of the measures and because of the intervention methodology used, a quantitative comparison by means of a meta-analysis was impossible.

Authors' conclusions: Current evidence suggested that psychosocial and developmental prevention programmes could be effective in practice both in the USA and in Europe. These included, in particular, the Life Skills Training Program, the Unplugged Program and the Good Behaviour Game. However, there were also general programmes that, for example, showed no effects, or in one case even opposite effects. The authors also concluded that there was a strong requirement for further empirical examination of the influence of programme content, delivery context and effectiveness in different settings and for specific subgroups.

Focus: tobacco prevention

Thomas and Perera (3-13; 2006; S and M; 94 studies (RCTs); 1980–2004; 5–18 years) examined 94 randomised controlled studies in order to assess the effectiveness of school-based programmes in preventing children and adolescents from starting smoking by means of a Cochrane Review. The programmes were grouped according to their intervention approach, into measures that provided information; approaches based on the social influence model; and social skills training programmes. In

addition to purely school-based programmes, the review also included several programmes that contained additional family and community components. The studies were categorised according to quality; 23 studies were allocated to the top category, 1. For individual questions, the effects of the intervention on current non-smokers (i.e. on the initiation of smoking) were quantitatively summarised (here *M*).

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

Results: The only high-quality study categorised as providing information reported significant effects of the intervention. However, the measure did not only entail providing information; it also included a non-smoking competition. Both high-quality studies focusing on social skills programmes showed positive but, when meta-analytically summarised, non-significant effects (OR = 0.77). Nine of the thirteen high-quality studies on measures focusing on social influence reported positive effects. However, the overall effect for the 13 studies with results on short-term prevention, which was quantitatively determined by meta-analytical procedure, was non-significant (OR = 0.93), while a non-significant effect was also obtained pooled over seven studies on long-term prevention (OR = 1.19). Three high-quality studies examined combined interventions including elements focusing on social influence and social competence (life skills programmes), of which one study found positive intervention effects. However, the quantitatively determined effect on short-term prevention over six studies was also non-significant (OR = 0.72); the only long-term study also showed a non-significant effect. Three of the four high-quality multicomponent interventions included in the review were found to have significant positive results.

Authors' conclusions: Because of the low number of high-quality studies on providing information alone, it was difficult to exclude the effectiveness of this approach, but there was little positive evidence for it.

The review showed some evidence for the short-term effectiveness of programmes focusing on social influence in the school-based prevention of smoking. There was not enough evidence of additional benefits through the addition of elements of social competence to programmes focusing on social influence. There were not enough data to form a basis for a judgement on the additional effectiveness of multicomponent programmes. It could be possible that combining social influences models with other components, such as community interventions and social skills training, might improve effectiveness. However, these interventions had not been subject to the same rigorous evaluation as the social influences approach on its own.

Hwang et al. (3-10; 2004; M; 65 studies (RCTs); 1978–1997; 11–18 years) examined the effectiveness of school-based programmes on the prevention of smoking in the USA using 65 randomised controlled studies in a meta-analysis. The interventions examined were allocated to the following three programme modalities: social influence (information on social norms and practice of social skills), cognitive behaviour (elements of social influence plus cognitive skills such as problem-solving or decision-making) and life skills training (elements of the other two interventions plus emotional elements, such as self-confidence). In addition, purely school-based programmes were compared with programmes that complemented school-based measures with community components, and the short-term as well as the long-term effectiveness of the interventions was examined. As an outcome parameter, the effect size (Cohen's *d*) of the interventions was calculated on the smoking behaviour of the overall group of schoolchildren (smokers and non-smokers) on the basis of the standardised mean difference between the treatment group and the control group.

Results: The overall effect on smoking behaviour was 0.15, which constitutes a small effect. In chronological sequence, the effect after less than one year was 0.19; between one and three years, it was 0.18; and after three years it was 0.09. In the short term, life skills training was most effective ($n = 31$, $d = 0.29$), followed by cognitive behavioural interventions ($n = 22$, $d = 0.21$) and approaches based on the social influence model ($n = 31$, $d = 0.12$). In the period between one and three years, cognitive behavioural interventions showed the largest effect size, which remained constant at $d = 0.21$. The overall effect size of life skills training was $d = 0.16$ and that of social influence interventions was $d = 0.15$. Purely school-based programmes were superior to combined programmes with regard to short-term effectiveness (school: $d = 0.22$; combined: $d = 0.16$); this was, however, reversed for the period of one to three years (school:

$d = 0.16$; combined: $d = 0.21$). Long-term effects of over three years could be examined only for the modalities of social influence ($d = 0.07$) and school ($d = 0.06$).

Authors' conclusions: The available studies gave conclusive indications for the effectiveness of school-based psychosocial tobacco prevention programmes for the reduction of smoking in adolescents in the USA. The best effects were achieved by programmes that implemented cognitive behavioural elements or life skills approaches and/or were implemented in a combined manner at school and in the neighbouring community. Long-term effects could also be achieved with such programmes.

Focus: tobacco prevention by information-giving in South Korea

Park (3-11; 2004; S; 11 studies (RCTs and CTs); 1992–2004; 12–16 years) examined the effectiveness of programmes for the prevention of smoking in schools in South Korea in a systematic review covering 11 controlled studies with and without randomisation. The programmes examined mainly used information-giving and the teaching of factual information as their intervention approaches. Further components included in several programmes, although comprehensively implemented in far fewer, were refusal skills, life skills and other components (e.g. smoking cessation interventions, education about advertising strategies used by the tobacco industry, etc.). The delivery of the programmes was non-interactive and smoking behaviour was examined in only five studies as an outcome variable.

Results: Not one study reported any significant effect on smoking rate. The effect sizes were negative or close to zero.

Authors' conclusions: The main intervention was the dissemination of knowledge in a non-interactive way. School-based smoking prevention of this kind may not influence the smoking behaviour of adolescents.

Focus: long-term effectiveness

Wiehe et al. (3-12; 2005; S; 8 studies (RCTs); 1989–2001; 8–18 years) found only eight randomised controlled US studies on smoking prevention with longer-term follow-up periods for their systematic review. They included studies with a follow-up of more than one year after the programme end and with participants who were 18 years old or in the 12th grade at time of follow-

up. The interventions were mainly based on the social influence model, and some measures had additional components intended to promote social competence. One study examined the effectiveness of a life skills programme.

Results: Only one study, based on the life skills intervention model, showed a reduction in prevalence of smoking behaviour in the longer-term follow-up survey.

Authors' conclusions: Few studies had evaluated the long-term impact of school-based smoking prevention programmes rigorously. No evidence of long-term effectiveness was found. It could be possible that life skills programmes, as opposed to other programmes, were effective because they were implemented with a high degree of interaction and participation on the part of the young people. One possible explanation for the short-term, albeit not long-term, demonstrated effectiveness of programmes could be that the programmes made adolescents aware of the responses desired by the researchers in the short term.

Focus: school tobacco policies

Piontek et al. (3-7; 2007; S; 11 studies; 1994–2005; no specified age) assessed several cross-sectional studies, although only one longitudinal study, on the topic of school tobacco policies. This assessment revealed that the implementation of a formal smoking ban by itself had no preventive effect on the smoking behaviour of schoolchildren one year later. The authors concluded that there was still a considerable need for research; however, the basic research up to now viewed school-based environmental prevention consisting of more than a simple smoking ban as a promising measure.

Focus: smokefree class competitions

Isensee and Hanewinkel (3-32; 2012; M; 5 studies (RCTs and CTs); 1996–2010; 11–14 years) examined the effectiveness of smokefree class competitions on the prevention of smoking on the basis of three RCTs and two CTs in a meta-analysis. Of the included studies, three were conducted in Germany, one in the Netherlands and one in Finland. In the intervention known in Germany as 'Be smart — don't start', entire school classes commit themselves by contract to refrain from smoking for a period of six months. The schoolchildren are surveyed about their smoking behaviour on a weekly basis. For the class to be eligible for the prizes awarded at the end of the competition, at least 90 % of the class must be non-smokers at any one

time. The examined outcome variable in this study was the current smoking behaviour of the entire group of schoolchildren (smokers and non-smokers) at the time of the previous follow-up assessment of the corresponding study (12 to 24 months).

Results: In two of the five studies, schoolchildren in the intervention group had a significantly reduced risk of being current smokers at the time of the survey. In the summary of all the studies in the meta-analysis, the overall risk ratio was significantly reduced for programme participants (pooled risk ratio = 0.86). This corresponds to a figure of 23.4 people who must participate in the intervention so that one person can be prevented from smoking (i.e. approximately one prevented case per participating school class for a duration of up to two years).

Authors' conclusions: The authors concluded that class competitions were an evidence-based measure for the prevention of smoking. There was broad evidence for the recommendation and implementation of this programme.

Johnston et al. (3-38; 2012; M; 7 studies (RCTs and CTs); 1992–2012; 11–14 years) conducted a Cochrane Review on a similar question to that addressed by *Isensee and Hanewinkel (3-32)* and examined the effectiveness of incentives for the prevention of smoking in schoolchildren. A total of seven studies were included (three RCTs and four CTs), with six of these examining the effectiveness of smokefree class competitions (see *Isensee and Hanewinkel, 3-32*). The results of five studies (all on class competitions) were summarised in a meta-analysis, with the analysis being carried out separately for the three RCTs and two CTs. The follow-up intervals of these studies ranged between 10 and 24 months. In contrast to the meta-analysis conducted by *Isensee and Hanewinkel (3-32)*, only those schoolchildren not smoking at the time of the initial survey, before the start of the intervention, were included; in addition, in several cases the authors adjusted included studies for clustered data (schoolchildren in school class/school) before incorporating them into the meta-analysis. In the opinion of the authors, this is a more conservative procedure than that of *Isensee and Hanewinkel (3-32)*.

Results: Only one of the included studies reported a significant effect of the intervention on the initiation of smoking, which disappeared after additional adjustment for the clustered data structure. Neither the summarised effects of the three RCTs (pooled risk ratio = 1.00) nor those of the two CTs (risk ratio = 0.86, not significantly different from 1) indicate that the intervention is

effective with regard to the prevention of initiation of smoking in schoolchildren.

Authors' conclusions: The authors concluded that there was no high-quality evidence for the effectiveness of incentives for the prevention of smoking in schoolchildren.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol CANNABIS Other illicit drugs Undifferentiated

Behavioural prevention of cannabis use

Porath-Waller et al. (3-8; 2010; M; 15 studies (RCTs and CTs); 1999–2006; 12–19 years) examined the effectiveness of school-based programmes for the prevention of cannabis use by means of a meta-analysis including 15 controlled studies with and without randomisation. The various interventions were based on the one hand on the social influence model and on the other hand on mixed models that combined different components of various intervention approaches. The results of all the studies were combined to form one overall effect size. In addition, effect sizes were also calculated for various moderators of effectiveness, such as programme duration, age of participants, methods of programme delivery, etc.

Results: The combination of the effects of all the studies resulted in an effect size of 0.58 (Cohen's *d*), which corresponds to a moderate effect of the interventions on cannabis use. In addition, the authors reported various significant moderators: combined intervention models were superior to those based purely on a social influence approach; a programme with a duration of more than 15 sessions was more effective than a shorter programme; programmes were more effective for children who were 14 years of age or older than for younger children; programmes were more effective when external specialists (health professionals, police officers, specialists) rather than teachers acted as trainers; an interactive programme structure was superior to a direct

structure; and, finally, measures were more successful if their implementation was checked.

Authors' conclusions: The available results provided evidence that school-based programmes were effective with regard to the reduction of cannabis use in young people.

Behavioural prevention programmes for cannabis and illicit drug use

Faggiano et al. (3-1; 2008; S; 29 studies (RCTs); 1980–2004; 6–17 years) examined 29 RCTs regarding the prevention of illicit drug use in a school context. The examined substances were cannabis, ecstasy, hard drugs and inhalants. The majority of the programmes examined were skills-oriented and aimed to promote life skills, refusal skills and safety skills. A minority of the programmes examined focused on emotional education (promotion of self-esteem, self-efficacy, motivation) and the enhancement of knowledge. The authors also explored differences in intervention effectiveness related to programme delivery (teachers vs. external specialists vs. peers). For the individual questions examined, the results were summarised into various subgroups of studies using meta-analytical techniques. Fourteen of the included studies reported no suitable data for the meta-analytical procedure. These results were reported in narrative form.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Results: Four studies were available for a meta-analysis of skills-based programmes. In comparison with the usual curricula, the use of skills-based programmes in schools proved to be effective with regard to reduced cannabis use (risk ratio (RR) = 0.82, four studies) and reduced use of hard drugs (RR = 0.45, two studies). These figures can be interpreted as a 20 % lower initiation of cannabis use and a 55 % lower initiation of

the use of hard drugs over the implementation period. In comparison with measures delivered by teachers, two out of two peer-implemented life skills programmes were more successful with regard to the prevention of cannabis use. Information-giving alone improved knowledge on drugs (standardised mean difference (SMD) = 0.91, three studies), but not decision-making skills or drug use. Emotional education approaches improved knowledge better than information-giving as the sole intervention (SMD = 0.61, two studies).

Authors' conclusions: In comparison with the customary procedure, skills-based programmes seemed to have a positive effect on mediating protection and risk factors, as well as on illicit drug use. Skills-based programmes helped to deter young people from drug use. There was no evidence for the effectiveness of emotional education and the enhancement of knowledge on the prevention of drug use. The number of schoolchildren who had to be treated in order to prevent cannabis use by one child (number needed to treat) was 33. Because the prevalence of cannabis use in the examined studies was 16.5 %, five of these 33 people would consume cannabis. Of these, one would be prevented from consumption by the intervention, which corresponds to a reduction in new consumers of 20 %.

Summary

Substances: Tobacco, alcohol, cannabis, illicit drugs
Geographical scope: Only a few German studies on non-smoking class competitions ('Be smart — don't start')
Conclusiveness of research: Evidence strength levels A to D (many meta-analyses).

Undifferentiated — across all substances

- Measures addressing the school system by implementing school action teams and by focusing on the improvement of school life and on the implementation of substance-specific components can have preventive effects on tobacco and alcohol use (B 3-2).
- The D.A.R.E. programme (information-giving, emotional education and refusal skills training, conducted by police officers) has no preventive effects on the consumption of tobacco, alcohol and illicit drugs (A 3-9).

11. There are no conclusive evaluations on the effectiveness of (random) alcohol and drug tests in preventing substance use by schoolchildren (D 3-35, C 3-36).

Alcohol

12. Alcohol-specific school-based measures can have preventive effects (B 3-3).
13. General measures intended to change several types of problem behaviour occasionally show preventive effects on alcohol use. Effective programmes include certain programmes that promote psychosocial development, including two life skills programmes and one behaviour management programme for the classroom (B 3-3, B 10-1).
14. Certain general programmes can be more effective than alcohol-specific programmes (longer-term effects, effects on drunkenness and binge drinking) (B 3-3).

Tobacco

15. Information-giving alone appears to have no effects on smoking behaviour (B 3-11, B 3-13).
16. School-based tobacco prevention measures alone have no long-term preventive effects on smoking behaviour (> 12 months) (A 9-1, B 3-12).
17. General programmes based on the social influence model, on the life skills approach or on the cognitive behavioural skills approach have preventive effects on the smoking behaviour of the entire group of smoking and non-smoking schoolchildren (A 3-10), but appear to have no effects on the initiation of smoking (A 3-13).
18. Class competitions have preventive effects on the entire group of smoking and non-smoking schoolchildren (A 3-32), but appear to have no effects on the initiation of smoking (A 3-38).
19. The effectiveness of school tobacco policies cannot be assessed because there is a lack of studies (B 3-7).
20. School-based measures (social influence approaches) that are combined with components in the community setting can have preventive effects on tobacco use (B 3-13).

21. The supplementing of school-based interventions with family-oriented elements appears to achieve no additional preventive effects (B 1-4).

Cannabis and illicit drugs

22. Behavioural, school-based prevention programmes have preventive effects on cannabis use (A 3-8, A 3-1).
23. Skills-oriented and more comprehensive programmes can have a larger preventive effect on cannabis and other illicit drug use than other programmes (A 3-1, A 3-8).
24. Information-giving and emotional education alone appear to achieve no preventive effects on cannabis use (A 3-1); however, when combined with skills-oriented approaches, they can be more effective than social influence measures on their own (A 3-8).
25. In cannabis prevention, programmes are effective when interactive methods are used, but not when non-interactive methods are used (A 3-8).
26. Longer programmes (> 15 hours) have larger effects on cannabis use than shorter programmes (A 3-8).
27. Behaviour-related programmes are more effective for children of 14 years of age or older than for those under the age of 14 years (A 3-8).
28. In cannabis prevention, delivery of programmes by external specialists is more successful than delivery by teachers (A 3-8).
29. In cannabis prevention, delivery of life skills programmes by peers is more successful than delivery by teachers (A 3-1).

Quantitative indications

Effectiveness of school-based programmes on smoking behaviour between 0.1 and 0.2, up to 0.3, mean weighted effect size d
 Effectiveness of school-based programmes on cannabis use up to 0.6 mean weighted effect size d

IPSY (Information + Psychosocial

Competence = Protection) (www2.uni-jena.de/svw/devpsy/projects/ipsy.html)

Target group: 5th to 7th grade, 10 – 12 years old (5th grade basic programme, 6th and 7th grades advanced training).

Methods: School-based life skills programme to prevent the misuse of substances such as alcohol and cigarettes; primary prevention before the first use.

Who conducts the programme? Teachers or older peers with appropriate training.

Content: Strengthening of self (feelings, self-image), problem-solving (anxiety, stress), social skills, information-giving (prevalence, short-term consequences, advertising, media), school, leisure (functional alternatives).

Duration: Basic programme — 15 units; advanced training programmes — seven units each.

Cost: Costs for manual, training at Friedrich-Schiller-University Jena.

Evaluation study (CT with long follow-up interval): Weichold et al., 2010. Study with $n = 23$ intervention schools and $n = 21$ control schools in the German federal state of Thuringia; quasi-experimental study design; pre, post, and two follow-up assessments; $n = 1\,693$ schoolchildren participating, with $n = 952$ participants at all measurement points. Use of questionnaires (before and after IPSY intervention, during follow-up) on various aspects of alcohol and cigarette use, life skills, family, friends, leisure, school; short questionnaire for teachers. Follow-up: seven months, one year later, an additional year later (three-year follow-up).

Weichold and Silbereisen, 2012: comparison of teachers versus peers with regard to effectiveness, pilot study: $n = 105$ schoolchildren, approximately 10.74 years old at the time of the pre-assessment. Peer-led: $n = 20$; teacher-led: $n = 62$; control group: $n = 23$. Pre and post assessments, two-year follow-up.

Evaluation results: Weichold et al., 2010: significant reduction in age-typical initiation of cigarette and/or alcohol use in the intervention group. In the case of cigarettes, a continuously increasing distance in attitude; in the case of alcohol, a consistently high distance. Increased self-confidence and lower susceptibility to peer pressure.

Weichold and Silbereisen, 2012: clearly more positive effects in delivery by teachers as opposed to peers.

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Klasse2000 (www.klasse2000.de)

Target group: Primary school pupils.

Methods: Early and continuous improvement of health and life skills, primary prevention against addiction, violence and health-damaging behaviours; playful and behaviour-oriented provision of information on general body processes from 1st to 3rd grade, as well as movement exercises and exercise breaks; in 4th grade, focus on tobacco and alcohol.

Who conducts the programme? Teachers and 'health educators' (specialists with specific training).

Content: Movement, healthy eating, breathing, relaxation, social skills, dealing with feelings and stress, strategies for problem-solving and conflict resolution, critical attitudes regarding tobacco and alcohol, dealing with problems and negative feelings, peaceful resolution of conflicts, dangers of tobacco and alcohol, and role playing, for example refusing when under peer pressure.

Duration: Teaching units during four primary school years.

Cost: Financing through donations; implemented alongside standard curriculum.

Evaluation study (CT with long follow-up interval): Maruska et al., 2011: $n = 29$ intervention schools (1 123 schoolchildren), $n = 29$ control schools (936 schoolchildren) in the German federal state of Hesse. Klasse2000 is implemented through 15 teaching units per school year. Within the first two school years, surveying of teachers; end of 3rd and 4th school years, surveying of schoolchildren and teachers with questionnaires; follow-up at 6th grade (two years post-intervention) ($n = 272$ schoolchildren in the intervention group; $n = 229$ schoolchildren in the control group) and 7th grade (three years post-intervention) ($n = 222$ schoolchildren in the intervention group; $n = 186$ schoolchildren in the control group).

Evaluation results: Risks of initiation of smoking and/or (secret) alcohol use 2–3 % lower for intervention group (combined: 5 %), although non-significant with regard to alcohol use. Number needed to treat for cigarette use is 28, and for substance use in general is 19. At follow-up, schoolchildren believe that control of their own health is possible, and particularly mention nutrition as a way to stay healthy; in the intervention group frequency of substance use (alcohol, cigarettes) is significantly lower and initiation of substance use is less likely to have occurred; children in the intervention group are less likely

to accept cigarettes offered by friends, and this remains the case one year later.

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Aktion Glasklar (www.aktionglasklar.de)

Target group: Four target groups — adolescents aged between 12 and 16 years, adolescents over 16 years, parents/relatives, and role models (teachers, doctors, youth group leaders).

Methods: Educational and awareness-raising campaign using Internet sites and printed media (information brochures and booklets for adolescents, parents, teaching materials).

Who conducts the programme? Teachers.

Content: Booklets include 'Alcohol as a means of enjoyment', 'When is alcohol OK?', 'Dealing with peer pressure', 'Temptations', 'Advertising', 'Prevention tips'. Internet sites: quiz on booklets, interactive tests ('Does alcohol make you fat?', 'How alcohol really works?', 'Check your drinking') with immediate display of results, self-commitment activities to stop drinking, downloads, information.

Duration: Eight teaching units.

Evaluation study (RCT with one-year follow-up): Morgenstern et al., 2009: $n = 30$ schools (in Schleswig-Holstein; basic, intermediate, advanced and comprehensive secondary schools); $n = 1\ 686$ schoolchildren in 7th grade (12–15 years). Intervention: four interactive teaching hours by teachers, booklets for schoolchildren and parents; recording of knowledge, attitudes, alcohol use. Follow-up: 4 months and 12 months post-intervention, $n = 1\ 433$ schoolchildren (85 %) after 12 months.

Evaluation results: A significant improvement in knowledge and reduction in binge drinking (sustained 12 months later), but a smaller effect on adolescents' attitudes towards alcohol and no short-term effectiveness on self-reported alcohol use and/or refusal intentions; effectiveness on initiation of alcohol use rather than a reduction in existing drinking behaviour and/or delay of first experiences of alcohol

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Leisure

Individual findings

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School LEISURE Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol Cannabis Other illicit drugs UNDIFFERENTIATED

Focus: extracurricular programmes — comparison with other areas of health promotion and prevention

Durlak et al. (2-4; 2010; M; 68 studies (24 RCTs and 44 CTs); 1979–2008; 5–18 years) calculated the effect size of extracurricular, non-school programmes aiming to promote the psychosocial development of children and adolescents in a meta-analysis covering 68 studies. The examined extracurricular activities were conducted at least in part during the school year, but were outside the school curriculum and were supervised by adults. The content of these programmes included one or several of the following topics: problem-solving, conflict resolution, self-control, leadership behaviour, decision-making, and skills to increase self-efficacy or self-esteem.

Results: The overall effectiveness of all programmes on all outcomes assessed (feelings and attitudes; appropriate behaviour; school performance) was $d = 0.22$, with results being very heterogeneous. An effect on substance use could be examined based on 28 individual interventions. These 28 interventions, analysed jointly, revealed an effect size of $d = 0.10$, which did not deviate significantly from 0. If solely the effects of preventive measures that met recommended practices for skill training ($n = 12$) were considered, this revealed a small but significant effect size of $d = 0.16$. These prevention measures were described using the acronym SAFE and characterised by the fact that learning was

conducted in stages (sequenced), that they used interactive forms of skill learning (active), that they provided for adequate time and space for developing personal or social skills (focused) and that they specified explicit learning targets and outcome parameters (explicit).

Authors' conclusions: The authors summed up by stating that current data indicated that extracurricular programmes had an overall positive and statistically significant effect on their participants. The effect size of SAFE measures was the same as or greater than those of evidence-based psychosocial approaches for school-aged children assessed in other reviews. The heterogeneity of the effects revealed a large potential for optimisation. Extracurricular programmes deserved to be acknowledged and supported as an important setting for the promotion of psychosocial well-being and adjustment in adolescence.

Focus: mentoring programmes

DuBois et al. (2-5; 2002; M; 55 studies; 1970–1998; under-19s) conducted a meta-analysis and quantitatively summarised the results of 55 studies (including 15 RCTs and 26 CTs) examining the differences in the experiences and behaviours of young people who participated in a mentoring programme. In general, a small effect ($d = 0.23$) was detected on the experiences and behaviours of participants (emotional well-being, problem/risk behaviour, social competence, school performance, professional advancement). Substance use was included in problem/risk behaviour in these studies. Because the outcome variable was not sufficiently differentiated, the results of this meta-analysis could not be included in the conclusions.

Results: 15 studies were available for the calculation of the effect size in the area of problem/risk behaviour. These revealed an effect size of $d = 0.21$, which was similar to the overall effect size. Larger effects were observable for so-called groups at risk.

Authors' conclusions: The study results provided support for the effectiveness of mentoring programmes with adolescents. It appeared not to be significant, for example, whether the programme pursued general health promotion or specific, prevention-related, psychosocial aims. However, effects were small. A large degree of heterogeneity of effect sizes could be observed, which calls for more specific research into factors influencing programme effectiveness.

Focus: environmental prevention in sports clubs and associations

Priest et al. (2-2, 2008; S; 0 studies; 2004–2007; all age groups) aimed to assess the effectiveness of interventions which support sports clubs and organisations in developing regulations for alcohol and tobacco use. These include, for example, smoking bans, campaigns against drink-driving, training service staff and selling non-alcoholic drinks. The search criteria for this review explicitly excluded 'sports performance-enhancing drugs' and 'recreational drug use'. The review was an update of a Cochrane Review first published in 2005.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School LEISURE Media Healthcare Community Legislation and regulations Undifferentiated
Substance	TOBACCO ALCOHOL Cannabis Other illicit drugs Undifferentiated

Results: Despite a thorough literature search (1 591 references), the authors were unable to find controlled individual studies or studies with a pre–post design for the updating of the review. This means that no assertions on effectiveness were possible. Individual studies reported factors promoting or hindering the implementation of regulations.

Authors' conclusions: The authors requested that rigorous evaluation studies be conducted in this field to enable the effectiveness of such efforts to be evaluated.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School LEISURE Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Focus: recreational settings

Akbar et al. (2-1; 2011; S; 14 of 33 studies; 1998–2010; age as the legal age limit for consumption) brought together the results of intervention studies focusing on the prevention and harm-minimisation of polysubstance use in clubs, pubs or discotheques or at festivals or raves. The interventions examined mainly involve training service staff and management to recognise, and to react appropriately to, underage consumers and intoxicated customers. In addition, measures were described that aimed to educate customers about alcohol- and drug-related risks, and that delivered this education partly passively (booklets, posters) and partly actively (education teams).

Results: The measures were presented in detail; however, their effectiveness cannot be assessed on an aggregate level because, to a large extent, they do not report any analysis of effectiveness or the studies are not comparable.

Authors' conclusions: In view of the requirement for appropriate methods, the authors lamented the research vacuum on the effectiveness of measures in the area of polysubstance use in a recreational setting and the identification of key elements.

Bolier et al. (2-7; 2011; S; 17 studies (RCTs, CTs and others); 1991–2009; no specified age) also examined the effectiveness of prevention measures on alcohol (15 studies) and drugs (two studies) in a recreational setting as part of a systematic review. The aim of the examined measures was above all the reduction of use and the prevention of misuse and negative consequences of use. In contrast to the review conducted by *Akbar et al. (2-1)*, however, not all of the included individual studies specified that young people were the target group. Furthermore, results concerning consumption behaviour were only reported in a few studies. The included studies were three RCTs, six CTs, four quasi-experimental time series studies and four pre–post studies without control groups. The content of the analysed interventions focused on training for bar staff, provision of information (to the target group of customers), regulations (e.g. the introduction of new regulations into bars and clubs; observance of age restrictions) and community projects in a nightlife setting, which included various components such as training bar staff and police engagement. The duration and scope of the various interventions was very variable and ranged from one-off training lasting no more than a few hours to interventions that were implemented over several years. The follow-up periods ranged from immediately after the end of the intervention to up to four years.

Results: In the case of the four community interventions, all were successful in having at least one positive effect on the examined outcome parameters, such as the serving behaviour of bar staff, risky alcohol use, alcohol-related injuries or access to alcohol by underage drinkers. Of the six studies aiming to train bar staff, four studies showed effects on the knowledge of the staff, three showed effects on self-reported behaviour, one on observable behaviour and one on traffic accidents. Of the two studies concerning the provision of information, one study found no effects on consumers of party drugs; the other intervention, without a control group, resulted in a reduction in alcohol use among the people reached. Of the five studies concerning regulations, two showed effects on the serving behaviour of bar staff and two resulted in the introduction of a more responsible serving policy, which did not, however, lead to a change in serving behaviour. Two of these studies showed that the effect of enforcement checks on the implementation of these regulations decreased over time.

Authors' conclusions: Interventions in the community setting appeared to have potential for the prevention of substance-related negative consequences. The results on the effectiveness of bar staff training were mixed and largely found effects on subjective outcome variables. Providing information had only minor effects on the attitudes and consumption behaviour of customers. The introduction or changing of regulations has the potential to be effective in relation to a variety of outcome parameters, but the evidence was mixed. Effects were found above all on the serving behaviour of bar staff.

Summary

Substances: Undifferentiated.

Geographical scope: No reviews of research using German-speaking samples.

Conclusiveness of research: Evidence strength level A for extracurricular programmes; hardly any research on measures in the recreational setting or in sports clubs and associations; no substance-specific evaluation of mentoring programmes.

30. Extracurricular programmes to promote personal and social skills have preventive effects on substance use if conducted as high-quality programmes. High-quality extracurricular programmes deliver learning in stages, use

interactive methods, allow sufficient time and space for skill development and specify explicit learning targets and outcome parameters (A 2-5).

31. Extracurricular programmes (including family, healthcare, youth clubs, computer-based measures) have long-term preventive effects on smoking behaviour (A 9-1).
32. There are no evaluations available on the preventive effectiveness of interventions to improve smoking- and alcohol-related regulations in sports clubs and associations (B 2-2).
33. There are no aggregate data available on specific preventive effects of mentoring programmes on substance use. Mentoring programmes have preventive effects on a broader scope of risky behaviour (A 2-5).
34. No assessment of behaviour-related measures intended to minimise harm in nightlife settings can be made because there is a lack of data on their preventive effects on consumption (C 2-1, C 2-7).
35. Interventions in a nightlife setting that involve the community, bar staff and the police may have preventive effects on risky alcohol use and alcohol-related accidents and injuries (C 2-7).

Quantitative indications

Extracurricular programmes on the basis of a meta-analysis: $d = -0.16$ on undifferentiated substance consumption (tobacco, alcohol, cannabis) for high-quality measures.

German-language, evidence-based example

No such example is available.

Media

Individual findings

Mass-media approaches can be conducted through traditional media (TV, radio, print) and/or through new media (the Internet, computers, mobile telephones). Warning labels on cigarette packets are also included as a measure in a media setting.

Focus: new media

The assessment of the effectiveness of universal prevention measures carried out using the Internet, intranets and mobile telephones (e-health) is possible through only one review that examines the use of new media (Internet- and computer-based programmes) in a school setting (Champion et al., 3-30).

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure MEDIA Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol Cannabis Other illicit drugs UNDIFFERENTIATED

Other meta-analyses or reviews do find effects of paediatric e-health interventions on various forms of behaviour promoting and maintaining health (Cushing and Steele, 2010) or on tobacco and alcohol use (Haug et al., 2012; Tait and Christensen, 2010). However, these almost exclusively assess studies on the effectiveness of treatment interventions (smoking cessation) and using evaluations of selective measures, not universal prevention measures.

Champion et al. (3-30; 2012; S; 12 studies (RCTs and CTs); 1992–2012; 11–14 years) conducted a systematic review including 12 studies on the effectiveness of, in total, 10 Internet- and computer-based prevention programmes concerning tobacco, alcohol and cannabis in a school setting. The interventions were delivered over the Internet in seven studies and on CD-ROM in five studies. All the studies originated in the USA and Australia. The majority of the programmes were based on the social influence model (six programmes), with two programmes being based on social cognitive theory and a further two on the transtheoretical model. The interventions mostly comprised six sessions (varying from one to fifteen sessions). Most of the control groups received health education as usual. For eight of the studies on seven programmes, follow-up data were collected after the end of the interventions; the follow-up periods ranged from 6 to 34 months. The authors described the overall quality of the studies as rather weak, despite RCT or CT design.

Results: In total, the level of substance use in the intervention group was found to be lower than that in the

control group for six of the seven analysed programmes at the end of the intervention or at the time of follow-up. Three of five studies found a reduction in tobacco use. All four studies on alcohol found a reduction in use; two studies found a lower frequency of binge drinking. One study examined cannabis and found a significantly lower frequency of consumption. The demonstrated effects of the programmes were small (effect sizes of 0.09 to 0.38; → ORs of 0.36 to 0.71). All programmes shown to be effective in this review had between four and 12 sessions; five of the six effective programmes were based on the social influence model and social cognitive theory.

Authors' conclusions: The results showed that Internet- and computer-based programmes could potentially reduce the consumption of tobacco, alcohol and cannabis among schoolchildren.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure MEDIA Healthcare Community Legislation and regulations Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

Focus: effectiveness of traditional media

Brinn et al. (4-1; 2010; S; 7 studies (RCTs and CTs); 1983–2010; 9–18 years) reported on the effectiveness of traditional mass-media interventions (television, radio, newspapers, distribution of leaflets) on tobacco prevention by assessing seven controlled trials, with or without randomisation.

Results: In total, three of these programmes showed effects. The three successful programmes were characterised by their long duration and the relatively high intensity of the messages, as well as by their targeting of a specific group. In an in-depth examination of one of the four measures, a lower proportion of daily smokers was found to exist in the treatment group compared with an untreated control group. The measure in question was a three-week advertising campaign shown repeatedly over a three-year period.

The combination of school-based measures with media activities (with a duration of 2–4 years) was found to be

more successful than a school-based programme alone in two of three studies.

Authors' conclusions: The authors concluded that the validity of even the most rigorous studies selected was severely restricted. However, there was some evidence that mass-media campaigns can have effects on the initiation of tobacco use. The authors considered it important to broadcast the message using many channels, to combine campaigns with school-based programmes and to ensure repeated exposure.

Focus: denormalisation of the tobacco industry through mass-media programmes

Malone et al. (4-2; 2012; S; 5 studies; 2001–2009; 12–20 years) analyse the effects of mass-media programmes focusing on the denormalisation of the tobacco industry (e.g. the 'Truth Campaign'). Five of the 60 identified studies examined the effects on the initiation of smoking. Overall, these were longitudinal or cross-sectional studies and therefore not intervention studies, which would have allowed causal conclusions to be drawn.

Results: In four of the five studies, the adolescents surveyed were less likely to begin smoking or develop a nicotine dependence if they remembered the campaign content well; the content questioned the credibility of the tobacco industry. This effect could be observed after up to 7 years.

Authors' conclusions: Presumably, the effectiveness of denormalisation of the tobacco industry was caused by synergies between myriad political and cultural influences, which cannot be disentangled. The research suggested that this approach is most effectively delivered at the population level and that increased exposure is generally associated with increased effects. Most research results came, however, from cross-sectional studies, which do not allow causal interpretations.

Focus: warning labels on cigarette packets

Hammond (4-3; 2011; S; 7 studies; unknown until 2011; no specified age) conducted a systematic review of 94 studies on the effectiveness of warning labels on cigarette packets. Seven of the included studies examined the impact of health warnings on the initiation of smoking. These were mainly surveys in which non-smokers reported whether or not the warning messages helped them to remain non-smokers. The warning messages were not evaluated as preventive interventions in terms of possible effects on consumption.

Authors' conclusions: The impact of warning labels on smoking prevalence could not be quantified, but the results of previous research suggest that extensive warning messages both impeded the initiation of smoking and encouraged smoking cessation. Larger warnings with pictures have been found to be significantly more effective than smaller, text-only messages.

Focus: public-service announcements about illicit drugs

Werb et al. (4-4; 2011; M; 11 studies (7 RCTs); 1991–2007; 9–22 years) evaluated public-service announcements about illicit drugs in order to evaluate their effectiveness on consumption or on intention to consume. The authors summarised the results of seven laboratory experiments and four longitudinal observational studies. The seven RCTs tested whether or not the trial participants reported a reduced intention to consume after viewing the public-service announcement. A change in consumption behaviour was not examined in these studies. The observational studies examined whether or not the consumption of the target group changed after viewing local or national campaigns containing such public-service announcements.

Results: Two of the seven RCTs showed a reduction in intention to consume. Five recorded no effect, or even an increase in intention to consume. Three of the observational studies found a reduction in consumption during the observation period and one study reported an increase in consumption.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure MEDIA Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol Cannabis OTHER ILLICIT DRUGS Undifferentiated

The meta-analysis is not significant for the RCT results, but is significant for the observational studies. On average, a 4 % reduction in consumption behaviour could be ascertained, although this occurred only in the subgroup of people with pronounced 'sensation seeking'.

Because of the design of the study, no causal connection could be derived.

Authors' conclusions: The data available from the review and the meta-analysis were not sufficient to support the conclusion that anti-drugs public-service announcements are capable of bringing about a change in intention to consume or self-reported consumption in young people. Although further developments in evaluation methods were necessary, several studies even showed that the measure could have opposite effects (weaker norms, increased intention to consume). This is particularly thought-provoking given the high costs associated with such measures.

Summary

Substances: Research in particular in the area of tobacco, hardly any on alcohol, hardly any on illicit drugs.

Geographical scope: No reviews of research using German-speaking samples.

Conclusiveness of research: Evidence strength levels A to C.

36. Internet- and computer-based preventive interventions in schools can have preventive effects on consumption of tobacco, alcohol and cannabis (B 3-30).
37. Mass-media educational approaches alone appear to achieve no preventive effects (alcohol: B 10-1; tobacco: B 4-1, C 4-2; illicit drugs: A 4-4). No direct causal effect has been demonstrated between mass-media measures and changes in behaviour (B 4-1, C 4-2, A 4-4).
38. Mass-media approaches in traditional media (radio and television advertising) can have preventive effects for tobacco if they are combined with school programmes and developed specifically for the target group (B 4-1).

Quantitative indications

None.

German-language, evidence-based example

No such example is available.

Healthcare

Individual findings

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media HEALTHCARE Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

Focus: alcohol-preventive brief interventions

Wachtel and Staniford (16-1; 2010; S; 14 studies, of which 5 took place in the healthcare setting (RCTs); 1998–2007; 10–25 years) aimed to determine the effectiveness of brief interventions on alcohol use in the healthcare setting. However, during the literature search they found only five studies in this setting, meaning that they had to include also studies from other settings in their review. In their article, the results of the four hospital-based measures and one medical-practice-based measure are presented. All five studies examined the effectiveness of a brief intervention based on motivational interviewing, as opposed to normal discussion or feedback. In this article, the techniques of motivational interviewing were described as 'reflective listening and appreciative communication', as well as 'posing open questions for behavioural exploration'. The focus is on the clients' strengths, with the aim of helping the client to bring about changes.

Results: Three studies' samples presumably also included young people with an increased risk of alcohol misuse (alcohol-related emergency room admissions, intoxicated when interviewed). In two cases, there were effects on alcohol use; in one case, there were effects on the consequences of use.

The two universally oriented interventions, which aimed to motivate participants to examine and question alcohol use behaviour through e-health software on a laptop or through an audio tape, found either no effects or even converse effects.

Authors' conclusions: The experience gained with using brief interventions for clients in the healthcare setting led the authors to recommend the implementation of personal brief interventions oriented around the concept of motivational interviewing with the aim of harm minimisation.

Focus: practice-based tobacco prevention

Christakis et al. (16-2; 2003; S; 4 studies (RCTs); 1996–2001; 10–19 years) reported on studies examining the effectiveness of activities aimed at tobacco prevention in medical and dental practices. They identified only four studies, which could, however, produce relatively conclusive results owing to their design (RCTs), large sample sizes and relatively long follow-up periods.

Results: Of the four evaluated interventions, one showed a small effect on later smoking behaviour. This intervention involved the sending of personalised letters and age-appropriate material on the advantages of remaining a non-smoker. The patients in the practice received one letter every three months for one year. The other interventions involved an advisory consultation at the practice, supplemented by materials or additional elements concerning the effects of smoking on dental health. These measures could not prevent an increase in the number of smokers after two or three years.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media HEALTHCARE Community Legislation and regulations Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

Authors' conclusions: In view of the currently very limited evidence, the authors considered the current demands for tobacco preventive measures in medical practices that have been made in the scientific literature and by professional societies to be somewhat premature. Given the lack of results in comparison with the proven effects that healthcare professionals achieve in other areas of prevention, such as the use of bicycle helmets, the setting of other priorities seemed to make sense,

although tobacco prevention messages are of course worthwhile.

Summary

Substances: Tobacco and alcohol.

Geographical scope: No reviews of research using German-speaking sample groups.

Conclusiveness of research: Evidence strength level B.

39. As a hospital-based, universal approach, an impersonal brief intervention by computer or audio tape oriented around the concept of motivational interviewing appears to have no preventive effects on alcohol use (B 16-1).
40. Educational measures by medical staff can occasionally achieve preventive effects on tobacco use (B 16-2).

Quantitative indications

None.

German-language, evidence-based example

No such example is available.

Community

Individual findings

'Community' is understood here to mean a geographical or political entity (e.g. a neighbourhood, municipality or region) that is smaller, closer to individuals and more amenable to influence by them than a national or federal political structure.

Prevention measures in the community setting take many different forms. Most of them are multicomponent projects incorporating several individual measures (involving school, family, the media, etc.) which are evaluated jointly. Community projects are multicomponent projects that have a community element and are initiated with key stakeholders in the community. In this setting, 'community coalitions' are mentioned frequently, a term which refers to networks made up of organisations and individuals within a community who feel obliged to pursue a certain aim.

Focus: alcohol-preventive community projects

Fagan et al. (5-10; 2011; U; 11 studies; RCTs and CTs; 1997–2009; 8–20 years) examined the effectiveness of community coalitions to prevent alcohol use by underage drinkers in an unsystematic review which included nine high-quality studies that reported positive results on different outcome variables. These outcome variables included initiation of use, drinking behaviour and binge drinking. Several studies also included use of other substances (e.g. tobacco and cannabis) alcohol sales and alcohol-related consequences (e.g. driving under the influence of alcohol and alcohol-related car accidents).

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media Healthcare COMMUNITY Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

All the studies had in common that the coalitions mobilised their communities and selected and implemented appropriate prevention strategies in several settings (e.g. family, school, leisure). An additional aim of several coalitions was to reinforce community-based environmental prevention and to change community norms and regulations/legislation.

Results: All seven studies that succeeded in influencing the alcohol consumption of young people contained a universal school-based prevention programme (life skills or social influence) as part of a community prevention programme with several varied components. Both studies that showed no effect on the consumption behaviour of young people focused on community regulations and norms and were thereby able to reduce the availability of alcohol, driving under the influence of alcohol and alcohol-related accidents. Two studies were found to have been unsuccessful in the measures they implemented. It was observed that this was owing to too little guidance being given to the participating community and the use of very heterogeneous and locally developed, untested individual components. In this review, additional essential key components for the success of coalitions were identified. For example,

coalitions must have clear goals and adequate planning time. Furthermore, an empirical analysis of needs in the community must be carried out and empirically validated prevention components must be selected and implemented. Moreover, the quality of implementation of the measures must be monitored and guaranteed.

Authors' conclusions: The results showed that approaches to community addiction prevention conducted by coalitions can influence alcohol use and misuse in young people. For effectiveness, it is important that the coalitions select and implement evidence-based prevention measures. The implementation of universal school-based prevention programmes as part of these measures is associated with preventive effects on drinking behaviour, binge drinking and drug use in young people below the age of 18.

Focus: alcohol-preventive multicomponent projects

Foxcroft and Tsertsvadze (5-4; 2011c; S; 20 studies (RCTs); 1996–2009; 7–15 years) conducted a Cochrane Review to assess the alcohol preventive effects of multicomponent interventions with components in at least two settings. They included randomised controlled studies with samples of young people below the age of 18 (7–15 years at the start of the intervention). The measures combined various approaches, such as information-giving, refusal training, school-based life skills training, family-based educational, communication and conflict resolution training and various training programmes and behavioural prevention measures in the community. The majority of projects combined individual-oriented school-based measures with interventions in the family. Because of the heterogeneity of the primary studies included in this Cochrane Review, the authors reported no quantitative results.

Results: Of the 20 studies included, 12 found evidence for the effectiveness of interventions in respect of reduced alcohol use, which was measured as weekly drinking, drinking frequency, binge drinking, use in the previous 30 days, lifetime use, heavy use, and volume and duration of use. The preventive effects displayed a temporal duration of three months to a maximum of three years. In seven of the included studies, the individual measures were compared with the multicomponent project; only three studies showed an additional effect as a result of an additional intervention in another setting.

Authors' conclusions: There was some evidence for the effectiveness of preventive multicomponent

interventions in the prevention of alcohol misuse by young people. In this review, the superiority of multicomponent interventions over interventions with only one individual component could not, however, be established.

Focus: alcohol-preventive community policies

Toomey and Lenk (5-11; 2011; U; 6 studies; 1996–2007; no specified age) examined the effectiveness of community policies on alcohol, which can include community regulations on access to alcohol, availability of alcohol, the implementation of sanctions for driving under the influence of alcohol and the implementation of community educational campaigns. Six studies were included in this unsystematic review, of which one study was assessed as a RCT, one as an ITS, three as CTs and one as a pre–post study. Both alcohol use and the negative consequences of use (e.g. driving under the influence of alcohol, alcohol-related accidents and accidental deaths, violence) were used as outcome variables.

Results: All six studies reported effects on at least one negative consequence of alcohol use. Two studies reported effects on the consumption behaviour of young adults.

Authors' conclusions: The reviewed studies showed that changing the community alcohol policy environment could influence alcohol use and the negative consequences of alcohol use in adolescents and adults. It was also clear that it was possible to amend the relevant community regulations even in less willing communities. However, in contrast to legislative measures by legislators at a national level, not just one amendment is required; rather, multiple amendments of regulations and measures are needed.

Focus: tobacco preventive community and multicomponent projects

Carson et al. (5-1; 2011; S; 25 studies (RCTs and CTs); 1989–2009; 8–24 years) examined the effectiveness of preventive community and multicomponent projects on the smoking behaviour of young people aged between 8 and 24 years in a Cochrane Review of controlled studies with and without randomisation. The interventions included in the studies were very varied, with only 13 focusing exclusively and directly on the prevention of smoking. Other studies focused simultaneously on the prevention of cancer or

cardiovascular diseases more generally, on smoking prevention in combination with smoking cessation, on the prevention of use of several substances or on several areas of problem behaviour.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media Healthcare COMMUNITY Legislation and regulations Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

In addition to the interventions at community level, most studies also contained school-based components. Other additional interventions were made through family, peers, media work, sales prohibitions and healthcare service providers. Five studies involved community leaders. The duration of the interventions was very varied and ranged from several weeks to three years; the follow-up intervals ranged from directly after the intervention to 15 years.

Results: Of the twenty-five studies, ten found a significant preventive effect on the smoking behaviour of young people (mostly on whether or not they had ever smoked in their lifetime). Of these ten studies, nine had a longer-term follow-up period (more than twelve months). In thirteen studies, no significant effect was found, and in two studies the control group reported lower smoking rates. Of the successful programmes, nine contained a school-based intervention, six included parents, eight used interventions with a duration of more than twelve months and nine were based on the models of social influence and social learning. Furthermore, five of the seven programmes focusing both on prevention and cessation of smoking were successful. Effects could also be observed in three of the five projects that involved community leaders, and in five of the nine projects involving mass-media components.

Authors' conclusions: There was some evidence for the effectiveness of multicomponent interventions in influencing the smoking behaviour of young people. However, the strength-of-evidence rating was not high and the studies included in the review contained a number of methodological weaknesses.

Focus: multicomponent projects on cannabis prevention

Gates et al. (2-3; 2009; S; 17 studies (RCTs); 1996–2004; 25 years and under) summarised the results of RCTs involving non-school measures for the prevention of illicit drug use. Of these studies, five were multicomponent projects.

Results: Of the five RCTs involving very different multicomponent projects, two showed small preventive effects on cannabis use.

Authors' conclusions: The authors concluded that none of the extracurricular measures had been clearly proven to be effective and that their cost-effectiveness was unknown. Therefore, it was difficult to recommend the implementation of measures until further studies had been conducted.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media Healthcare COMMUNITY Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Summary

Substances: Tobacco, alcohol and illicit drugs.
Geographical scope: No reviews of research using German-speaking samples.
Conclusiveness of research: Evidence strength levels B and D.

- Community projects initiated with key community stakeholders that use a network consisting of organisations and individuals for the implementation of effective prevention measures may have preventive effects (D 5-10).
- Multicomponent projects conducted simultaneously in two or more settings may have alcohol preventive effects (B 5-4).

43. Alcohol-preventive multicomponent projects occasionally display stronger effects than individual measures (B 5-4).
44. Community alcohol policies involving local stakeholders that implement several regulations (restrictions on access to alcohol, on its availability, on driving while under the influence of alcohol) may have preventive effects on the negative consequences of alcohol use (D 5-11), although less so on alcohol use itself (D 5-11, D 5-10).
45. Multicomponent and community projects that have a final or intermediary target of tobacco prevention show preventive effects on tobacco use (B 5-1, A 9-1). This applies in particular to multicomponent projects that include a school-based intervention, include parents and the media, work with peers, last for more than 12 months and aim to achieve both prevention and cessation of smoking (B 5-1).
46. Community projects occasionally show preventive effects with regard to cannabis use (B 2-3).

Quantitative indications

None.

German-language, evidence-based example

No such example is available.

Legislation and regulations

Individual findings

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media Healthcare Community LEGISLATION AND REGULATIONS Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

Focus: pricing

Elder et al. (6-10; 2010; S; 78 studies (CT and ITS); up to 2005; 9 studies with samples with a maximum age of 25 years), as the US Department of Health and Human Services Task Force on Community Preventive Services, assessed the effectiveness of tax increases on the reduction of excessive alcohol use in affluent states, together with its negative consequences. Excessive use is defined as binge drinking, heavy use and underage use. In the USA, studies on this area are mostly controlled intervention studies; outside the USA, they are mainly ITS designs.

Results: 50 studies reported as an outcome parameter alcohol use at population level. In the 38 studies that reported on → price elasticities for alcohol use at population level, 95 % found negative price elasticities of between -0.5 for beer and -0.79 for spirits. A price elasticity of -0.5 implies that an increase in price of 10 % would be associated with a reduction in consumption of 5 %. The remaining 12 studies analysed their data using measures other than price elasticity. Eight studies found an inverse relationship: the higher the purchase price, the lower the consumption at population level. Four studies reported mixed effects. Sixteen studies used individual consumption patterns as the outcome variable. Nine of these had a sample of young people (from high school students to 25-year-olds). Six of these nine studies reported an inverse relationship between purchase price and individually reported alcohol use. Three studies with young age groups reported price elasticities: these were -0.29 for alcohol use (high school) and -0.53 for heavy use (16–21 years) and -0.95 and -3.54 for binge drinking among men and women, respectively, aged 18–21 years. The remaining studies reported mixed results, although mainly inverse relationships.

Authors' conclusions: The majority of studies included in this review showed that higher taxes on alcohol and higher purchase prices were accompanied by reductions in both general alcohol use and excessive alcohol use.

The extent to which these effects were dependent on age, income or consumption pattern was not directly testable. However, there was some evidence that these effects were stronger in groups with more frequent excessive use (e.g. young men). Price increases also had robust effects on the negative consequences of alcohol use.

Focus: effects of alcohol marketing and advertising bans

Jernigan (6-7; 2010; U; 13 studies; 1991–2006; no specified age) provided, in this unsystematic review, an

overview of alcohol marketing and its effects on young people. In a section of this article, the author looked at the effectiveness of health policy interventions in respect of alcohol advertising and cited 13 studies; however, no information on their type and quality was given.

Results: Three of the studies cited by the author concerned advertising measures in the alcohol industry designed to promote responsible drinking and deter underage people from consumption. One study found that the volume of messages promoting ‘responsibility’ was very small compared with classic forms of product advertising. Another study reported that these advertising measures worked by using strategic ambiguity and that adolescents and young adults interpreted their content very differently. One study found little evidence for the effectiveness of such measures with regard to responsible drinking, and also reported that adolescents had a largely positive assessment of the companies issuing these advertising messages and interpreted the content of the messages as ‘pro-drinking’. Few studies have examined the effectiveness of advertising bans on the drinking behaviour of young people. Three studies from one research group consistently found that advertising bans had no effects, although another research group, with partially identical sets of data, did find effects. In a more recent study, in which the authors examined data from two large US surveys on the drinking behaviour of young people, it was found that a 28 % reduction in alcohol advertising would reduce the proportion of young people drinking every month from 25 % to 24–21 % and would reduce the proportion of those binge drinking every month from 12 % to 11–8 %.

Authors’ conclusions: Results of research from longitudinal studies would suggest that alcohol advertising has small but significant effects on the drinking behaviour of young people. Voluntary commitments by the alcohol industry have proven to be ineffective in preventing these effects. Alcohol advertising should be systematically and independently observed, and health policy measures should be implemented by governments in order to reduce the influence of alcohol marketing.

Focus: regulation of cigarette prices

Bader et al. (6-12; 2011; S; 86 studies; 1975–2010; 24 years and under) examined the preventive effects of cigarette tax increases on smoking initiation and progression in smoking intensity among adolescents and young adults to find out for which age groups increases in cigarette taxation would be most effective. They identified

a total of 86 studies with young samples, which were of moderate to strong quality, according to the standards of the Effective Public Health Practice Project Canada.

Results: Among the 22 studies that analysed an effect on the initiation of smoking among young people, nine showed no effect, seven showed positive effects and a further six showed a positive effect in certain cases. Five studies examined progression to different stages in smoking uptake. Of these, three showed a connection between a higher purchase price and lower progression in smoking uptake, while two showed this only in certain cases. Twelve of the 22 studies examined age-related effects within the group of young people: younger teenagers reacted less sensitively to price than older teens. Four studies allowed the assessment of price regulation among young adults and examined its effect on initiation: three of these found no effect and one reported a positive effect. One study tested the effect of price increases on the progression in smoking behaviour of young adults and reported an effect such that transitions to higher levels of smoking uptake were reduced.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media Healthcare Community LEGISLATION AND REGULATIONS Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

Authors’ conclusions: Increasing cigarette prices is an effective tobacco control measure for reducing consumption in young age groups. However, the effect on initiation is less clear. Because most studies were cross-sectional, they were less conclusive than longitudinal studies. The authors recommended increases in taxation in order to increase cigarette prices or other similar measures, such as the imposition of a minimum price, a ban on price-based promotions and a crackdown on cigarette smuggling.

Focus: prevention of sale of tobacco products to minors

Stead and Lancaster (6-2; 2008; S; 35 studies (13 RCTs or CTs); 1983–2007; minors below legal purchase age)

examined the effectiveness of interventions intended to prevent the sale of tobacco products to minors. Of the 35 controlled and longitudinal studies examined in this Cochrane Review, 12 also examined the smoking behaviour of minors as an outcome variable. In the majority of studies, retailers of tobacco products were informed of their legal obligations, feedback was given on compliance with these regulations, warnings were issued on the consequences of non-compliance and non-compliance was sanctioned by the police and health officials.

Results: Four of the six controlled intervention studies that analysed the smoking behaviour of minors as an outcome variable found indications for the effectiveness of measures in the intervention areas in comparison with the control areas. Three of the five uncontrolled longitudinal studies reported reduced smoking rates in association with a reduction in illegal sales.

Authors' conclusions: There was evidence for the relative effectiveness of various interventions intended to reduce the illegal sale of tobacco products to minors. Simply informing sellers of the legal requirements was not enough; the legislative provisions also had to be enforced. The impact of these interventions on the smoking behaviour of minors was very small if the measures did not prevent minors to a sufficient extent from accessing tobacco products.

DiFranza (6-11; 2012; S; 28 studies; 1987–2010; minors below legal purchase age) presented in this article the results of a World Health Organization (WHO) report compiled on the basis of more than 400 studies and 400 government reports on the sale of tobacco to minors. According to the author, this therefore includes 90 % of all available documents on this topic that are otherwise not covered in systematic reviews. The primary objective was to find out which type of interventions intended to prevent the sale of tobacco to minors could be expected to reduce smoking. The review includes 41 studies, with different methods, evaluating the effectiveness of interventions on tobacco use. DiFranza assumes that the effectiveness of regulations is dependent on efforts to enforce them (test purchases, punishments).

Results: Two studies (one CT, one RCT) show that training retailers alone has no effect on the tobacco use of children aged over 12 years. A further two studies (one being a RCT) show that a weak enforcement of provisions intended to protect minors (children as test purchasers, suspension of enforcement because of a legal dispute with retailers) had no effect on the smoking behaviours of young people. In 19 studies in which sales to minors provably and substantially decreased as a

result of the existence or introduction of regulations, there was also strict enforcement of the prohibition on sale (test purchases with older youths, financial penalties); this was associated with a reduction in the prevalence of smokers among young people. Nine studies also reported a reduction in the proportion of smokers, without strict enforcement of regulations having been documented.

Authors' conclusions: The available research results, taken as a whole, indicate that, where interventions succeed in preventing the sale of tobacco to minors, it can be expected that this will lead to a reduction in smoking among young people. This conclusion contradicted the results of earlier reviews, which had concluded that interventions intended to restrict access were ineffective.

Focus: tobacco policy measures

Forster et al. (6-1; 2007; U; 21 studies; 1991–2006; no specified age) examined the effectiveness of tobacco policy interventions on the smoking behaviour of adolescents and young adults in an unsystematic review. The authors reported in particular on the effectiveness of smoking bans (e.g. at home, in school, at work and in the community), restrictions on access to tobacco for young people and taxation measures. The type and quality of the studies included were mentioned only in a few specific cases; occasionally, results from other reviews were included in the results.

Results: Bans on smoking were connected with a slower progression in smoking, a less frequent transition from experimenting with tobacco to regular smoking and an increase in smoking cessation among young people. The results on the effectiveness of restrictions on young people's access to tobacco were inconsistent. Some results supported the effectiveness of regulations for shops selling tobacco and their enforcement. In these cases, young people more often avoided shops by using social sources (e.g. parents, other young people and adults, etc.), but it was shown that young people who used exclusively social sources smoked less than young people who also used commercial sources. There was no strong evidence for the effectiveness of interventions that punished young people for the purchase, possession or use of tobacco products. Adults have proved sensitive to the price of cigarettes and increased taxation of tobacco is associated with a reduction in consumption. Young people are also sensitive to price; however, owing to the often irregular smoking behaviour of this target group, the effects of tax increases are more difficult to estimate. However, tobacco price increases

appear to be very successful among young adults who smoke.

Author's conclusions: There was evidence for the effectiveness of smoking bans in preventing smoking among adolescents and young adults. Randomised studies and longitudinal studies supported a connection between the enforcement of sales prohibitions at retail outlets and a lower prevalence of smoking and tobacco use among young people. There was evidence that an increase in cigarette prices through taxation would reduce smoking among adolescents and young adults.

Friend et al. (6-5; 2011; U; 43 studies; 1986–2010; no specified age) examined the effect of local tobacco policies on the tobacco use (cigarettes and smokeless tobacco) of adolescents and young adults in an unsystematic review. The authors primarily considered the effectiveness of pricing policies, tobacco access restrictions for young people, smoking bans and advertising bans. The quality of the included studies is mentioned only in certain cases.

Results: Studies at national and state levels had shown that higher cigarette prices were related to decreased youth cigarette smoking (three studies). In contrast, less was known about local pricing policies and their impact on youth smoking behaviour. However, because young people are sensitive to price policies (four studies), the impact of price differences of cigarettes and smokeless tobacco products in communities should be investigated further. With regard to access restrictions, the authors reported that even moderate strengthening of checks on outlets can reduce sales to minors, especially if these interventions are publicised in the media and combined with other community and policy activities (nine studies). With regard to the effects of outlet density on the smoking behaviour of young people, the authors summarised the published results as being mixed and unclear (seven studies) and stated that no study to date had investigated the connection between outlet density and consumption of smokeless tobacco products. With regard to the enforcement of punishments for minors caught in possession of tobacco products, the authors cited, *inter alia*, one intervention study and concluded that the evidence for the effectiveness of these interventions was promising (six studies). The authors stated that smoking bans implemented at state level are associated with reduced smoking among young people (six studies); however, the findings for local regulations were not yet clear in this regard (three studies). The authors reported that there was convincing evidence for a connection between tobacco advertising and the initiation of smoking and the smoking behaviour of young people (five studies), but they did not name any study

that had examined the effects of advertising bans on the smoking behaviour of young people.

Authors' conclusions: The effects of local tobacco regulations were not well studied, but they did appear to reduce youth tobacco use. Local tobacco policies to prevent initiation and reduce tobacco use among young people were often focused on restricting sales to young people; however, they could also include the implementation of outlet density regulations, the enforcement of possession regulations, smoking bans and restrictions on advertising. The evidence for the effectiveness of local tobacco policies on young people was mixed and concentrated almost exclusively on smoking. Some studies found no effects for interventions, but the majority of studies were positive.

Differential effectiveness of tobacco control interventions on social inequality

Thomas et al. (6-3; 2008; S; 90 studies; 1961–2005; no specified age) examined, in a systematic review on the basis of 90 studies of extremely varying quality, the effectiveness of various legislative tobacco control instruments on social inequality in smoking. Half of the selected studies originated from the USA and the UK; the remaining studies originated predominantly from Europe, Australia and New Zealand. For several interventions, such as smoking bans, restrictions on sales, warning messages and price increases, the authors reported differentiated results for adolescents and young adults. The selected outcome variables were prevalence and smoking behaviour, as well as a whole series of other indirect indicators for consumption (e.g. sales figures), knowledge and attitude, and other health-related outcome parameters (e.g. mental health).

Results: Three of the included studies examined the effects of smoking restrictions in schools and found that these were more effective for girls than boys and for younger schoolchildren (middle school as opposed to high school). Thirteen studies examined the effectiveness of restrictions on sales to minors. The interventions included educating retailers, with or without additional checks and enforcement of regulations.

Two of these 13 studies found that the interventions influenced the smoking behaviour of girls more than that of boys. However, six studies found no clear differential effects by gender. Three studies found evidence that restrictions on sales were more effective for younger schoolchildren than for older schoolchildren, and four additional studies found inconsistencies in effects by age.

In three studies on warning labels on cigarette packets, there appeared to be no evidence that these changed the attitudes or smoking behaviour of young people. Two studies assessed the effects of the introduction of advertising restrictions and found significant reductions in the prevalence of smoking among children, adolescents and young adults. However, for methodological reasons, in both studies these effects could not be clearly attributed to advertising restrictions and, in addition, there was no evidence of differential effects by gender or age. Twenty studies assessed the effects of cigarette prices on smoking behaviour and found that an increase in price reduced smoking among young people. One study compared various age groups of young people with each other and found that 17- to 18-year-olds reacted more sensitively to price in their smoking behaviour than 13- to 16-year-olds. Four studies found that boys aged between 13 and 18 years were more sensitive to price than girls. Three studies examined the effectiveness of price policy by ethnic background and found that adolescents belonging to ethnic minorities were more affected by price increases than their white counterparts.

Authors' conclusions: Restrictions on smoking in schools were possibly more effective for girls. Sales restrictions for minors were possibly more effective for girls and younger children. Young people under 25 years were affected by price increases and there was some evidence that boys and adolescents belonging to ethnic minorities were more sensitive to changes in price.

Summary

Substances: Tobacco and alcohol.

Geographical scope: No reviews of research using German-speaking samples.

Conclusiveness of research: Evidence strength levels B to D (very few RCTs).

Alcohol

47. An increase in the general alcohol price can have preventive effects for adolescents and young adults (B 6-10, D 6-8).
48. Marketing activities by the alcohol industry that promote responsible consumption may not achieve any preventive effects (D 6-7).
49. Restrictions on alcohol marketing may have preventive effects (D 6-7).

50. Measures for the prevention of the sale of tobacco products to minors may have preventive effects if they are successfully implemented and include both educating the retailers and community and media elements that raise awareness of the topic (B 6-2, C 6-11, D 6-5).
51. Measures to increase the price of cigarettes may have preventive effects on the initiation of smoking behaviour; they may also reduce smoking among adolescents and may reduce the rate at which young adults increase smoking (C 6-12, C 6-3, D 6-5).
52. Male adolescents and adolescents belonging to ethnic minorities may be particularly sensitive to prices (C 6-3).
53. Smoking bans in public places may have preventive effects on the smoking behaviour of adolescents (D 6-1, D 6-5).
54. The effectiveness of penalties for the purchase, possession or use of tobacco products by young people is evaluated inconsistently (D 6-1, D 6-5).
55. The effectiveness of advertising bans for tobacco products cannot be evaluated because there is a lack of evaluation studies (D 6-5).

Quantitative indications

None.

German-language, evidence-based example

No such example is available.

Across several settings

Selective prevention

Results

Focus: children from families suffering from addiction

Bröning et al. (10-4; 2012; S; 13 studies (7 RCTs and 2 CTs); 1994–2009; 0–17 years) identified thirteen studies which tested nine programmes to assess the effectiveness of prevention measures for children from families suffering from addiction. Of these, four were school-based measures, one was a community measure and four were family-based programmes.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family School Leisure Media Healthcare Community Legislation and regulations UNDIFFERENTIATED
Substance	Tobacco Alcohol Cannabis Other illicit drugs UNDIFFERENTIATED

In the majority of cases, the interventions lasted approximately 14 weeks, with weekly sessions of 90 minutes; only the community approach was conducted over two years. The content of the interventions fell into in the areas of managing feelings, problem-solving and education on substances and addiction development, as well as on improving family relationships. The school-based and community-based interventions did not involve, or hardly involved, parents in the preventive work.

Only one conclusive study examined effects on the consumption behaviour of children, and because of the young age of participating children, most studies examined the impact of programme participation on self-esteem, social behaviour and coping skills.

Results: One school-based programme found no effects on consumption prevalence; one family-based programme achieved long-term effects on substance-related problems, although not on consumption.

Authors' conclusions: The small number of studies and the heterogeneous methodological quality of the evaluations allowed nothing more than preliminary conclusions to be drawn. With regard to preventive effects on consumption behaviour, findings were still unclear and required longer-term evaluation. Effects might be expected above all in the form of improved knowledge, coping skills and, to a lesser extent, self-esteem. Furthermore, explanations and solutions for negative effects, in particular in relation to school-based programmes, should be found. In contrast, the family-based programmes appeared to be more successful, which the authors ascribed to an improvement in family life as a result of participation in the interventions.

Focus: family-based programmes

Stolle et al. (1-10; 2010; S; 15 studies (8 RCTs and 2 CTs); 1991–2009; 0–17 years) sought a model for a universal

family programme and assessed 42 individual studies covering 15 programmes. Among these were 11 universal and four selective approaches that deviated strongly with regard to inclusion of families. For eight of the programmes there were RCT studies, for two programmes controlled studies and for the remainder of the measures lower quality studies.

Results: Seven of the eight programmes examined in RCT studies (six universal, two selective) showed effects during a period of at least two years. The two selective programmes addressed behavioural problems at a young age. The effects of one of these programmes on substance dependence were evident at follow-up, when participants had reached adulthood. Both programmes with non-RCTs (one universal, one selective) showed effects on behavioural problems (aggression, social withdrawal) in their young samples (aged nine years and under).

Authors' conclusions: The authors' conclusions related only to their choice of a universal prevention programme and not to the selective approaches.

Thompson et al. (10-2; 2005; BP; 2 programmes; 21 studies; 1986–2003; adolescents and young adults) describe three family-based approaches to treatment and two selective/indicated programmes on the prevention of substance abuse by young people.

Results: The family-based Strengthening Families Program is described as being effective with children from addiction-affected families and, when culturally adapted, as being effective with three ethnic minorities in the USA (three studies). The indicated multisystemic therapy approach was developed for juvenile offenders and has been proven in two RCTs to be effective in the prevention of alcohol and cannabis use (as well as other problem behaviour).

Authors' conclusions: In view of the encouraging results with regard to long-term effects of family-based interventions on youth substance use, the factors associated with these positive results should be researched more thoroughly.

Tobacco preventive programmes of the US National Cancer Institute

Sherman and Primack (3-15; 2009; S; 5 programmes (RCTs); 1993–2000; 10–16 years) examined the effectiveness and characteristics of five programmes aiming to prevent smoking in adolescents from the RTIPs (Research Tested Intervention Programs)

database of the US National Cancer Institute. All five available programmes were aimed specifically at the prevention of smoking, and only one programme included dietary changes as an additional component. Four of the five programmes were aimed at specific groups of adolescents that are typically at higher risk of using tobacco (Native Americans, young people living in tobacco-producing regions and Hispanic migrant farm children).

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

The interventions were very varied and consisted primarily of information-giving, social influences and refusal skills training. Owing to the specificity of the target groups, most also included specially adapted cultural components. The programmes relied primarily on lectures, with additional individual elements being videos as well as role-playing and other interactive components.

Results: Four studies reported findings indicating effectiveness. One programme was successful in reducing the proportion of newly initiated smokers. In addition, it was successful in reducing the number of weekly or more frequent smokers and preventing weekly or more frequent smokeless tobacco use. Another programme resulted in a lower incidence of use of smokeless tobacco products; however, there was no effect on smoking behaviour. The third study achieved an effect on smoking behaviour, but not on the use of smokeless tobacco products. The most recent study reported no effect on the smoking rate.

Authors' conclusions: Only five of the programmes in the database of the US National Cancer Institute aimed to prevent smoking in young people. Programmes that were successful generally targeted specific demographic groups and were often conducted by professional health educators and/or trained community members.

Focus: average effectiveness of all behaviour-related interventions in colleges

Carey et al. (3-18; 2007; M; 62 studies (RCTs); 1985–2007; college students) conducted a meta-analysis covering 62 randomised controlled studies and examined the average short-, medium- and long-term effectiveness of all programmes aiming to prevent alcohol abuse in colleges. To a large extent, the studies they use overlap with those drawn upon by Larimer and Cronce (3-16); however, Carey et al. estimate the average effect of all interventions and do not test individual approaches against each other. Approximately two thirds of the interventions were delivered in personal discussions or in a group context, with the remaining interventions using computerised and/or written feedback. The content included components such as education on alcohol and blood alcohol concentration; normative comparisons; feedback on consumption and consumption problems, expectancies and motives; training in goal-setting; and other skills-based interventions.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

The effectiveness of the interventions is given for various follow-up periods, from immediately after the intervention to up to four years afterwards, and for various outcome parameters (e.g. drinking frequency and volume, frequency of binge drinking and drunkenness, blood alcohol concentration, alcohol-related problems, etc.). Pooled effect sizes are reported for each outcome parameter at each survey time.

Results: At post-test, immediately after the end of the programme, the examined interventions proved effective in comparison with the control group with regard to drinking volume ($d = 0.19$), frequency of heavy drinking ($d = 0.17$) and maximum blood alcohol concentration ($d = 0.41$). At medium-term follow-up (14–26 weeks after programme end), the interventions showed effects on drinking volume ($d = 0.11$), time spent drinking ($d = 0.19$),

frequency of heavy drinking ($d = 0.11$) and alcohol-related problems ($d = 0.12$). At long-term follow-up (27–195 weeks after programme end), there were still observable effects on frequency of drinking days ($d = 0.16$) and alcohol-related problems ($d = 0.14$).

The effect sizes with regard to consumption behaviour were similar among the evaluation studies. This homogeneity prevented an analysis of specific intervention characteristics that may have achieved larger long-term preventive effects on alcohol use. In contrast, specific characteristics could be identified with regard to improved short-term effects on alcohol-related problems. These included: there were more women among the participants; the interventions were delivered individually or personally; motivational interviewing techniques were used; there was feedback on norms, drinking motives and expectancies; or decisional balance exercises were used.

Authors' conclusions: Individual-centred interventions were able to influence the alcohol use of students for up to six months. These interventions were also effective with regard to alcohol-related problems, and effectiveness in this case was proven for longer periods and varied depending on participants and intervention methods. The effects on the intervention group (in comparison with the control group) decreased over time.

Focus: effectiveness of various approaches in colleges (studies up to 2007)

Larimer and Cronce (3-16; 2007; S; 42 studies (RCTs); 1999–2007; college students) examined the effectiveness of interventions intended to reduce alcohol use and prevent alcohol abuse in colleges using 42 randomised controlled studies. The studies examined are roughly allocated to the areas of information-giving/awareness of problems, cognitive/behavioural skills training and motivational feedback/interventions. The results are reported in the section 'Selective prevention', because the participants in the majority of the studies (25 of 42) were selected because of their already heavy alcohol use or membership of a high-risk group. Only the effects on consumption behaviour were assessed.

Results: In the area of information-giving/awareness of problems, those interventions involving the provision of information alone proved to be virtually ineffective (one of 10 studies had positive effects) and the same applied to interventions that aimed merely to clarify consumption-related values (none of three studies had positive results). There was, however, evidence for the effectiveness of normative re-education programmes (six of eight studies

had positive results). There was little evidence for the effectiveness of interventions that were intended to challenge and correct participants' alcohol-related expectancies (two of seven studies had positive results) but some evidence for the effectiveness of retrospective self-monitoring (using a diary; one of one study had positive results). The authors found some evidence for the effectiveness of multicomponent alcohol skills training programmes (three of eight studies had an effect on consumption behaviour) but no evidence for a general life skills training programme (the only relevant study had no positive results). The strongest evidence was found for interventions in the area of motivational/feedback-based approaches. There was strong evidence both for brief motivational interventions (nine of 14 studies had positive results on consumption behaviour) and also for motivational feedback delivered by mail or computer (seven of eight studies had positive results). For specific high-risk groups within this normatively heavily consuming population, it was found that, in general, the same interventions were effective for fraternity/sorority members, athletes, first-year students and students mandated to participate in the interventions as for other students. In an assessment of the selective approaches conducted by the authors of the expert report themselves, the following picture was revealed: three of four studies evidenced an effect for a multicomponent programme, three of three studies for normative education, seven of nine studies for brief motivational interventions and four of six studies for feedback programmes. This means that the results reported by the authors are also applicable to selective prevention, as defined in this expert report (already heavy consumption, fraternity/sorority members, athletes, mandated participants). The use of trained peers for the recruitment of participants, referral and provision of services was proven to be successful in the only study that examined this.

Authors' conclusions: Colleges that wish to implement prevention programmes aimed at individuals should use brief motivational interventions or skills training, preferably incorporating personal normative feedback, training on blood alcohol concentration, behavioural training on risk minimisation and other personalised feedback. The use of computerised feedback can be a sensible first step before personal contact. Several studies that reported gender effects showed that women benefited more from the interventions. The currently available research, albeit preliminary, showed the effectiveness of brief motivational interventions and skills-based programmes for participants mandated to participate in the interventions. Students at high risk because they belong to certain groups were influenced by the measures to the same degree as other students.

The use of trained peers continued to be supported by the results.

Focus: effectiveness of various approaches in colleges (studies 2007–2010)

Cronce and Larimer (3-17; 2011; S; 36 studies (RCTs); 2007–2010; college students) examined, similarly to *Larimer and Cronce (3-16)*, 36 recently published randomised controlled studies on the prevention of alcohol abuse in colleges. The largely selective interventions were aimed at college students, with individual programmes being conceived for special groups (mandated participants, first-year students and athletes). The measures were mainly brief motivational interventions, which mostly involved personalised feedback. Further interventions included feedback on blood alcohol concentration, information-giving and multicomponent programmes that combined educational approaches with motivational components, personalised feedback and other components. Only the results related to effects on substance use were evaluated for this expert report.

Results: 17 studies examined the effectiveness of personalised normative feedback. Of 14 studies in which this feedback was given in person, six achieved a reduction in drinking behaviour, but not in alcohol-related consequences. Four further studies were successful in reducing the consumption of the student participants, which, however, resulted in no significant difference from the control group. In three of four studies that supplemented personalised normative feedback with written material, mail, computer, web or electronic diary, a reduction in drinking behaviour was observed. Of the 17 included studies that examined brief motivational interventions, mostly with additional personalised feedback, 12 resulted in a reduction in drinking behaviour and to some extent also reduced alcohol-related problems. One programme showed a protective effect against the initiation of binge drinking. The two interventions in which the participants' alcohol-related expectancies were challenged resulted in reduced alcohol use. Of two studies that examined the effect of feedback on blood alcohol concentration, one showed that the intervention had been successful in reducing it. In four studies on alcohol education, there were no indications of effectiveness. Five of the eight multicomponent interventions resulted in a reduction in alcohol use and to some extent in an additional reduction in alcohol-related consequences.

Authors' conclusions: The studies examined delivered consistent evidence for the effectiveness of brief

personalised individual motivational interventions and interventions with feedback. There was also weaker evidence for the effectiveness of interventions that challenged alcohol expectancies, and mixed evidence for feedback on blood alcohol concentration. There was no evidence for the effectiveness of educational programmes, and positive, if also mixed, evidence for combined multicomponent programmes consisting of educational, motivational and feedback elements.

Focus: effectiveness of various normative approaches in colleges

Moreira et al. (3-20; 2009; M; 22 studies (RCTs); 1998–2008; 17–24 years) examined the effectiveness of interventions intended to reduce alcohol use and prevent alcohol abuse among college students through influencing the perception of social norms. The interventions can be classified as online or computer feedback (seven studies), individual personal feedback as part of a motivational intervention (eight studies), written feedback by letter (four studies), personal feedback in a group (four studies) and campaigns within the context of social marketing on the topic of consumption norms (two studies). A majority of the interventions in this review were tested on selective samples (high-risk drinkers, students mandated to participate in the intervention, fraternity/sorority students and first-year students). Effects were reported as SMDs between intervention groups and control groups. The follow-up periods are short-term (3 months), medium-term (4–16 months) and long-term (17 months plus). The outcome variables were, *inter alia*, consumption (drinking frequency and/or volume) and binge drinking. The pooled results are grouped according to question asked (outcome variable and follow-up period) and for various numbers of studies (each two to five studies).

Results: Online or computer feedback showed short-term effectiveness on consumption (five studies, SMD = –0.29) and medium-term effectiveness on consumption (three studies, SMD = –0.31) and binge drinking (two studies, SMD = –0.22). Personal feedback showed short-term and medium-term effectiveness on consumption (three studies, SMD = –0.26). Feedback in a group showed short-term effectiveness on consumption (three studies, SMD = –0.32) and binge drinking (four studies, SMD = –0.38). One of the social marketing campaigns showed long-term (three years) effectiveness on consumption (two studies, SMD = –0.06). One study with gender-specific written feedback and one study with gender-specific online or computer feedback were effective in the short-term for drinking volumes in men (SMD = –0.62 and –0.68), although not in women.

Otherwise, written feedback did not prove effective on consumption variables in the short- or medium-term.

Authors' conclusions: Interventions that used online or computer feedback or individualised personal feedback appeared to be effective in reducing alcohol abuse. The evidence for other interventions was mixed. No evidence was found for the effectiveness of written feedback by letter. Overall, this study showed that individualised, personalised interventions based on social norms could effectively reduce alcohol use and abuse in the short- and medium-term.

Focus: computer-based versus non-computer-based approaches in colleges

Carey et al. (3-21; 2009; M; 35 studies (RCTs); 1998–2008; 17–24 years) examined the effectiveness of computer-based interventions (Internet, intranet or CD-ROM/DVD) intended to reduce alcohol use and prevent alcohol abuse among college students. The typical intervention was an approximately 20-minute session containing feedback on the participant's consumption, a normative classification of consumption, alcohol-specific education and individually tailored content. The majority of the interventions in this review were also examined on selective samples (high-risk drinkers, first-year students and mandated students). The follow-up periods were short-term (less than six weeks) and medium-term (six weeks plus).

Results: In the short- and medium-term, a significant effect on alcohol use and problems was found when the intervention group was compared with a group that received no treatment. Depending on the specific consumption variable, the \rightarrow effect strengths were $d = 0.14–0.32$ in the short-term and $d = 0.22–0.32$ in the medium-term. A comparison between computer-based and non-computer-based alcohol-specific programmes (ranging from brochures to personalised brief interventions) revealed no difference in effectiveness.

Authors' conclusions: Computer-based interventions reduced the volume and frequency of alcohol use of college students. Computer-based interventions were in general as effective as non-computer-based approaches and therefore not necessarily preferable.

Focus: meta-analysis of fully automated web-based programme

Tait and Christensen (10-6; 2010; M; 15 studies (RCTs); 2004–2009; under-25s) included only fully automated

web-based programmes and RCTs in their meta-analysis of the effectiveness of Internet-based interventions and identified almost exclusively alcohol-related programmes specifically targeting young, already (heavily) consuming adults in tertiary education facilities. In two studies, effectiveness was also examined on non-drinkers. For adolescents, they found only one measure on tobacco prevention and one on smoking cessation, so this area was not addressed in this report.

Results: The mean effect size of fully automated Internet programmes for young, alcohol-consuming adults/students is $d = -0.12$ on alcohol use (10 studies), $d = -0.35$ on heavy drinking or binge drinking (seven studies) and $d = -0.57$ on the negative consequences of consumption (six studies). The effect size of these programmes on future consumption for non-consumers in this age group is nearly zero and not significant (two studies).

Authors' conclusions: Web-based interventions targeting the alcohol use of young adults in tertiary education facilities appeared to be effective at least in the short-term for current drinkers. These programmes achieved similar effect sizes to personal brief interventions. However, there was no evidence for their use as preventive measures for non-drinkers in this age group. There were insufficient data to assess the effectiveness of these measures for the prevention and cessation of tobacco use among adolescents.

Focus: effectiveness of the 'expectancy challenge' approach

Labbe and Maisto (10-7; 2011; S; 11 studies (9 RCTs); 1993–2008; college students) examined the gender-specific effectiveness of 'expectancy challenge' interventions among young college students. This approach attempts to influence the alcohol-related expectancies of students to cause a change in their drinking behaviour. This takes place through randomised provision of alcohol or a placebo to participants and subsequent group discussions. In these discussions, participants indicate who they believe consumed alcohol, including themselves. In this way, the participants are educated on the role of alcohol-related expectancies. Everyday situations are then analysed with regard to how they influence participants' expectancies.

Results: Five of six studies among male groups showed an effect on consumption behaviour. In contrast, only two of four comparisons among female groups and only one in four comparisons among mixed groups showed

an effect on consumption. In the last case, however, the interventions were primarily adapted or amended versions of the original approach.

Authors' conclusions: 'Expectancy challenges' for male groups were the most effective in influencing expectancies and consumption. In female and mixed groups, expectancies were influenced, but consumption less so. The original format of the intervention should be used, because it contained an in-person challenge intervention and did not rely on a video; in addition, the original intervention included an alcohol/placebo manipulation.

Focus: environmental prevention of alcohol use in colleges

Toomey et al. (10-8; 2007; U; 36 studies; 1999–2006; college students) propose 31 specific environmental measures for alcohol prevention for young college students (selective) and for all college students (universal) and report on research on their effectiveness. Since the previous review in 2002, 36 empirical studies had been published on this topic. However, these measures were examined largely in cross-sectional or uncontrolled designs. There were hardly any evaluations of individual or combined measures among them, meaning that an examination of their causal effectiveness on alcohol use must still be conducted.

Authors' conclusions: The results of the research spoke in favour of environmental prevention measures. However, the recommended strategies had not yet been evaluated or had been only partly evaluated.

Saltz (10-9; 2011; U; 5 studies (2 RCTs and 2 CTs); 2004–2010; college students), in his article, updated the report of *Toomey et al. (10-8)* on the state of the research and presented five more recent evaluation studies in which environmental prevention measures were implemented on college campuses and in the community. These included party patrols, control points checking for driving under the influence of alcohol, social host ordinances and the use of local and campus media to increase the visibility of these strategies.

Results: Two studies found effects on alcohol use, two on the negative consequences of consumption. In one case, effects could be found only in colleges that implemented a certain intensity of environmental preventive efforts.

Author's conclusions: Significant progress had been made over the past decade with regard to prevention

research involving college students. Although there had been only a handful of studies, they clearly established that these types of interventions could influence the alcohol use of students.

Focus: alcohol-preventive brief interventions

Wachtel and Staniford (16-1; 2010; S; 14 studies, of which 5 took place in the healthcare setting (RCTs); 1998–2007; 10–25 years) aimed to determine the effectiveness of brief interventions on alcohol use in the healthcare setting. However, during the literature search they found only five studies in this setting, meaning that they had to include also studies from other settings in their review. In their article, the results of the four hospital-based measures and one medical-practice-based measure are presented. All five studies examined the effectiveness of a brief intervention based on motivational interviewing, as opposed to normal discussion or feedback. In this article, the techniques of motivational interviewing were described as 'reflective listening and appreciative communication', as well as 'posing open questions for behavioural exploration'. The focus is on the clients' strengths, with the aim of helping the client to bring about changes.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family School Leisure Media HEALTHCARE Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

Results: Three studies' samples presumably also included young people with an increased risk of alcohol misuse (alcohol-related emergency room admissions, intoxicated when interviewed). In two cases, there were effects on alcohol use, and in one case there were effects on the consequences of use.

The two universally oriented interventions, which aimed to motivate participants to examine and question their alcohol use behaviour through e-health software on a laptop or through an audio tape, found either no effects or even converse effects.

Authors' conclusions: The experience gained with using brief interventions for clients in the healthcare setting led the authors to recommend the implementation of personal brief interventions oriented around the concept of motivational interviewing with the aim of harm minimisation.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family SCHOOL Leisure Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Focus: counselling on substance abuse in schools

Loneck et al. (3-4; 2010; S; 10 studies; 1991–2007; 11–18 years) attempted to compile results on the effectiveness of professional counselling in preventing alcohol and drug abuse by schoolchildren. The Student Assistance Programs (SAPs) primarily provide professional counselling to individual schoolchildren in schools in the USA that have been referred to a counsellor, and therefore the approach can be considered selective. The approach is mainly based on the problem-solving model, with the aim of reducing consumption.

Results: Of the 10 identified studies, three could be classified as methodologically high quality, two as medium quality and five as weak. Of the high-quality studies, only one examined the effects on consumption behaviour; this study could find no significant effects. The medium-quality studies, however, showed that schoolchildren in schools that offer SAPs tended to use fewer substances than schoolchildren at control schools in which there were no such programmes. In the high-quality studies, there were also several indications of positive effects of this programme on protective factors such as substance use intentions and attitudes.

Authors' conclusions: Because there was a lack of (high-quality) studies in this area, no conclusions could be drawn either for or against the effectiveness of counselling on substance abuse in schools.

Focus: mentoring programmes

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family School LEISURE Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Thomas et al. (2-6; 2011; M; 4 studies (RCTs); 1998–2005; 13–18 years) identified four RCTs aiming to prevent alcohol and/or illicit drug use by teenagers from a total of 233 studies on the effectiveness of mentoring programmes. These structured programmes saw adolescents mostly from minority populations spend regular time with non-professional mentors over a period of more than one year.

Results: Two of three RCTs found significant effects on initiation of alcohol use (RR = 0.71); one of three studies found effects on the initiation of illicit drug use. The fourth study found no significant effect on substance use three years after the end of the programme.

Authors' conclusions: The authors see insufficient evidence to determine whether or not the efforts of stakeholders in the mentoring programmes resulted in less alcohol or drug use. Only three studies found preventive effects, meaning that, from an addiction prevention perspective, only modest benefits can be expected from these extensive efforts.

Focus: effectiveness of non-school measures outside of study conditions

Derzon et al. (5-3; 2005; M; 46 programmes (CT); 1994–1995; 9–17 years) analysed data from 46 programmes intended to prevent alcohol, cannabis and tobacco use by a high-risk group of young people. The behavioural prevention measures were very varied and included information-giving (17 programmes), normative and emotional education (12 programmes), social and life skills training (13 programmes) and structuring of leisure time (5 programmes). Standard protocols were prescribed for evaluation and all 46 sites also used substance use within the past 30 days as a common

outcome parameter. The effect sizes were determined using a pre–post comparison between the intervention group and the control group. Because the interventions differed strongly in their implementation, the effect sizes were adjusted for potential error sources in the effectiveness estimates.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family School LEISURE Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco ALCOHOL CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Results: An adjustment of the results was carried out for the extent of treatment received by the control group, for the intensity (the number of hours per week during which the programme was implemented) and for the coherence of the programme (the strength of the theoretical foundations and the rationale of the intervention and how intensively the implementers were trained). Through this adjustment, the authors achieved a simulated effect size that improved from 0.022 to 0.243 (the latter figure is for the interventions that were intensive and coherent). The resulting effect size was statistically significant.

Authors' conclusions: The analysis made it clear just how important it was to include study-specific methodological and procedural differences in assessing the effectiveness of prevention measures. The results indicated that prevention programmes for adolescents could result in significant positive effects in comparison with untreated groups if these programmes were of a certain intensity and demonstrated a clearly communicated and correspondingly implemented rationale. When these study characteristics were taken into account, it could be seen that differences in theoretical approach were possibly insignificant for effectiveness.

Focus: prevention of drug use in risk groups

Roe and Becker (10-3; 2005; S; 16 studies (RCTs and CTs); 1994–2003; 3–24 years) assessed 16 studies that examined the effectiveness of a measure intended to

prevent illicit drug use by high-risk groups. Studies were considered only if they examined consumption behaviour as an outcome parameter. In these studies, 'high-risk' was defined using the following indicators: 'low socioeconomic status' (seven studies), 'individual had already shown problem behaviour' (six studies) and 'children from families affected by addiction' (four studies). Nine interventions were in a school setting, five were in a community setting, one programme was in a children's care home and one measure was a family programme.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family School Leisure Media Healthcare Community Legislation and regulations UNDIFFERENTIATED
Substance	Tobacco Alcohol CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Results: Seven of the school-based programmes could be classified as a social influence model or life skills approach. Four of these were embedded in a universal prevention framework. The target groups participated in these programmes together with their fellow schoolchildren and in one case also received additional elements. Three studies showed effects for the high-risk group. The other three school-based programmes had an indicated prevention approach; two of these achieved effects on illicit drug use. Considering all settings, only one of the four measures that were educational or counselling-based had an influence on the behaviour-related outcome parameter. In the two interventions that also included the parents, it was not possible to show an effect on (later) illicit use by the children. Finally, one of the two multicomponent approaches was effective. This intervention contained individual components in family and leisure settings and also included a case manager who established, planned and coordinated the individual measures.

Authors' conclusions: The review showed that there was higher quality research on this target group, at least in the USA. Universal, school-based programmes that were (life) skills-oriented achieved positive effects for the high-risk groups; specific elements for this target group would probably bring even greater benefits as part of universal programmes. The critical age for the

implementation of indicated prevention of illicit drug use was 11–13 years. Because a considerable proportion of adolescents in this group were not to be found in schools, other settings were very important here. The authors emphasise here the multicomponent project that included a case manager. While understanding the importance of parental and family factors for the development of this target group, it is important to understand also that there are measures that can be effective in prevention without family components, given that many high-risk adolescents may not be in contact with their parents or families.

Focus: non-school programmes

Gates et al. (2-3; 2009; S; 17 studies (RCTs); 1996–2004; 25 years and under) summarised the results of RCTs involving non-school measures for the prevention of illicit substance use.

Results: Two studies examine the effects of non-school selective group programmes that provide education on the risks of substance use and teach general skills. The interventions were found to have no effects on consumption behaviour. One brief intervention and one hour-long discussion based on motivational interviewing resulted in effects on cannabis use in small samples of clinic patients and/or college students.

Authors' conclusions: The authors concluded that none of the non-school measures had been shown unequivocally to be effective and that their cost-effectiveness was unknown. It was therefore difficult to recommend the implementation of measures until more research had been conducted.

Results	Effectiveness
Target group	Universal SELECTIVE Undifferentiated
Setting	Family School LEISURE Media Healthcare Community Legislation and regulations Undifferentiated
Substance	Tobacco Alcohol CANNABIS OTHER ILLICIT DRUGS Undifferentiated

Conclusions

Substances: Almost exclusively alcohol, few illicit drugs.

Geographical scope: No reviews of research using German-speaking sample groups.

Conclusiveness of research: Evidence strength levels A to D; several meta-analyses in the area of alcohol use in colleges.

Family

- In childhood, selective approaches involving the supervision and assistance of first-time parents by midwives and nursing professionals or skills training with children displaying problem behaviour and their parents can have preventive effects on later alcohol use in adolescence (B 10-1).
- Family programmes can be used for children from families affected by addiction to change risk factors for later alcohol use. Nothing can be said on preventive effects on consumption behaviour on an aggregate level because there is a lack of long-term studies (B 10-4, D 10-2).

School

- School-based skills programmes can be used for children from families affected by addiction to change risk factors for later alcohol use. Nothing can be said on preventive effects on consumption behaviour on an aggregate level because there is a lack of long-term studies (B 10-4, D 10-2).
- Universal, school-based programmes focusing on (life) skills can have preventive effects on illicit drug use of high-risk groups that are being reached by these measures; additional indicated elements can bring even greater benefits for this target group (B 10-3).
- Selective measures that use life skills programmes in a school setting can have preventive effects on the alcohol use of older adolescents (16–20 years) (B 10-1).
- The effectiveness of counselling in schools cannot be evaluated because there is a lack of studies (B 3-4).

62. Tobacco preventive measures with groups with an increased risk of tobacco use may have preventive effects (C 3-15).

College — alcohol

63. Behaviour-related measures with students have preventive effects on alcohol use. They are small and of medium-term duration (up to six months) and also achieve effects on alcohol-related problems (A 3-18).

64. Online and computer feedback comparing the participant's drinking behaviour with the drinking behaviour of peers has short-term preventive effects and can have medium-term preventive effects (A 3-20).

65. Measures that use normative feedback as part of a personal brief intervention or a group session can have preventive effects on alcohol use (A 3-20).

66. Written feedback appears to have no preventive effects on alcohol use (A 3-20).

67. Computer-based alcohol-related interventions have preventive effects on short-term and medium-term alcohol use behaviour (A 3-21).

68. Computer-based alcohol-related interventions have similarly small preventive effects on short-term and medium-term alcohol use behaviour to other, non-computer-based alcohol-related brief interventions (A 3-21).

69. Purely web-based alcohol-related programmes for young adults who are already consuming alcohol have preventive effects on consumption, heavier consumption and alcohol-related problems (A 10-6).

70. Purely web-based alcohol-related programmes appear to have no preventive effects on the future alcohol use of non-drinkers (A 10-6).

71. There are differences in the effectiveness of different approaches (A 3-18, against B 3-16, B 3-17).

- a. Personal motivational brief interventions can have preventive effects (B 3-16, B 3-17).
- b. Normative education can have preventive effects on alcohol use (B 3-16).

c. Measures that challenge alcohol-related expectancies in gender-specific groups using drinking experiments can have preventive effects (B 10-7).

d. Information-giving alone appears to have no preventive effects (B 3-16, B 3-17).

e. Clarification of values appears to have no preventive effects (B 3-16).

f. Multicomponent approaches can have preventive effects (B 3-16, B 3-17).

72. Measures for alcohol prevention in the college setting may have preventive effects on consumption and its negative consequences (D 10-8, D 10-9).

Leisure/healthcare/community

73. Mentoring programmes can have preventive effects on alcohol and illicit drug use (A 2-6).

74. Non-school measures appear to have no preventive effects on cannabis and illicit drug use (A 5-3, B 2-3, B 10-3).

75. Non-school prevention programmes can achieve preventive effects on substance use if they have a certain intensity and demonstrate a clearly communicated and correspondingly implemented rationale (A 5-3).

76. As a hospital-based, selective approach, personal brief interventions based on the concept of motivational interviewing can have preventive effects on alcohol or cannabis use (B 16-1, B 2-3).

77. Indicated prevention in the form of a multicomponent project with a case manager can have preventive effects on alcohol and illicit drug use (B 10-3).

Quantitative indications

Behavioural prevention for the reduction of alcohol use in colleges: $d = 0.1-0.3$; via computer feedback, up to 0.4.

German-language, evidence-based example

No such example is available.

Negative effects

No current review of negative effects of prevention measures could be found during the literature search. Whether individual interventions also led to negative results was noted only during the general evaluation of measures. These findings are reported in the description of each review. It was therefore not possible to draw conclusions based on reviews in this regard.

However, it is indisputable that prevention measures can also have inverse effects. Of the publications evaluated in this expert report, reference can be made to iatrogenic effects in the following works: Thomas et al. (1-4, 2007; family, universal tobacco prevention), Fletcher et al. (3-2; school system, universal addiction prevention), Foxcroft and Tsertsvadze (3-3, 2011b; school, alcohol prevention), Wachtel and Staniford (16-1; healthcare, alcohol prevention), Werb et al. (4-4; media, illicit drug use prevention) and Carson et al. (5-1; community, tobacco prevention). In most cases, this concerns one or two studies covered by each of the reviews mentioned above. Whether this is because addiction prevention measures are generally harmless or because negative effects are less frequently published in the literature cannot be decided on the basis of the available data, but it is important to bear the question in mind.

Gender specificity

No current review on gender-specific effects of prevention measures could be found during the literature search. However, several reviews allow conclusions to be drawn concerning gender specificity.

Preventive effects associated with the price regulation of cigarettes may be stronger for male than for female adolescents (C 6-3).

Female-specific family programmes can have preventive effects for alcohol use (B 1-1).

Gender-specific feedback on alcohol use as part of selective prevention with male college students can have preventive effects (A 3-20).

Expectancy-challenge interventions using drinking experiments as part of selective prevention with college students can have preventive effects only when the approach is gender-specific (B 10-7).

Efficiency

In addition to the question of effectiveness (efficacy), in times of financial restrictions, the question of cost-to-benefit ratio (efficiency) of addiction prevention measures is also relevant. The search strategy used for the updating of this expert report found only several individual studies and no reviews on this subject.

Tobacco prevention

In addition to the results already described for the various settings, one further review was included, which contains assertions on the long-term effectiveness of a group of tobacco prevention measures cutting across several settings.

Results	Effectiveness
Target group	UNIVERSAL Selective Undifferentiated
Setting	Family School Leisure Media Healthcare Community Legislation and regulations UNDIFFERENTIATED
Substance	TOBACCO Alcohol Cannabis Other illicit drugs Undifferentiated

Müller-Riemenschneider et al. (9-1; 2008; M; 35 studies (RCTs); 2001–2006; 7–17 years) examined the long-term effectiveness (12–120 months) of tobacco prevention using 35 recent high-quality studies. The interventions were classified as school-based, as community-based and as multicomponent interventions. In the school setting, various interventions were analysed, such as information-giving, normative approaches, life skills programmes and class competitions. The community approaches included family interventions, interventions by medical specialists, interventions in youth clubs and computer interventions. Multicomponent approaches were school-based programmes supplemented by additional components in an additional setting; these were mainly family-based programmes or included parents, or they included additional community components or individual feedback by letter. The effects on smoking initiation and smoking behaviour were pooled across the studies (depending on approach and outcome between one and five studies).

Results: Of 14 studies in the school setting, nine were of high quality. Of these, only two reported significant preventive effects. The pooled overall effect was insignificant both for smoking initiation (OR = 0.94) and for smoking behaviour (30 days OR = 0.87; regular OR = 0.88). When including the studies of acceptable quality, the effects on current smoking were marginally significant (OR = 0.79; regular OR = 0.80). Of 10 studies in the community setting, seven were of high quality and four of these reported preventive effects. The pooled effects were significant for current smoking (OR = 0.85). Of 11 studies on multicomponent interventions, six were of high quality; four of these reported preventive effects. The pooled effects were significant for smoking initiation (OR = 0.73) and for regular smoking (OR = 0.59). Both interventions that had a target group of children aged seven years and that included the parents in the interventions showed preventive effects. Of the eight studies with a follow-up period of more than three years, seven showed preventive effects.

Authors' conclusions: The evidence for the long-term effectiveness of school-based prevention programmes was not unequivocal, and the evidence for community approaches and multicomponent interventions was moderate.

School-based tobacco prevention measures alone have no long-term (> 12 months) preventive effects on smoking behaviour (A 9-1; see conclusion 16).

Multicomponent programmes (a school programme combined with a family-oriented or community measure) have short-term and long-term preventive effects on smoking initiation and smoking behaviour (A 9-1; see conclusion 45).

Non-school programmes (including in the family, healthcare and youth club settings, and computer-based measures) have long-term preventive effects on smoking behaviour (A 9-1; see conclusion 31).

Conclusions

Substances: Tobacco.

Geographical scope: No reviews of research using German-speaking sample groups, only several German studies on smokefree class competitions ('Be smart — don't start').

Conclusiveness of research: Evidence strength levels A to D; more high-quality studies in the area of behavioural prevention.

Family

- Family-based interventions demonstrate occasional preventive effects on consumption of tobacco (B 1-4).

School

- General programmes based on the social influence model, on the life skills approach or on the cognitive behavioural skills approach have preventive effects on smoking behaviour of the entire group of smoking and non-smoking schoolchildren (A 3-10), but appear to have no effects on the initiation of smoking (A 3-13).
- The D.A.R.E. programme (information-giving, emotional education and refusal skills training, conducted by police officers) has no tobacco preventive effects (A 3-9).
- Information-giving alone appears to have no effects on smoking behaviour (B 3-11, B 3-13).
- School-based tobacco prevention measures alone have no long-term (> 12 months) preventive effects on smoking behaviour (A 9-1).
- Class competitions have preventive effects on the entire group of smoking and non-smoking schoolchildren (A 3-32), but appear to have no effects on the initiation of smoking (A 3-38).
- The effectiveness of school tobacco policies cannot be assessed because there is a lack of studies (B 3-7).
- Measures addressing the school system by implementing school action teams and by focusing on the improvement of school life and on the implementation of substance-specific components can have preventive effects on tobacco use (B 3-2).
- Multicomponent programmes (a school programme combined with a family-oriented or community measure) have short-term and long-term preventive effects on the initiation of smoking and smoking behaviour (A 9-1, B 3-13).
- The supplementing of school-based interventions with family-oriented elements appears to achieve no additional tobacco preventive effect (B 1-4).

Leisure

- Non-school programmes (including in the family, healthcare and youth club settings, and computer-based measures) have long-term preventive effects on smoking behaviour (A 9-1).
- There are no evaluations available on the preventive effectiveness of interventions to improve smoking-related regulations in sports clubs and associations (B 2-2).

Media

- Internet- and computer-based preventive interventions in schools can have preventive effects on consumption of tobacco (B 3-30).
- Mass-media approaches in traditional media can have preventive effects for tobacco if they are combined with school programmes and developed specifically for the target group (B 4-1).

Healthcare

- Educational measures by medical staff can occasionally achieve preventive effects on tobacco use (B 16-2).

Community

- Multicomponent and community projects that have a final or intermediary target of tobacco prevention show preventive effects on tobacco use (B 5-1, A 9-1). This applies in particular to multicomponent projects that contain a school-based intervention, include parents and the media, work with peers, last for more than 12 months and aim to achieve both prevention and cessation of smoking (B 5-1).
- Multicomponent programmes (a school programme combined with a family-oriented or community measure) have short-term and long-term preventive effects on smoking initiation and smoking behaviour (A 9-1).

Legislation and regulations

- Measures to prevent the sale of tobacco products to minors can have preventive effects if they are successfully implemented and include both education

of retailers and the community and media elements that raise awareness of the topic (B 6-2, C 6-11, D 6-5).

- Measures to increase the price of cigarettes may have preventive effects on the initiation of smoking behaviour; they may also reduce smoking in adolescents and may reduce the rate at which young adults increase smoking (C 6-12, C 6-3, D 6-5).
- Male adolescents and adolescents belonging to ethnic minorities may be particularly sensitive to price (C 6-3).
- Smoking bans in public places may have preventive effects on the smoking behaviour of adolescents (D 6-1, D 6-5).
- The effectiveness of penalties for the purchase, possession and use of tobacco products by young people is evaluated inconsistently (D 6-1, D 6-5).
- The effectiveness of advertising bans for tobacco products cannot be evaluated because there is a lack of evaluation studies (D 6-5).

Selective approaches

- School-based tobacco preventive measures with groups with an increased risk of tobacco use may have preventive effects (C 3-15).

Gender specific

- Preventive effects associated with the price regulation of cigarettes may be stronger for male than for female adolescents (C 6-3).

Quantitative indications

Effects of community and multicomponent interventions on smoking initiation and smoking behaviour: ORs from 0.85 to 0.59.

Effectiveness of school-based programmes on smoking behaviour: between 0.1 and 0.2, up to 0.3, mean weighted effect size *d*.

Alcohol prevention

Results

In addition to the results already described in the various settings, one further review has been analysed, which contains assertions on the most promising programmes and measures for the general assessment of the effectiveness of alcohol prevention.

Spoth et al. (10-1; 2008; S; 127 programmes; 1980–2006; 0–20 years) proposed a different method of identifying alcohol preventive measures to be recommended. From a total of 400 screened interventions, they examined the state of evidence for 127 programmes. Rigorous criteria had to be fulfilled in order to classify the evidence as 'most promising' or 'mixed or emerging' rather than as 'insufficient'. The measures were subdivided into three age groups: under-10s, teenagers aged between 10 and 15 years, and teenagers aged between 16 and 20 years. The criteria for effectiveness for under-10s included aggressive behaviour, the most significant predictor of later alcohol abuse; however, two studies reported follow-up data after 7 or 13 years and thus had consumption in adolescence as an outcome parameter. Both of the older age groups had alcohol use behaviour as an outcome parameter.

Results: According to the criteria for ensuring effectiveness used in this work, there were five promising programmes for under-10s. Of these, three were universal and two were selective. The universal measures worked in the overlapping settings of family and school and had a minimum duration of five school years. In one of the selective measures, midwives and nursing professionals worked with first-time mothers, while the other measure involved working with children with disruptive social behaviour and their parents on developing skills. Both of these selective measures showed long-term effects on alcohol use in adolescence.

For the second group of children, those aged between 10 and 15 years, four measures were classified as most promising. These were all universal, with one each in the settings of family and school and the other two being community approaches with many components.

Results	Effectiveness
Target group	UNIVERSAL SELECTIVE Undifferentiated
Setting	Family School Leisure Media Healthcare Community Legislation and regulations UNDIFFERENTIATED
Substance	Tobacco ALCOHOL Cannabis Other illicit drugs Undifferentiated

For the third age group, that of 16- to 20-year-olds, the three most promising measures consisted of one universal programme in the workplace setting, one selective and indicated school-based measure and one indicated intervention within a community project.

Environmentally oriented prevention measures (media, regulations and their implementation) that met the highest standards of effectiveness of this review could not be identified for the two younger age groups up to the age of 16. With regard to effectiveness for the older age group, there was only 'mixed or emerging' evidence for interventions that aimed to reduce alcohol sales to underage young people and reinforce age controls, or, at a community level, to influence the acceptance of selling alcohol to underage youngsters and of adolescents using alcohol. Strong evidence could not be found for any alcohol-specific media campaign. Finally, increasing the legal age limit for alcohol use by children and adolescents was a measure with only 'mixed or emerging' evidence of effectiveness.

Authors' conclusions: The authors concluded that their review identified several universal and selective prevention measures that significantly reduced the alcohol use rate in participating adolescents and underage populations or reduced risk factors associated with a high probability of later alcohol use among children.

In the opinion of the authors, despite the advances in prevention research, there were still gaps with regard to prevention measures for 8- to 12-year-olds, older adolescents aged between 16 and 20, young adults not attending college and members of minority groups.

In childhood, selective approaches involving the supervision of first-time parents by midwives and nursing professionals or skills training with children displaying problematic behaviour can have preventive effects on later alcohol use in adolescence (B 10-1; see conclusion 56).

For ten- to 15-year-olds, certain universal measures can have preventive effects. These are, for example, a family programme, a school-based culturally sensitive curriculum based on social influence, and community prevention projects where measures are implemented in the contexts of school, family, media and community domains (B 10-1).

For older adolescents (16–20 years), universal measures that provide stress management training in the workplace can be effective (B 10-1).

For older adolescents (16–20 years), selective measures that implement life skills programmes at school can be effective (B 10-1; see conclusion 60).

Environmental preventive measures (age limit for legal consumption, enforcement of sales prohibitions, community public relations work on reducing the acceptance of alcohol sales to and alcohol use by young people) can have preventive effects for 16- to 20-year-olds (B 10-1).

Conclusions

Substances: Alcohol.

Geographical scope: No reviews of research using German-speaking samples.

Conclusiveness of research: Evidence strength levels A to D; more high-quality studies in the area of behavioural prevention.

Family

- Parental training and family programmes have preventive effects on alcohol use (A 1-2, B 1-1, B 10-1).
- Alcohol preventive effects can be determined for initiation and frequency of use (A 1-2).
- Alcohol preventive effects through family programmes can be long term (> 4 years) (A 1-2, B 1-1).
- Family programmes aimed specifically at girls can have preventive effects for alcohol (B 1-1).

School/workplace

- School-based measures targeted specifically at alcohol can have preventive effects (B 3-3).

- General measures intended to change several types of problematic behaviour show occasional preventive effects on alcohol use. Among these, however, specific programmes targeting the promotion of psychosocial development can have preventive effects. These are certain life skills programmes and one behaviour management programme for the classroom (B 3-3, B 10-1).
- Certain general programmes can be more effective than alcohol-specific programmes (longer-term effects, effects on drunkenness and binge drinking) (B 3-3).
- Measures addressing the school system by implementing school action teams and by focusing on the improvement of school life and on the implementation of substance-specific components can have preventive effects on alcohol use (B 3-2).
- The D.A.R.E. programme (information-giving, emotional education and refusal skills training conducted by police officers) has no preventive effects on the consumption of alcohol (A 3-9).
- For older adolescents (16–20 years), universal measures that provide stress management training in the workplace can be effective (B 10-1).

Leisure

- Extracurricular programmes to promote personal and social skills have preventive effects on substance use if conducted as high-quality programmes. High-quality extracurricular programmes deliver learning in stages, use interactive methods, give sufficient time and space for skill development and specify explicit learning targets and outcome parameters (A 2-5).
- There are no evaluations available on the preventive effectiveness of interventions to improve alcohol-related regulations in sports clubs and associations (B 2-2).
- Interventions in a nightlife setting that involve the community, bar staff and the police may have preventive effects on risky alcohol use and alcohol-related accidents and injuries (C 2-7).

Media

- Internet- and computer-based preventive interventions in schools can have preventive effects on consumption of alcohol (B 3-30).
- Alcohol-specific media campaigns alone appear to achieve no preventive effects (B 10-1).

Healthcare

- As a hospital-based, universal approach, an impersonal brief intervention by computer or audio tape based on the concept of motivational interviewing appears to have no preventive effects on alcohol use (B 16-1).

Community

- Multicomponent projects conducted simultaneously in two or more settings can have alcohol preventive effects (B 5-4, B 10-1).

Legislation and regulations

- Environmental preventive measures (age limit for legal consumption, enforcement of sales prohibitions, community public relations work on reducing the acceptance of alcohol sales to and alcohol use by young people) can have preventive effects for 16- to 20-year-olds (B 10-1).
- An increase in the general alcohol price can have preventive effects for adolescents and young adults (B 6-10, D 6-8).
- Marketing activities by the alcohol industry that promote responsible consumption may not achieve any preventive effects (D 6-7).
- Restrictions on alcohol marketing may have preventive effects (D 6-7).

Selective approaches for groups with increased risk

- In childhood, selective approaches involving the supervision and assistance of first-time parents by midwives and nursing professionals or skills training with children displaying problem behaviour can have preventive effects on later alcohol use in adolescence (B 10-1).

- School-based life skills programmes and family programmes can be used for children from families affected by addiction to change risk factors for later alcohol use (aggression). Nothing can be said on preventive effects on consumption behaviour on an aggregate level because there is a lack of long-term studies (B 10-4, D 10-2).
- For older adolescents (16–20 years), selective measures that implement life skills programmes at school can have preventive effects on alcohol use (B 10-1).
- Behaviour-related measures with students have preventive effects on alcohol use. They are small and of medium-term duration (up to six months) and are also effective on alcohol-related problems (A 3-18).
- Online and computer feedback comparing the participant's drinking behaviour with the drinking behaviour of peers has short-term preventive effects and can have medium-term preventive effects (A 3-20).
- Written feedback for students appears to have no preventive effects on alcohol use (A 3-20).
- Measures that use normative feedback as part of a personal brief intervention or a group session can have preventive effects on alcohol use (A 3-20).
- Personal motivational brief interventions with students can have alcohol preventive effects (B 3-16, B 3-17).
- Computer-based, alcohol-related interventions have preventive effects on short-term and medium-term alcohol use behaviour (A 3-21).
- Computer-based alcohol-related interventions have similarly small preventive effects on short-term and medium-term alcohol use behaviour to other, non-computer-based, alcohol-related brief interventions (A 3-21).
- Purely web-based alcohol-related programmes for young adults who already consume have preventive effects on consumption, heavier consumption and alcohol-related problems (A 10-6).
- Purely web-based alcohol-related programmes appear to have no preventive effects on the future alcohol use of non-drinkers (A 10-6).

- Multicomponent approaches with students can have preventive effects (B 3-16, B 3-17).
- Information-giving alone appears to have no preventive effects with students (B 3-16, B 3-17).
- Clarification of values appears to have no preventive effects (B 3-16).
- Measures that challenge alcohol-related expectancies in gender-specific groups using drinking experiments can have preventive effects (B 10-7).
- As a hospital-based, selective approach, personal brief interventions based on the concept of motivational interviewing can have preventive effects on alcohol use (B 16-1).
- Indicated prevention in the form of a multicomponent project with a case manager can have preventive effects on alcohol use (B 10-3).

Quantitative indications

Family-oriented programmes on the basis of a meta-analysis: between $OR = 0.71$ for initiation of alcohol use and $d = -0.25$ for reduction of alcohol use. Long-term effects up to four years, $OR = 0.53$. Behavioural prevention for the reduction of alcohol use in colleges: $d = 0.1$ to 0.3 ; by computer feedback, up to 0.4 .

Prevention of illicit drug use

Results

No additional reviews were identified that examined the effectiveness of prevention of illicit drug use across multiple settings.

Conclusions

Substances: Illicit drugs.

Geographical scope: No reviews of research using German-speaking samples.

Conclusiveness of research: Evidence strength levels A to B (exclusively results for behavioural prevention).

Family

- Family-based measures demonstrate occasional preventive effects on cannabis use (B 2-3).

School

- Behavioural, school-based prevention programmes have preventive effects on cannabis use (A 3-8, A 3-1).
- Skills-oriented and more comprehensive programmes can have a larger preventive effect on cannabis and other illicit drug use than other programmes (A 3-1, A 3-8).
- Information-giving and emotional education alone appear to achieve no preventive effects on cannabis use (A 3-1); however, when combined with skills-oriented approaches, they can be more effective than social influence measures on their own (A 3-8).
- In cannabis prevention, programmes are effective when interactive methods are used, but not when non-interactive methods are used (A 3-8).
- Longer programmes (> 15 hours) have larger effects on cannabis use than shorter programmes (A 3-8).
- Behaviour-related programmes are more effective for children 14 years of age or older than for those under the age of 14 years (A 3-8).
- In cannabis prevention, delivery of programmes by external specialists is more successful than delivery by teachers (A 3-8).
- In cannabis prevention, delivery of life skills programmes by peers is more successful than delivery by teachers (A 3-1).
- The D.A.R.E. programme (information-giving, emotional education and refusal skills training conducted by police officers) has no preventive effects on illicit drug use (A 3-9).

Leisure

- No assessment of behaviour-related measures intended to minimise harm in nightlife settings can be made because there is a lack of data on their preventive effects on consumption (C 2-1, C 2-7).

Media

- Internet- and computer-based preventive interventions in schools can have preventive effects on cannabis use (B 3-30).

Community

- Community projects show occasional preventive effects on cannabis use (B 2-3).

Legislation and regulations

- None.

Selective approaches for groups with increased risk

- Selective mentoring programmes can have preventive effects on illicit drug use (A 2-6).
- Non-school measures appear to have no preventive effects on cannabis and illicit drug use (A 5-3, B 2-3, B 10-3).
- As a hospital-based, selective approach, personal brief interventions based on the concept of motivational interviewing can have preventive effects on cannabis use (B 2-3).
- Indicated prevention in the form of a multicomponent project with a case manager can have preventive effects on illicit drug use (B 10-3).

Quantitative indications

Effectiveness of school-based programme on cannabis use: up to 0.6 mean weighted effect size *d*.

Prevention of problematic gambling behaviour

Results

Gray *et al.* (14-1; 2007; S; 13 studies (RCTs); 1966–2006; 11–46 years) found 13 randomised studies on the effectiveness of prevention in the area of gambling addiction, published up to 2006 in specialist journals and grey literature, for their meta-analysis. These included mainly evaluations of educational measures and school-based programmes, as well as warning

messages and self-help materials. The interventions using self-help materials targeted adults with self-reported gambling problems (three studies). Otherwise, the programmes were aimed at universal target groups comprising younger and older adolescents (nine studies) and young adults (one study). Only six studies examined effects on gambling behaviour, with the criteria being so varied that no quantitative summary was possible by meta-analysis.

Results: The results showed that the two educational school-based programmes evaluated (three sessions of one hour) had no preventive effects on behaviour (partly owing to the very low prevalence of problematic gambling behaviour).

Results	Effectiveness
Target group	Universal Selective UNDIFFERENTIATED
Setting	Family School Leisure Media Healthcare Community Legislation and regulations UNDIFFERENTIATED
Substance	Tobacco Alcohol Cannabis Other illicit drugs Undifferentiated GAMBLING

While flashing warning messages on roulette games resulted in young adults losing less money, they did not, however, reduce the number of games played (one study). In all three studies with adults, self-help material supplemented by a counselling session reduced the number of playing days, the money staked per playing day and/or the money lost. Overall, the prevention measures were most effective in correcting misconceptions about the chances of winning and attitudes towards gambling (in seven of nine studies) and in increasing knowledge (six of seven studies that examined this outcome).

Authors' conclusions: The authors concluded that, owing to the usual age of initiation, prevention activities should be aimed at schoolchildren aged between 12 and 14 years (7th and 8th grade) to pre-empt the initiation of gambling behaviour. Schools were the optimum method of access, as the necessary psycho-educational content could be easily integrated into a health or social science curriculum. The most promising method of delivering education was a combination of a video, activities and lectures by appropriately trained personnel. However, it could not be assumed that changes in knowledge (of

risks) and attitudes (resulting in a more realistic assessment) would lead to a change in gambling behaviour. Finally, it must be noted that few studies were available; the authors criticised the methodology of these studies and argued that further research was required.

Buth and Kalke (14-2; 2012; S; 26 studies; 1999–2011; no specified age) assessed 26 controlled and uncontrolled studies, published between 1999 and 2011, on the universal and selective prevention of gambling behaviour; these studies overlap with those examined by *Grey et al. (14-1)*. In addition, they reported on experiments that tested potentially effective technical elements in the laboratory (warning messages, game pauses, payout intervals, game length, availability of stop buttons and frequency of near wins). In the following, we present only the evaluations of measures that were not included in *Grey et al. (14-1)*.

Results: In addition to the educational measures in the school setting outlined by *Grey et al. (14-1)*, this work also looked at two other, more comprehensive, programmes. One of these examined cognitive behavioural techniques and the other examined content implemented across several subjects in the school curriculum, including mathematics and natural sciences. These two measures both positively changed influencing factors on gambling behaviour (knowledge about probabilities, coping, self-observation and self-reflection). Effects on gambling behaviour itself were not reported. The two media campaigns, whose results were not reported in the work of *Grey et al. (14-1)*, were aimed at the entire population, and resulted in inconsistent effects on problem awareness and the use of telephone counselling. Two information-based programmes especially for slot machine players achieved short-term effects on single influencing factors of problematic gambling behaviour, both for risky and for non-problematic players. Finally, three studies described player protection options for endangered adults on the Internet (player blocking, self-limitation, deposit limits) as useful, if they are used. These then lead to less time and money being invested (either in total or less than planned).

Authors' conclusions: The authors concluded that, overall, the evaluation of gambling-related prevention measures was in its infancy. However, studies thus far showed some promising starting points.

Conclusions

Issue: Problematic gambling behaviour.
Geographical scope: No reviews of research using German-speaking samples.
Conclusiveness of research: Evidence strength levels B and C.

90. Because there is a lack of studies, there are currently no universal measures that can be identified as having preventive effects on problematic gambling behaviour (B 14-1, C 14-2).
91. Self-help materials combined with a motivational interview can have preventive effects in selective prevention with older adults (B 14-1).

Quantitative indications

None.

Areas with a lack of research findings

Behavioural areas

Prescription drug abuse

The prevention of prescription drug abuse and dependence is part of the German National Strategy on Drug and Addiction Policy (Die Drogenbeauftragte der Bundesregierung (Drug Commissioner of the German Federal Government), 2012). Particular target groups are young adults wishing to enhance their sports performance and cognitive abilities and older people. Hardly any evidence-based prevention approaches can be drawn upon. In the only review on this issue (DuPont, 2012), the topic is explored, the problem is considered and options for policy action are proposed. There is hardly any evidence. The expert recommendations (strength-of-evidence rating D) are to increase engagement regarding this issue in scientific and medical communities; develop a national education campaign; develop abuse-resistant prescription drugs; develop monitoring programmes for prescription drug use; implement enforceable rules against the illegal sale of prescription drugs by doctors and patients; ban driving under the influence of prescription drugs; and provide assistance for doctors who abuse prescribed controlled substances themselves. No further conclusions can be drawn based on high-quality reviews on effective prevention measures. Examples from

practice are described for middle-aged women, but evaluations of these have not yet been carried out (Hefti-Kraus, 2002). The alarming prevalence of prescription drug abuse observed among students in the USA could not be replicated for Germany. According to the HISBUS study, approximately 5 % of students use prescription drugs to enhance their performance (Middendorff et al., 2012). Because user groups (older vs. younger people), substances (sedative vs. stimulating/performance-enhancing substances) and underlying motivations for using substances vary greatly, different approaches are required for prevention. This should be taken into consideration when designing and implementing prevention measures.

Internet addiction

Prevention of what is known as 'Internet addiction' must be founded on empirically proven models of cause if it is to be effective. Because the diagnostic classification of this disorder has not yet been clarified and the research on aetiology is still ongoing (Putzig et al., 2010; Guan and Subrahmanyam, 2009), it is not surprising that prevention concepts have been evaluated to an even lesser extent. A systematic review on the effectiveness of prevention measures for Internet addiction was not identified in the literature search. Two explanations for Internet addiction are currently being formulated. On the one hand, it is seen as an additional area in which people suffering from other mental illnesses may demonstrate symptoms. Comorbid mental disorders often include anxiety and depression. For the treatment service system, this means taking into account media dependence when treating these people. On the other hand, media dependence is described as a definable, independent disorder (Teske et al., 2012). Observations of basic research to date point to the recommendation of behavioural and environmental measures for prevention (Putzig et al., 2010; Kammerl et al., 2012). The expert recommendations (strength-of-evidence rating D) are media education measures in cooperation with parents, nursery schools and schools, aiming to protect against the negative consequences of (excessive) media use and to promote media skills and alternative leisure activities. Limiting time spent online and blocking websites are cited as being promising (Putzig et al., 2010).

Settings

Prevention in the workplace

Despite the importance of the workplace setting for prevention and early intervention, the literature search

identified only one unsystematic review on the effectiveness of preventive measures in this area (Ames and Bennett, 2011). Because neither the approach (universal or selective) nor the target group (young people or adults) is clear, this was not included as a data resource for the conclusions drawn in this expert report. However, it should nonetheless be described in more detail here because it mainly includes high-quality studies. In an unsystematic review, Ames and Bennett (2011) assessed the effectiveness of interventions in the workplace for the prevention of alcohol abuse and problems caused by alcohol (22 studies (17 RCTs or CTs); 1996–2011). The age of the participants was not reported for most studies. With the exception of one study with young adults, it can be assumed, however, that the majority of the interventions were targeted at adults. The authors reported the effectiveness of the interventions on the promotion of general health, which focuses directly on the individual, or the promotion of health by improvement of the climate in the team and the company. In the area of the promotion of general health, alcohol prevention was tackled using educational measures, implemented in a group and individually, and stress management training. Three of these five measures had an effect on the alcohol consumption of the entire group or a subgroup. The promotion of social health in the team attempted to boost team morale through psychosocial support and information-giving. Two of six measures had an effect on the alcohol use of participants. Furthermore, the authors also assessed brief interventions, Internet-based interventions and environmentally based preventive measures. The selectively focused brief interventions involved personal feedback, information-giving and skills training (two studies). One of these studies was successful in reducing alcohol-related negative consequences for participants. In the other study, which involved personal feedback in the form of a letter, the participants reduced their alcohol use. The Internet-based interventions also used personal feedback, motivational interviewing and information-giving. Here, three of five studies were successful in reducing the consumption of the participants. The environmentally based preventive measures included one natural experiment and three cross-sectional studies. In this area, it was shown that the extent of availability of alcohol and social controls in the workplace were associated with alcohol use.

The authors conclude that well-developed prevention programmes for alcohol in the workplace have until now been the exception rather than the rule. Programmes for the promotion of general health showed marginal effectiveness; programmes for the promotion of social health showed effects on consumption, group morale, risk awareness, help seeking and resilience. Internet-

based programmes were promising, and environmentally based preventive measures showed that a change to the company culture affected consumption behaviour.

A first meta-analysis on the theme of addiction prevention in the workplace is expected from the US-wide programme *Young Adults in the Workplace: A Multisite Initiative of Substance Use Prevention Programs* (Bray et al., 2011). In this, the results of ongoing RCTs of six different measures will be analysed jointly.

| Target groups

Prevention with migrant groups

There are few research results in the area of prevention with migrants. With regard to tobacco use, young people from a migrant background do not differ from those from a non-migrant background (BZgA 2012, issue on smoking). With regard to alcohol use, it has been found that young people from a migrant background from Turkey, the eastern Mediterranean region and Asia consume less than young people from a non-migrant background (BZgA 2012, issue on alcohol). The German Health Interview and Examination Survey for Children and Adults (KiGGS) also enquires about migrant backgrounds but, in contrast to the BZgA, does not break the data down by country of origin. In the KiGGS results, young people from a migrant background show lower prevalence with regard to smoking and alcohol use than young people from a non-migrant background; cannabis is consumed with the same frequency (Lampert and Thamm, 2007). Bisson et al. (2010) report on how to reach various migrant groups with prevention measures depending on the method of access selected. They recommend a programme tailored to the target group and a proactive approach for this difficult-to-reach population. Young people from a migrant background in Germany are underrepresented in psychosocial care, and there are only a few migration-specific, intercultural addiction prevention projects on offer (Boos-Nünning and Siefen, 2005). There are also indications that the medical understanding of substance-related disorders established in Germany is considered to be incorrect by a majority of young people from a Turkish background (Penka et al., 2003) — a situation worth bearing in mind when designing preventive measures. In one of the few evaluation studies of different prevention programmes for young ethnic German immigrants and migrants, in Baden-Württemberg, the participating young people reported positive effects with regard to their substance use and further risk factors and protective factors (Bühler, 2007). Some initial insights into addiction

prevention in old people with a migrant background originate from Switzerland (Arnold and Oggier, 2011). In the authors' opinion, prevention approaches for this target group should provide information about addiction in old age and retirement, begin as early as possible, be relationship-guided and be delivered in settings such as trade unions, migrant organisations and businesses.

Prevention with older people

The most commonly abused substances in old age are prescription drugs (in particular benzodiazepine) and alcohol (Weyerer, 2010). In a study on risk factors for risky alcohol use in men aged over 75 years in Germany, such risky consumption was found in 6.5 % of people surveyed (Weyerer et al., 2009). The authors concluded that prevention measures should target this group of drinkers and inform them of the risks. New cases of alcohol abuse or dependence in old age often arise in connection with grief, changes in social role or illness (O'Connell et al., 2003). There are only very few studies available on the prevention of addiction in old age. In a study from the USA, older men did not benefit with regard to their substance use from annual preventive visits to doctors any more than a control group (Burton et al., 1995). Selective prevention should target older men who display risky use, and better screening instruments should be developed for this target group.

| Addiction prevention in Germany

We are not aware of any systematic reviews or meta-analyses on the effectiveness of addiction and gambling prevention measures in Germany. There are databases, recommended treatments and presentations of prevention projects, but there is no review that summarises the available studies on the effectiveness of these measures.

Last year, a health technology assessment (HTA) report on the effectiveness of alcohol prevention projects in Germany was published (KorczaK, 2012). By means of a survey of prevention experts at national, federal state and community levels, the current status of evidence-based alcohol preventive work in Germany was assessed. A project was described as being evidence-based if the effectiveness on consumption could be shown in a RCT. The identification of the experts was successful; however, a low response rate and biased responses prevented a representative sample of projects. Furthermore, some very heterogeneous projects were combined into one group. To this extent, the conclusions of the report that in Germany only 5.3%

TABLE 5

Type and number of publications and corresponding evidence strength of conclusions for each area of results

	Setting-specific works on prevention of substance abuse								Works on prevention in various areas across several settings				Total
	Family	School	Leisure	Media	Healthcare	Community	Legislation and regulations	Selective approach	Tobacco	Alcohol	Illicit drugs	Gambling	
Meta-analysis	1	6	2	1				6	1				17
Systematic review	5	7	3	4	2	2+1*	5	7+3*		1		2	38
Unsystematic review		1				2	3	2					8
Best practice								1					1
Total	6	14	5	5	2	4+1*	8	16+3*	1	1		2	64
Evidence strength	A	A	A	A	B	B	B	A				B	

* These articles have already been allocated to another area, but also contain relevant information for the area in question.

of projects were examined for effectiveness and that only 1% of projects are effective are not valid. The Klasse2000 programme and the Aktion Glasklar campaign were highlighted as being positive.

Methodological quality of reviews

For the purpose of updating this report, 17 more recent meta-analyses, 38 systematic reviews, eight unsystematic reviews and one best-practice survey were assessed. This meant the addition of a literature base of 64 publications up to and including the year 2012. A total of 48 of these publications were found during the literature search, 14 were taken from lists of references and two were identified and selected during a separate search on gambling.

Table 5 shows which kind of and how many publications form the basis of the conclusions for each area of results.

The literature basis is dominated by systematic works (meta-analyses and systematic reviews) which attempted to ensure that all potential individual studies were considered in the review. Because in most cases studies reported on the criteria that were used for searching and selecting the individual studies, there is adequate transparency. The number of individual studies included varied greatly (between four and 127 studies). More than half of the included reviews restricted themselves to high-quality individual studies. The differing quantities of individual studies reflected the fact that researchers' selection criteria differed

according to their particular areas of interest, but there was often a considerable degree of overlap in the studies used to produce findings in any given setting. In most cases, the evaluation strategy was cogent and the conclusions were compelling.

Although most of the works meet the standards formulated for reviews, their methodological quality varies considerably across the different settings of addiction prevention. This is not surprising given that the individual studies included in these reviews are also of widely varying quality. As Table 5 shows, the greatest number of reviews and the highest levels of quality are to be found in the school and college setting (selective approach). The strength-of-evidence ratings are the same as those for the 2006 expert report. However, no meta-analyses are available for community or legislative measures. This may be best explained by the fact that the ideal path of quantitative intervention research — involving experiments or quasi-experiments — is often not followed (or cannot be followed) in the area of testing the effectiveness of legislative measures. The level of scientific rigour, both in individual studies and in reviews, is thus much higher in relation to school- and college-based interventions (and generally with regard to behavioural prevention) than it is in relation to legislative measures or environmental prevention. This distinction needs to be borne in mind in any attempt to compare effectiveness in different fields.

The fact that there are no reviews for the effectiveness of addiction prevention measures in Europe or in the German-speaking areas, despite growing controlled intervention studies, continues to be seen as a major

flaw. The generalisability of US-dominated research results to Europe and Germany has still not been systematically examined.

Methodological limitations of reviews

Reviews, as used as a basis for this expert report, without doubt have their advantages; however, they also have several limitations that should be mentioned at this point.

The conclusiveness of a review is to a certain extent difficult to assess, because the quality of each review is dependent on the quality of the studies included. Although prevention research has made advances in the implementation of the standards of quantitative intervention research, many shortcomings must still be criticised in the reviews.

There are no uniform standards for the categorisation and grouping of programmes according to the intervention methods that they use. Even Cochrane Reviews possess no uniform standards. This makes a comparison between studies difficult. In many cases, the compilers of this report had to go down to the level of the individual studies included in the reviews in order to examine the plausibility of the grouping of certain programmes.

One problem with regard to categorisation that affects meta-analyses as a type of study is the so-called apples and oranges problem, which means that fundamentally different measures are treated as very similar or identical. Because the research questions addressed in meta-analyses are in general more complex than those addressed in individual studies, it is often difficult to consolidate individual studies into a common question and analyse them jointly. This means, for example, that a non-significant overall effect across all school-based prevention programmes does not allow a conclusion to be drawn about whether or not all these programmes, with their heterogeneous content (e.g. information-giving, life skills programmes, refusal skills training, etc.), are ineffective. Some studies — among them Cochrane Reviews — address this issue by calculating effect sizes over subgroups of included studies according to different research questions. This approach may avoid the apples and oranges problem, but it causes the number of studies upon which an analysis is based to decrease considerably, and the results attained are therefore less conclusive.

Finally, reviews reflect the recent state of research, with only some time delay. In order to compile and analyse primary studies on a specific research question in a review, there must first be an adequate base of these studies.

CHAPTER 4

Discussion

Summary: what works and what does not?

For the purposes of this expert report, our definition of effectiveness was preventive effects on consumption behaviour of participants in prevention measures. In other words, the avoidance, delay and/or reduction of substance use and/or gambling behaviour as a result of the prevention measures in question.

Measures or approaches that can be expected to be effective can be found for nearly all settings in the consulted literature. These are described in detail in the conclusions for the specific settings. In the following section, the conclusions are presented as recommendations formulated on the basis of the available scientific knowledge, in order to illustrate which measures should be considered for certain settings and for certain target groups. Using the various strength-of-evidence ratings, ranging from A (meta-analysis based on high-quality studies) to B (systematic review based on high-quality studies), C (meta-analysis or systematic review based on all available studies) and D (unsystematic review, best-practice survey), the following universal and selective approaches can be recommended.

Universal prevention of substance abuse

Family setting

- Parental training and family programmes (strength-of-evidence rating A)

There is high-quality and consistent evidence for the effectiveness of parental training and family programmes in the family setting, in particular with regard to alcohol use and, to a lesser extent, for tobacco and cannabis. With family measures, the active participation of parents is crucial, as is a comprehensive approach that includes substance-specific elements as well as elements that promote the psychosocial development of the child or adolescent.

In comparison with the expert report of 2006, the evidence for this approach has been strengthened on the basis of meta-analyses and systematic reviews with high-quality studies; behavioural parenting training with parents can now also be recommended, in addition to comprehensive family programmes working with parents and children.

From a methodological perspective, in this setting the definition of effectiveness used in this expert report must be queried, because families with young children are also part of the target group. However, effects on consumption behaviour can first be measured upon initiation of alcohol use, meaning that key risk factors and protective factors for later abuse are suggested here as effectiveness parameters (Spath et al., 2008).

School setting

- Alcohol-specific behaviour-related interventions, certain life skills programmes and a behaviour management programme (strength-of-evidence rating B)
- General tobacco preventive programmes based on the social influence model or the cognitive behavioural skills approach (strength-of-evidence rating B)
- Tobacco preventive class competitions (strength-of-evidence rating A)
- Tobacco preventive school-based measures (social influence approach), combined with components in the community setting (strength-of-evidence rating B).
- General skills-oriented programmes for the prevention of illicit drug use in which interactive methods are used (strength-of-evidence rating A)
- Alcohol and tobacco preventive measures addressing the school system, by implementing school action

teams and by focusing on the improvement of school life (strength-of-evidence rating B)

More studies have been conducted in the school setting than in any other, and therefore more results are available in this setting as well. However, in this setting, the results regarding the different substances are inconsistent. Alcohol-specific programmes and individual comprehensive life skills programmes promoting development and a behaviour management programme for the classroom are indicated for alcohol prevention. The results of more comprehensive skills-oriented measures also show evidence of effectiveness in the prevention of illicit substance use. Information-giving alone and emotional education approaches cannot be recommended.

With regard to the effectiveness of school-based tobacco prevention, the effects are different according to whether the outcome is the initiation of smoking (i.e. non-smokers become smokers less frequently as a result of the intervention) or the smoking behaviour of the group as a whole (i.e. following the intervention, there are fewer smokers overall among previous non-smokers and smokers). While the initiation of smoking appeared not to be influenced by the programmes examined (more comprehensive approaches, class competitions), the overall prevalence of smokers in a class could be influenced. In view of the still very unstable consumption pattern in prevention samples, the effect on the group as a whole appears to us to be more relevant.

In comparison with the expert report of 2006, which consistently recommended interactive programmes focused on life skills or social influence, the current conclusions are less clear-cut. This concerns in particular behavioural measures intended to prevent the use of alcohol and tobacco. In contrast, for cannabis use, the conclusions are very similar to those reached in 2006. This lack of clarity is also caused by the fact that the measures are not (cannot be) grouped homogeneously, so the common features of effective approaches are difficult or impossible to determine. Methodologically, it should be noted with regard to reviews in this setting that a more uniform and clearer classification of interventions with schoolchildren in the reviews would be helpful in order to better illustrate the effective approaches and identify key elements.

Leisure setting

- Non-school programmes for the development of personal and social skills, with high-quality implementation (strength-of-evidence rating A)

In comparison with other settings, there are relatively few high-quality studies available for assessing the leisure setting. The effectiveness of measures in sports clubs and organisations and on the party scene cannot therefore be assessed with any certainty, because there is a lack of high-quality primary literature. However, from the few conclusive studies available on prevention in the nightlife setting, there are some indications of the significance of environmental measures, including training bar staff and police intervention, for the prevention of alcohol at a community level. No conclusive literature could be found on the effectiveness of peer programmes, which are in fact widespread. Good extracurricular skills-oriented programmes are to be recommended for → general addiction prevention. Mentoring programmes have a proven effect on risky behaviour in general, but no conclusive data could be found on the effectiveness of such programmes specifically for the prevention of substance use.

This means that, even after the updating of this expert report, there is still little to say on effective approaches in this setting. However, more systematic reviews exist, which at least identify and detail projects and indicate the need for more research on effectiveness evaluations.

Media setting

- Internet- and computer-based prevention measures in schools (strength-of-evidence rating B)
- Mass-media approaches in the traditional media in combination with school programmes intended to prevent the use of tobacco, not as a stand-alone measure (strength-of-evidence rating B)

For the first time, there is now evidence for the effectiveness of Internet- and computer-based universal interventions intended to prevent consumption. The conclusions are still very general because there are few individual studies, meaning that the key elements of effectiveness cannot be determined. Furthermore, the programmes are delivered in the school setting, so knowledge about the effectiveness of Internet sites that adolescents can access and interact with only in their leisure time could not be gathered. Measures using social media (social networks, message boards and chat sites) and their effectiveness could not be assessed either.

Because of the high and still increasing popularity and social significance of these media, it is an urgent requirement to build a substantiated database for this area of intervention in the near future. As in the expert

report of 2006, the current review literature also concludes that traditional mass-media activities cannot influence consumption behaviour on their own. They are discussed as sensible preparatory or supporting measures for multicomponent projects aiming to prevent the use of tobacco (Carson et al., 2011).

Healthcare setting

- Educational measures by medical staff show only occasional preventive effects on tobacco use (strength-of-evidence rating B).
- No impersonal alcohol-related brief intervention by computer or audio tape (strength-of-evidence rating B)

Only very little evaluation literature could be found on prevention activities in the healthcare setting, meaning that only a few conclusions could be drawn. Initial results do not indicate the success of universal measures thus far. However, there are results suggesting the importance of the healthcare setting for selective prevention (see below). Since the healthcare profession is perceived as a credible source for preventive messages and has good access to target groups (such as the family), these results should be seen as an incentive for developing effective approaches for universal prevention in this setting, not as a reason to abandon it.

Community setting

- Multicomponent approaches aimed at the prevention of tobacco use that combine school-based and family-based or community-based measures (strength-of-evidence rating A)
- Multicomponent approaches aimed at the prevention of alcohol in two or more settings (strength-of-evidence rating B)
- Community projects initiated by key community stakeholders that work towards implementing effective alcohol prevention measures as a network of organisations and individuals (strength-of-evidence rating D)
- Selected community initiatives on cannabis prevention with measures in school, family, peer, media, commerce and healthcare settings (strength-of-evidence rating B)

With regard to community addiction prevention using combined measures in several settings, it is to be noted

that preventive efforts have in the interim since the publication of the 2006 report shown effects with respect to the use of alcohol and tobacco and, in individual cases, illicit drugs. The projects largely consist of school-based measures, such as information-giving, refusal skills training or life skills programmes, in combination with family training in educational skills, communication and conflict resolution. Based on individual studies, the characteristics of successful community addiction prevention projects can be identified (Collins et al., 2007; Hawkins et al., 2009). However, the superior benefits of multicomponent projects in a direct test against effective measures in just one setting have not been proven in this updated expert report. For example, it has been shown that additional family-based components only occasionally offer additional effects to a school-based measure.

If one pulls together the experiences in the community setting, it can be anticipated that comprehensive community policy regulations — combined with community projects targeted at the implementation of effective individual measures — should have the largest effect on alcohol and tobacco use and the prevention of the negative consequences of alcohol use.

Legislation and regulations

- Increasing the price of all alcoholic drinks (strength-of-evidence rating D), restriction of alcohol advertising (strength-of-evidence rating D)
- Increasing the price of tobacco (strength-of-evidence rating C), measures preventing the sale of tobacco to minors in combination with additional components (strength-of-evidence rating B), smoking bans in public places (strength-of-evidence rating D)

With regard to the effectiveness of legislation and regulations, this expert report shows that the largest effects are to be expected from an increase in the price of alcohol and tobacco products. For England, a method was developed for estimating which type of price increases would have a specific effect on the substance use of young people and young people with risky consumption (Brennan et al., 2008; Meier et al., 2010). This simulation resulted in a recommended increase in the price of lower-priced products in particular as a universal approach (Brennan et al., 2008).

It may be surprising that the strength-of-evidence rating of reviews in the area of environmental prevention does not achieve the same quality as such studies in the area of behavioural prevention (e.g. in the family or school

setting). This is largely because a randomised study design is scarcely practicable in studies assessing the effectiveness of legislation. In addition, individual control strategies are rarely implemented alone. Price and availability are mostly addressed jointly, and their introduction is accompanied by a public debate. This means that confounding variables in the assessment of effectiveness can hardly be controlled. The recommendations can, however, be based on numerous observational studies. For example, the effect of advertising on the initiation of tobacco and alcohol use has been clearly proven (Lovato, Watts and Stead, 2011; Smith and Foxcroft, 2009), and the connection between the portrayal of alcohol and advertising on TV and alcohol use in young people has been confirmed in trials (Engels et al., 2009). Because an advertising ban as an intervention has rarely been examined, no review of high-quality studies on this instrument could be drawn upon. There has also been more recent work published on the age limit for legal consumption, meaning that the conclusion drawn in the expert report of 2006 — that is, that an increase in the legal age limit for alcohol use may have preventive effects — is still current.

Selective prevention of substance abuse

The following interventions can be recommended for groups with an increased risk of developing substance abuse (e.g. children from families affected by addiction, children with behavioural problems, students (especially first-year students) and hospital patients).

- In the family: supervision and assistance of first-time parents by midwives and nursing professionals, life skills programmes for children displaying problem behaviour and their parents, family programmes for families affected by addiction (alcohol, strength-of-evidence rating B).
- In schools: life skills programmes with additional indicated elements (illicit drugs, strength-of-evidence rating B), life skills programmes for older adolescents (alcohol, strength-of-evidence rating B).
- In colleges: personal brief interventions, online and computer-based feedback and normative feedback, web-based programmes, gender-specific programmes aimed at challenging alcohol expectancies (alcohol, strength-of-evidence rating A); multicomponent approaches consisting of providing information, motivational interviewing and feedback (alcohol, strength-of-evidence rating B).

- In the leisure/community setting: mentoring programmes with teenagers (alcohol, strength-of-evidence rating A).
- In the leisure/community setting: multicomponent projects with a case manager (alcohol, illicit drugs, strength-of-evidence rating B).
- In the healthcare setting: personal brief interventions based on motivational interviewing (alcohol, cannabis, strength-of-evidence rating B).

In the family setting, school-based skills programmes and family-based programmes have proven effective in selective prevention with children from families affected by addiction. However, alcohol use as an outcome variable is not valid for all studies owing to the age of the target group and because not all studies have an adequate follow-up interval to enable conclusions to be drawn concerning the effect on drinking behaviour. However, in several studies, effects were achieved on later alcohol use in adolescence, and, in other studies, effects were shown on risk factors for later alcohol use. This is why, in our opinion, such programmes can nevertheless be recommended. There are numerous high-quality reviews on alcohol prevention with young people in colleges, and this topic has been examined from several angles. With regard to the discussion on the best use of resources, it is apparent here that the effectiveness of computer-based or web-based interventions is no different from that of personal interventions. It can also be concluded that non-school (community) prevention programmes can show effects if they are implemented with a certain (high) intensity and according to a clearly communicated rationale (mentoring programmes, programmes in non-school institutions, multicomponent projects). The effectiveness of personal brief interventions in the treatment of alcohol-related disorders is well documented (O'Leary Tevyaw and Monti, 2004) and a few studies provide support for its use as a selective preventive approach in the hospital setting. With regard to gender-specific effectiveness, it can be said, in summary, that there are still only a few, unsystematic research results available. These indicate that a gender-specific approach appears to be useful with universal family programmes and with selective alcohol prevention measures for college students that work with feedback approaches and with challenging alcohol expectancies.

Prevention of problematic gambling behaviour

On the basis of the literature examined here, there are currently no effective universal measures for the

prevention of problematic gambling behaviour that can be recommended. In selective prevention with adults, the combination of educational materials and motivational interviews appears to influence gambling behaviour.

Comparison and classification of results

In the following section, the conclusions drawn in this expert report are compared with selected recent works and publications that have a similar focus and similar conclusions.

Alcohol

The second edition of the work by Babor et al. (2010) and the HTA report by Korczak et al. (2011) are concerned exclusively with alcohol.

Babor and a group of international experts in the area of alcohol policy present an overview of alcohol use, its negative consequences and the possibility of preventing or reducing these consequences. The publication by Babor et al. can best be described as an international expert assessment, because no information is given on the methods used for the selection of the literature. The greatest effectiveness with regard to the reduction of consumption at population level was shown to be as a result of taxation measures, sales prohibitions and minimum age limits for the purchase of alcohol. A series of other environmental preventive measures, such as control of the availability of alcohol through restrictions on retail outlets and selling times, interventions with retailers and sales staff and advertising bans, are viewed by the authors as having medium effectiveness. School-based behavioural prevention is assessed by the authors as being ineffective, and normative interventions with students in colleges are viewed by the authors as having limited effectiveness.

Korczak et al. (2011) based their HTA report on a comprehensive search of 34 databases and give a well-founded overview of the prevention of alcohol abuse among young people. Korczak et al. arrive at similar conclusions to Babor et al. They conclude that environmental preventive measures such as tax and price increases, checks on sales personnel, restriction of the availability of alcohol and restrictions on alcohol advertising all have a high degree of effectiveness. The authors also see mainly positive effects for interventions

in families, personalised computer-based interventions in schools and colleges, and motivational brief interventions. Media campaigns and informational and educational programmes in schools are assessed by the authors as being ineffective.

This expert report agrees with most of the conclusions in both of these works concerning environmental prevention measures. However, there is a clear difference with regard to the assessment of school-based behavioural prevention measures. These are deemed ineffective by both Babor et al. and Korczak et al. On the basis of a Cochrane Review by *Foxcroft and Tsertsvadze (3-3)*, which was first published in 2011 and which therefore could not be considered in the works by Babor et al. and Korczak et al., we assess these measures differently and are of the opinion that alcohol-specific programmes, individual life skills programmes and a behaviour management programme for the classroom can be effective in the prevention of alcohol abuse.

All substances

In their study, Toumbourou et al. (2007) summarised systematic reviews with the aim of presenting a picture of the effectiveness of interventions aimed at reducing the harm associated with substance use by young people. The study differed from this expert report in this aim, with our work being restricted for reasons of comparability to effects on consumption behaviour. We do not consider associated harm in our conclusions and mention this only in exceptional cases. The authors come to the conclusion that the strongest evidence exists for the effectiveness of price structures for tobacco and alcohol through taxation. There was additional evidence for the implementation of laws prohibiting the serving of alcohol to people who are already drunk, imposing restrictions on the density of retail outlets and imposing restrictions on selling times. In the opinion of the authors, there was also evidence for the imposition and systematic enforcement of smoking bans and for a minimum age limit for the purchase of alcohol. In the opinion of the authors, in the field of behavioural prevention, house visits to disadvantaged families and interventions in early school years aimed at improving the school environment and avoiding social exclusion can reduce risk factors for unhealthy development and associated harm as a consequence of substance use. The authors also come to the conclusion that school-based skills-oriented programmes could delay initiation of drug use and that purely educational programmes are not effective in this regard. In general, prevention measures are more successful if they include

interventions lasting several years and use more than one strategy.

For their 'review of reviews', Jepson et al. (2010) selected only systematic reviews and meta-analyses published between 1995 and 2008 and chose a similar procedure to that chosen for this expert report. They examined the effectiveness of interventions on six different health behaviours, including smoking, alcohol use and illicit drug use. The authors reported results separately for the target group of young people. With regard to smoking, the authors concluded, in contrast to our work, that mass-media measures could prevent initiation; however, the evidence for this was not strong. As in this expert report, the authors arrived at the conclusion that information-giving alone is not effective in preventing smoking. Jepson et al. find that there is only limited evidence for interventions that target the development of social skills. On this topic, this expert report differs: effects on the initiation of smoking behaviour were not seen, but effects were found on smoking behaviour in the young age groups as a whole. The conclusions of Jepson et al. are contrary to those in this report when they say that there is little evidence for the effectiveness of bans on selling tobacco to minors on their smoking behaviour.

With regard to the prevention of alcohol abuse, the authors conclude that there is insufficient evidence for the effectiveness of peer-led measures and interventions based on social norms. With regard to the prevention of illicit drug use, the authors claim positive effects for life skills programmes in schools. They also state that they can draw no conclusions on the effectiveness of non-school/extracurricular activities. In the opinion of the authors, there is evidence that the age range 11–13 years is the critical phase for an intervention with vulnerable children and adolescents.

What is 'effectiveness' in terms of addiction prevention? What is meant by 'evidence-based'? What significance does scientific evidence have for practice?

This expert report is intended to assist decision-makers and practitioners in the field of addiction prevention in deciding for or against certain preventive approaches and measures through the application of the current status of knowledge on their effectiveness. The intention is to assist in the decision-making process in favour of evidence-based practice using effective measures. But

what does 'effective' mean? In this expert report, 'effective' is defined as 'having an effect on behaviour' (i.e. substance use and gambling behaviour). Should proven effectiveness be the sole criterion for deciding which action to take? What significance does scientific evidence have for practice? How can this knowledge be integrated into a decision? These questions will be discussed below.

Evaluated, effective, evidence-based — these three adjectives dominate the discussion on the best procedures to use in prevention and are often (incorrectly) used interchangeably. A measure is 'evaluated' if data related to the implementation of an intervention are systematically and scientifically collected, processed and analysed, to assess whether or not the objectives of an intervention have been achieved (EMCDDA, 2012). One can evaluate the concept, the implementation or the effects of a measure or its transfer into practice (Mittag, 2006; Uhl, 1998). A positive evaluation result exists if the concept is consistent with prior research, if it can be implemented or if it achieves the stipulated outcome parameters. If an evaluation has been carried out for a measure, this is better than no evaluation, because it means that thought has already been given to the achievement of objectives and the mechanism of action. However, 'evaluated' does not yet mean 'effective' (and 'not evaluated' does not mean 'ineffective').

'Effective' means that measurable effects on the target criteria are observed in a group of participants in comparison with an untreated control group. There is a difference between 'efficacy' and 'effectiveness' (EMCDDA, 2012). The former describes the situation in which a measure conducted under optimum conditions (e.g. well-qualified implementers, high treatment adherence) was successful in generating preventive effects on the outcome variable. 'Effectiveness' means effects are generated under real-life, natural conditions or in everyday practice. However, the question of which outcome criteria to select is a different one. In addition to self-reported consumption behaviour, outcome criteria might include cognition, attitudes or biochemical parameters. However, effectiveness can only be claimed for the parameters that were measured (Society for Prevention Research, 2004).

According to Pentz (2003), a measure can be deemed an evidence-based substance abuse prevention programme if it has been tested under rigorous conditions (experimental or quasi-experimental design, peer-reviewed publication, follow-up interval of at least one year) and there is evidence (statistically significant)

for prevention, delay or reduction of substance use by young people, and not just an effect on knowledge and attitudes. The standards of the Society for Prevention Research are more rigid and at times more demanding (Society for Prevention Research, 2004). These standards require that programmes are evaluated using a randomised study design and, if this cannot be implemented, a controlled design without self-selection of participants into the different study conditions. For the evaluation of policy instruments, the minimum requirement is an interrupted time series design, with randomisation of the participants also being preferable here. However, it is acknowledged that this can rarely be implemented. Long-term effects of at least six months should be examined (Society for Prevention Research, 2004). The key US establishment for addiction prevention, the Center for Substance Abuse Prevention (CSAP) within the Substance Abuse and Mental Health Services Administration, recommends the use of certain prevention programmes in policy and practice (www.nrepp.samhsa.gov). An intervention is deemed to be evidence-based if it has documented evidence of effectiveness (CSAP, 2009). The criteria are that the intervention:

- is based on a coherent model of why it should work (theory of change), and
- is similar to a programme listed in the registers or published in peer-reviewed literature in both content and structure, and
- was implemented with proven effectiveness in the past and was able to demonstrate consistent and credible positive effects on multiple occasions while observing scientific evidence standards, and
- is reviewed and assessed as appropriate by a panel of prevention experts (scientists, practitioners, key community stakeholders).

Classifying a programme as evidence-based according to this definition does not, however, guarantee that it works in large-scale implementation. One example of this is the Strengthening Families Program, which is recommended by many authorities (www.strengtheningfamiliesprogram.org). In one high-quality study under realistic field conditions, the intervention displayed no or virtually no effectiveness (Gottfredson et al., 2006; Gutmann et al., 2004, cited in Gottfredson et al., 2006).

The outcome parameter of 'consumption behaviour' should also be critically analysed. The ultimate objective of addiction prevention, also known as the 'clinically

relevant endpoint' (Mangiapane and Velasco Garrido, 2009), is the prevention of the occurrence of clinically relevant, substance-related disorders such as abuse and dependence (National Academy of Sciences, 2009). We argue that, in age groups in which consumption is not yet widespread or very irregular, early consumption can be no more (and no less) than one predictor among several others (also known as 'surrogate parameters') that are empirically associated with later abuse (Bühler and Kröger, 2006). In childhood, this could be, for example, aggressive behaviour or self-control capabilities. For older adolescents, young adults and adults, the stipulation of risky consumption as outcome parameter is (more) sensible.

On the other hand, it could be argued that one must conduct 'only' studies with long-term follow-up periods, in which abuse and dependence can be examined as an outcome parameter. Without doubt, this would be a considerable advantage for generating knowledge relevant to prevention efforts. However, behind this idea is an understanding of addiction prevention that must also be critically scrutinised. This idea is based on the assumption that — similarly to immunisation against infectious diseases — one 'correct' measure is required to be fully armed in later risk situations and risk phases against the development of abuse; as if there were a precisely specifiable trigger situation to which — primed by the preventive action — one could respond. This would work in a similar way to the body's immune response to a specific disease agent, when it has developed antibodies as a result of immunisation. Against the notion of transferring this idea to psychosocial phenomena is, first, the multicausality that is inherent in the development of an addiction (Petraitis et al., 1995; National Academy of Sciences, 2009). Second, we know that, in contrast to physiological factors, the psychosocial 'antibodies' or 'immune response' (i.e. the developed protective factors) can change over the course of a lifespan. For example, the self-efficacy to resist alcohol can be eroded by non-preventive experiences. To this extent, it seems questionable if the effectiveness of psychosocial measures can be examined in a similar way to the effectiveness of physiological prevention instruments.

By no means should this create the impression that high scientific standards are negligible during the evaluation of prevention or not helpful in the further development of effective prevention measures. It should merely be noted that, even with high scientific standards, not all concerns can be eliminated and that the scientific evidence is therefore not sufficient as the sole decision-making criterion for the implementation of prevention

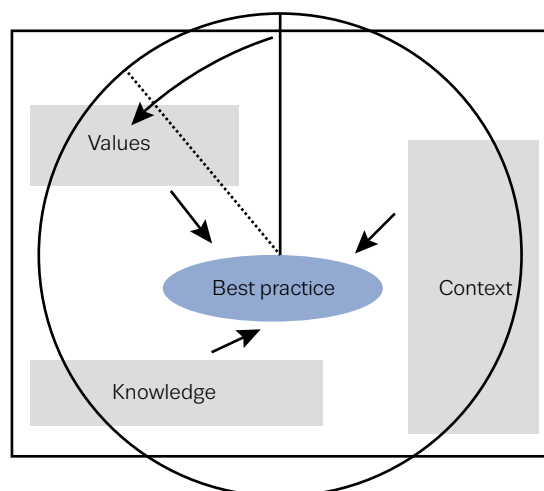
measures ⁽⁶⁾. Evidence-based practice goes beyond a specific study design and a specific outcome parameter. A therapy is evidence-based if it integrates the strongest evidence from systematic research, clinical experience and patient values (Sackett et al., 2000). For prevention health promotion, the foundation Gesundheitsförderung Schweiz (Health Promotion Switzerland) defined evidence-based practice on the basis of international studies and discourses in the following way (Broesskamp-Stone, 2012): similarly to a radar beam, three dimensions must be repeatedly reflected when planning and implementing health promotion and prevention activities (see Figure 3).

- **Values:** basic (ethical) values and principles of health promotion and public health, such as avoidance of harm, respect for autonomy, equal opportunity for health, sustainability and empowerment.
- **Knowledge:** systematically generated current scientific findings, knowledge from own evaluations and reflection of nescience, supplementary knowledge from experience, practice and expert opinions.
- **Context:** available capacities for measures, laws, policy/cultural factors and their significance for the transferability of scientific findings and interventions to the respective context.

In this concept of evidence-based — or, better, 'evidence-informed' — prevention and health promotion, scientific knowledge is a central, but not the only, criterion that must be observed during the planning and implementation of addiction prevention.

This is where we see the contribution made by this expert report and its conclusions concerning the effectiveness of prevention measures in various settings. The conclusions summarise the systematically researched, international findings (largely from the USA) of high-quality studies. The strength of evidence of our conclusions is expressed through the wording and the reference to a certain level of conclusiveness (A to F). Evidence can be strengthened by replication studies and field studies with varying context conditions (such as evaluations at national level in countries other than that where the original study was carried out). In order to

FIGURE 3
Radar screen model of best practice
(from Broesskamp-Stone, 2012)



make a yet more evidence-informed decision for or against a specific preventive measure, it is therefore imperative to consider the findings of effectiveness research with samples from one's own country, in our case from Germany. With the exception of the school setting, these findings are, unfortunately, rather scarce. Where possible, a measure with strong evidence for implementation with German groups is described for each setting. For an overview of German addiction and violence prevention programmes, the website 'Grüne Liste Prävention' (Green List of Prevention; <http://www.gruene-liste-praevention.de/nano.cms/datenbank>) can be recommended; it also reports on interventions' concept quality and evidence strength on the basis of mainly German, but also sometimes only international, individual studies.

There is still little knowledge about the effectiveness of addiction prevention programmes in Germany that is based on strong evidence. In order to expand this knowledge, more high-quality evaluation studies with longer follow-up periods are required, which do not examine only whether but also with whom and why a measure achieves or does not achieve its objectives. It is certainly neither necessary nor feasible for every preventive activity in Germany to be evaluated. In our opinion, it is desirable for every measure that is, or will be, widely implemented to undergo a methodologically high-quality reference study with an adequate follow-up period and a reasonable outcome parameter. The findings of such studies can then flow into the 'knowledge' dimension of decision-making on the radar screen. The health policy objective would then be to favour those approaches and programmes with a coherent intervention concept and for which a high-

⁽⁶⁾ For an even more critical argument on the dominance of the evidence-based medicine paradigm in prevention and health promotion, see Elkeles and Broesskamp-Stone (2010). For health promotion, they see the 'concept of evidence, which as in medicine is so tightly linked with the natural science experiment' as 'questionable'. 'The RCT is inappropriate, or even counter-productive there' (p. 1). This is mainly the case because health promotion concerns 'mostly interventions in social systems and/or social programmes that are always context dependent'.

quality effectiveness study is available. Such a study should have shown that the preventive measure implemented with a young target group can influence central predictors of later substance abuse (including early initiation of use), or that the preventive measure implemented in adolescence can prevent current risky behaviour. As the radar screen model also shows, further knowledge should be generated through less resource-intensive evaluation methods during the initial

implementation of the measure, adapted for context and target group. This would include, for example, information on whether or not the measure reaches its target group, whether or not it can be implemented in its existing form and whether or not the expected short-term changes in risk factors and protective factors can be observed. If such a procedure can be established, we will be one step further along the path to an evidence-informed prevention practice.

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| Glossary

Best-practice survey

- A survey of the effectiveness of optimal preventive measures.
- Does not lend itself to generalising conclusions about the average effectiveness of preventive measures.

Clinical criteria for abuse and dependence (DSM (APA, 1994))

- Abuse requires the presence of at least one of the following criteria: significant problems at home, in the family or at school as a result of substance use; substance use in dangerous situations or problems with the law as a result of substance use; social and interpersonal problems as a result of substance use.
- Dependence requires the presence of at least three of the following criteria: development of tolerance and withdrawal symptoms; more prolonged or heavier consumption than intended; unsuccessful attempts at control; a high amount of time spent in procuring and using the substance and recovering from use; restriction of activities; continued use despite harmful consequences.

Control group (CG)

- Group that does not participate in the preventive measure and is compared with the treatment group.

DSM-IV

- Acronym for *Diagnostic and Statistical Manual of Mental Disorders* — a classification system for categorising and diagnosing mental disorders, published by the American Psychiatric Association.

Effect size

- Quantitative difference between → treatment group and → control group.
- Difference in mean outcomes for treatment group and control group, standardised by population distribution (Hedges' *d*).
- Effect sizes of 0.2 or less are considered 'small', of 0.5 or less 'medium' and up to 0.8 'large'.
- Can be interpreted as the absolute → percentage difference in distribution of consumers between the treatment and control groups (differential success rate (Rosenthal and Rubin, 1982)). In the absence of any effect, the distribution would be 50:50.

Expert survey

- Survey of the effectiveness of preventive measures based on interviews with experts or the conclusions of an expert, rather than on individual studies.

General addiction prevention

- Addiction prevention which targets a number of substances (normally tobacco, alcohol and cannabis), rather than focusing on just one.

High-quality individual studies

- Characterised by convincing research design, ensuring that differences in behaviour between → treatment groups and → control groups can actually be ascribed to the effectiveness of the preventive measure, ruling out, in so far as is possible, other potential explanations.
- High-quality studies involve comparison between a treated and an untreated group, preferably with participants distributed between the two groups on a random basis (randomisation). This is what happens in randomised controlled trials (RCTs) and controlled trials without randomisation (CTs). Data are then gathered from the groups at least before and after the treatment and preferably also at a later date.
- Where it is not possible to compare two groups, an interrupted time series (IST) study is an alternative. Here, data are collected from a group at a particular time; there then follows an interval without treatment, which ends with collection of the same data; thereafter follows an interval with treatment, which again ends with collection of the same data. This enables comparisons of behavioural development, with and without treatment, to be drawn in respect of the same people.

High-quality reviews

- Characterised by systematic identification and selection of individual studies, transparency in the search and selection procedure, the quality of the individual studies, rigorous evaluation of results and compelling conclusions.
- Appear, in so far as is possible, in peer-reviewed journals.
- For example → meta-analyses, systematic → reviews.

ICD-10

- Abbreviation for *International Statistical Classification of Diseases and Related Health Problems* — a diagnostic classification system for diseases and health problems published by the World Health Organization (WHO). Currently available in its 10th revised version.

Intention-to-treat analysis

- This determines the number of participants who need to be treated in order to achieve one successfully treated person — the so-called number needed to treat (NNT). For example, an

NNT of nine means that for every nine people treated one person reports that treatment has been successful. The calculation is based on the total number of people originally part of the group, even if not all of them experience the intervention in its entirety.

Intra-class correlation

- Describes the possibility that individuals within one group or class bear a closer resemblance to one another than to individuals of different groups or classes.
- Poses a problem when the level of 'randomised' allocation to treatment or control group (e.g. allocation by class or school) is not that applied at the evaluation stage (e.g. evaluation on an individual basis) because it could lead to distortion in assessing the statistical significance of a difference and thus to erroneous evaluation of the possible effect of the intervention (i.e. the difference in the outcome variable between TG and CG).

Meta-analysis

- Review including quantitative conclusions (in terms of → effect size) about the effectiveness of measures.
- Quantitative summary of the results of numerous individual studies according to predetermined statistical procedures.
- Considered the most compelling methodological procedure for generating evidence-based conclusions.
- See also 'high-quality reviews'.

Odds ratio

- Quantifies the probability of being a non-consumer, rather than a consumer, as a result of participation in a preventive measure as opposed to non-participation (below 1, the probability is less; above 1, the probability is greater).
- A logistical regression outcome parameter that predicts the outcome in relation to a criterion variable (in this case, the variable is 'consumption' and the options are 'consumer' or 'non-consumer') using predictor variables (the variable here is 'group' and the options are → 'treatment group' or → 'control group').
- Expresses in numerical terms the ratio of probability of a particular outcome in relation to a criterion variable (e.g. being a consumer), on the basis of characterisation using a predictor variable (e.g. being a member of the TG and not the CG). If the odds ratio is 0.66 it means that the probability, as a member of the TG rather than the CG, of being a consumer is reduced by a factor of 0.66. If the odds ratio is 1.50, it means the probability is increased by a factor of 1.5.

Percentage difference, absolute

- Difference between the percentages of consumers in the → treatment and → control groups. For example, where 10 % of people in the TG are smokers and 15 % of those in the CG are smokers, there is an absolute percentage difference of 5 %.

Percentage difference, relative

- Relative proportion of consumers in the TG, compared with the percentage in the CG. For example, where 10 % of people in the TG are smokers and 15 % of those in the CG are smokers, there is a relative percentage difference of 30 %.

Preventive effects on consumption behaviour

- The outcome variables in this report are preventive effects on consumption behaviour. This term covers the prevention, delay or reduction of consumption.

Price elasticity

- Change in consumption with a 1 % increase in price. For example, a value of -0.5 means that a 1 % increase will produce a reduction in consumption of 0.5 % or that a 10 % increase will reduce consumption by 5 %.

Review

- An overview, with qualitative conclusions on the effectiveness of measures.
- A qualitative summary of the results of numerous individual studies according to more or less cogent, non-statistical procedures.
- See also 'high-quality reviews'.
- Systematic review: where the search and selection procedure for individual studies aims to include every available individual study in the review.
- Unsystematic review: where it is not clear that the search and selection procedure aimed to include every available individual study in the review.

Risk factors and protective factors

- Risk factors and protective factors are factors that influence substance use. Risk factors are associated with increased likelihood of substance use. Where risk factors are present, the simultaneous presence of protective factors means that the likelihood of substance use is mitigated. For example, the effect of the risk factor 'parental separation' on subsequent substance use could be mitigated by the protective factor 'good inter-sibling bonding'.

Treatment group (TG)

- Group that participates in the preventive measure.

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