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for Drugs and Drug Addiction

THEMATIC PAPERS

PREVENTING LATER SUBSTANCE USE DISORDERS IN AT-RISK CHILDREN AND ADOLESCENTS

a review of the theory and evidence base of indicated prevention

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for Drugs and Drug Addiction

EMCDDA
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Preventing later substance use disorders in at-risk children and adolescents

A review of the theory and evidence base of indicated prevention

Prepared by

Jörg M. Fegert, Renate Schepker, Ferdinand Keller, Andrea G. Ludolph, Paul L. Plener, Anette E. Williamson, Nora Volmer-Berthele, Laura E. Weninger (University of Ulm, Germany) Nestor D. Kapusta (Medical University of Vienna, Austria), Lisette 't Hart-Kerkhoffs (VU University Medical Centre, Amsterdam, Netherlands)

EMCDDA project leader

Gregor Burkhart

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European Monitoring Centre
for Drugs and Drug Addiction

Rua da Cruz de Santa Apolónia, 23–25, 1149-045 Lisbon, Portugal
Tel. +351 218113000 • Fax +315 218131711
publications@emcdda.europa.eu • http://www.emcdda.europa.eu

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Introduction

Background

The EU action plan on drugs (2005–2008) included among its targets the improvement of drug demand reduction programmes in regard to their coverage, accessibility, quality and evaluation, while ensuring effective dissemination of evaluated best practice (target 7). In addition, it set the task of improving methods for the early detection of risk factors and early intervention (target 10).

In 2006, the EMCDDA issued a call for tender to carry out a review of the principles and evidence base of indicated prevention and to identify best practices among interventions in this area.

The call for tender emphasised the need to:

1) increase knowledge and understanding of risk behaviour, focusing on the mental health problems that occur during childhood and increase the risk for developing drug problems; and
2) identify models of best practice for substance use prevention activities targeting at-risk children in EU Member States, candidate countries and Norway.

The current report has been prepared by a multidisciplinary team of physicians, psychologists and pedagogues. The following chapters present a review of research, in EU Member States and outside the EU, and preventive interventions for this target group, including interventions for families with vulnerable children or for vulnerable families. Special emphasis is placed on the review of the literature and the practical knowledge base of the biological and psychological aspects of indicated prevention, and risk factors at the individual level.

The approach taken by the study group was first to concentrate on basic knowledge about neurobiology and risk factors and then to focus on questions of practical applicability. Thus, in addition to a systematic review of the scientific literature, different programmes throughout Europe were evaluated in order to provide a picture of the 'indicated prevention landscape'.

The process of including as much input on the development of juvenile drug use as possible led to the need to put special emphasis on the expanding field of neurobiological knowledge on addiction.

While the approach taken in this report might be seen by some as a 'medicalisation' of drug prevention, a deeper understanding of the complex mechanisms that may lead to addiction is necessary for the development and provision of better services.

In conducting the review, it was repeatedly seen that target populations at high risk of developing a substance use disorder later in life (e.g. foster care populations with high rates of psychiatric disorders) often go undiagnosed and untreated. The fields of youth welfare and medicine often appear to coexist as mutually exclusive entities with little or no interaction, missing the opportunity of identifying and addressing the needs of the high-risk population.

An important message of this report is that more networking is necessary to detect and treat high-risk individuals. A key aim of this publication is to help establish the common understanding that is required to enable this level of networking among those involved in the care of vulnerable young people.

Structure of the report

Chapter 1 contains an introduction explaining the principles of indicated prevention and the deduction of a working definition of indicated prevention, which was used for the subsequent evaluation.

The results of research on psychosocial and individual risk and protective factors are presented in Chapter 2. The chapter includes evidence about well known psychosocial and familial risk and protective factors from the literature, and refers also to high-risk groups. The description of individual and neurodevelopmental perspectives, which present new insights into developmental pathways, forms a major part of the chapter. A special focus is given to well known child psychiatric psychopathology associated with a higher risk of development of later substance abuse. This is followed by an overview of longitudinal studies that describe abuse careers, with the aim of using the trajectory of substance use to identify subgroups. Finally, the neurobiology of addiction is reviewed.

Chapter 3 lists the guidelines and practice parameters for the assessment and treatment of specific psychiatric risk conditions for adolescent substance abuse, as available in the EU, Germany, the United Kingdom and the United States.

Chapter 4 tabulates the programmes that have been found in the research literature as well as those reported from governmental and associated agencies, or found by internet searches. The chapter also includes method sections wherein the procedures for assessing the relevant information are explained.

Chapter 5 addresses and assesses the ethical concerns and considerations that are under debate in professional and public fora.

Chapter 6 summarises the research results as well as the existing programmes for indicated prevention and gives recommendations for further steps.

Abbreviations

AACAP	American Academy of Child and Adolescent Psychiatry
ADHD	Attention-deficit/hyperactivity disorder
AWMF	Arbeitsgemeinschaft der wissenschaftlichen medizinischen Fachgesellschaften e.V. (Association of the scientific medical societies in Germany)
BAG	Bundesamt für Gesundheit (Swiss Health authority)
CAP	Child and adolescent psychiatry
CBCL	Child behavior checklist
CBT	Cognitive behavioural therapy
CD	Conduct disorder
CT	Controlled trial
DGKJP	Deutsche Gesellschaft für Kinder- und Jugendpsychiatrie: German association of child and adolescent psychiatry
DSM IV	Diagnostic and statistical manual of mental disorders – fourth edition
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ESCAP	European Society of Child and Adolescent Psychiatry
ESPAD	European School Survey Project on Alcohol and Other Drugs
EU	European Union
FDA	United States Food and Drug Administration
GABA	Gamma-aminobutyric acid
HaLT	Hart am Limit (German prevention programme)
ICD-10	Tenth revision of the international statistical classification of diseases and related health problems
IOM	Institute of Medicine
IQ	Intelligence quotient
NICE	National Institute for Health and Clinical Excellence
NIDA	National Institute on Drug Abuse
MRI	Magnetic resonance imaging
OR	Odds ratio
PTSD	Post-traumatic stress disorder
RCT	Randomised controlled trial
SSRI	Selective serotonin reuptake inhibitor (antidepressant)
SUD	Substance use disorder
TCA	Tricyclic antidepressants
THC	Tetrahydrocannabinol
UCPP	Utrecht Coping Power Programme
USIP	Universal, selective and indicated prevention
WHO	World Health Organization

Chapter 1

Principles of indicated prevention

1.1 Classifying prevention

Indicated prevention can be seen as the third part of a 'prevention chain' leading from universal prevention and selective prevention to indicated prevention with numerous overlapping borders. Several widely used definitions of indicated prevention are presented here in order to show how the definition used in this report is derived ([1]).

One of the most widely cited definitions concerning the 'universal-, selective- and indicated prevention' (which will in the following be referred to as USIP) approach, is that of Mrazek and Haggerty (1994), which they wrote for the Institute of Medicine (IOM). This model can be shown using a graphical description (Figure 1.1) and is summarised in Table 1.1.

The new IOM framework by Springer and Phillips (2007) first gives a general description of the targets of different prevention types (Table 1.2).

In a more elaborate description of the three different forms of prevention, Springer and Phillips point out that 'indicated prevention serves the individual screened for early problems associated with substance abuse.' They make the point that the observable 'signs or symptoms' can be either directly related to substance abuse, or to problems associated with substance abuse (but do not warrant a DSM-IV diagnosis of dependence).

This seems to open up the field, as symptoms that may be associated with a progression to substance abuse can be

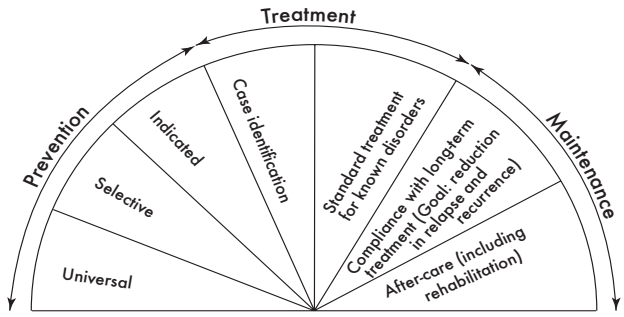

Figure 1.1: The continuum of care model of the Institute of Medicine.

Table 1.1: Classification of prevention strategies, Institute of Medicine (Mrazek and Haggerty, 1994)

Prevention strategy	Target population	Examples	Risk/negative effects	Cost
Universal	General public Population not identified by individual risk	Childhood immunisation; programme against divorce in pre-marriage counselling	Low	Advantage: cost per individual low
Selective	Individuals or subgroup with significantly higher risk of developing a disorder Risk may be imminent or lifetime risk Risk groups: biological, psychological social	Preschool programmes for children in poor neighbourhoods	Minimal or non-existent	Advantage: does not exceed moderate level of costs
Indicated	High-risk individuals with minimal but detectable signs or symptoms foreshadowing disorders, but do not meet diagnostic levels of disorder Asymptomatic individuals with markers and symptomatic individuals with early symptoms	Parent–child interaction training for children with behavioural problems	Some risk	May be reasonable despite high costs

([1]) The concept of indicated prevention is distinct from that of primary, secondary and tertiary prevention. For the use of the latter concept in a psychiatric context, it is useful to refer to the consensus statement on prevention of the World Psychiatric Association (WPA). There, three major aims of prevention are defined (WPA December 2003). Primary prevention: the identification of, and interventions with, high-risk groups was recommended, for example prenatal care, healthy start to life programmes, good parenting, collaborative multi-agency programmes. Secondary prevention: pre-morbid intervention in mental illness such as depression, post-traumatic stress disorder, substance abuse or psychosis was recommended. Tertiary prevention: this was defined as early intervention in mental illness, for example in community-based treatment and rehabilitation programmes. The World Psychiatric Association also defined goals in educating the community about mental illness (secondary prevention) and stigma reduction (tertiary prevention).

Table 1.2: Revised Institute of Medicine classification of prevention approaches (Springer and Phillips, 2007)

Universal prevention	Addresses general public or segment of entire population with average probability, risk or condition of developing disorder
Selective prevention	Specific sub-population with risk significantly above average, either imminently or over lifetime
Indicated prevention	Addresses identified individuals with minimal but detectable signs or symptoms suggesting a disorder

recognised as part of a childhood psychiatric disorder, which allows for the opportunity of treating these symptoms accordingly.

Although the new IOM framework points out that indicated prevention measures are a 'critical stage in the continuum of care', this field seems to be rather neglected, as funding is often not easy to obtain for a group that is in need of preventive efforts and may also be in need of treatment. The fact that indicated prevention is costly to deliver (as it must often be delivered on an individual basis) is a further obstacle to the inclusion of such measures in prevention plans.

Defining the inclusion criteria for indicated prevention determines the target population of the intervention. For this purpose, Springer and Phillips suggest explicitly defining the types of criteria that are used for selection and the relationship between these criteria and the development of substance abuse.

Concluding from other studies, they summarise similar points:

- The aim of the intervention is to prevent progression to a (DSM-IV) disorder;
- Indicated prevention should target dependence and associated harms, rather than initiation or use;
- Indicators should correlate with substance abuse more strongly than indicators used in selective intervention efforts;
- A screening instrument or procedure is required to identify at-risk individuals;
- Family, peer or community level indicators are not suitable; individual indicators (such as 'school failure, justice system involvement, health or mental health problems, violence or aggression, binge drinking, substance use violation') are.

Three major methods of recruitment are observed:

- Self-referral;
- Referral by teachers;
- Initial screening processes (e.g. automatic referrals for violent or consuming students).

To obtain outcome measures, Springer and Phillips suggest that, concerning substance use, reduction of use or of particularly harmful use might serve as an outcome variable. If multiple or co-occurring problems are present and targeted through the intervention, these indicators should be assessed for their outcome as well.

To summarise the IOM's point of view, and include the National Institute on Drug Abuse's (NIDA) very similar approach (NIDA, 1997), indicated prevention:

- Aims at individuals with minimal but detectable signs or symptoms of substance use or related behaviours;
- Targets individuals at high risk with first indicators of drug use (alcohol consumption, school failure, cannabis consumption) but no DSM-IV diagnosis of dependency;
- Individuals need to be identified before the preventive intervention;
- The aim of the intervention is not to stop initiation or use, but to prevent progression to dependence and correlating disorders and to reduce the length and frequency of dangerous use;
- The indicators defined need to have a stronger correlation with substance abuse than those in selective prevention;
- Individual risk and protective factors need to be known in order to determine a specific intervention.

The United States Behavioral Health Services Division (Health Policy Commission) defines the targets of the USIP approach as follows:

- Universal prevention targets the general population;
- Selective prevention targets those at higher-than-average risk for substance abuse;
- Indicated prevention targets those already using or engaging in other high-risk behaviours to prevent chronic use.

In accordance with the IOM classification, the British National Health Service provided the definitions listed in Table 1.3 (McGrath et al., 2006).

Another approach to define the USIP continuum was made by Meili (2004) from the health authority of Switzerland (Bundesamt für Gesundheit, BAG). He tried to show an overlap with the concept of primary, secondary and tertiary prevention (Figure 1.2). Within this concept, 'early intervention' might be seen as 'indicated secondary prevention.'

Toumbourou et al. (2007), in a review, discussed different concepts for preventing substance abuse and dependence in adolescents with regard to their levels of evidence, and defined five distinct intervention concepts (see Table 1.4).

They define universal, selective and indicated prevention solely on the 'basis of level of risk of a disorder in various groups targeted'.

Whereas universal prevention targets whole populations at average risk, selective prevention targets groups at an increased risk and indicated prevention aims to intervene in individuals with 'early emerging problems'.

Toumbourou et al. (2007) present a risk and protective factors model for substance use and related harm, based on the work of Loxley et al. (2005). This model is based on the concept of distal (e.g. early developmental risk, social- and behavioural risk) and proximal (e.g. patterns and places

Table 1.3: The British National Health Service classification of prevention

Prevention strategy	Target population	Examples	Risk/negative effects	Aim
Universal	Entire population group	School drug-prevention curriculum	All members expected to benefit	Prevent young people from starting to use illicit substances
Selective	Subsets of the population, risk of developing drug use is above-average: biological, psychological, or environmental risk factors	After-school programme for children with behavioural problems	Risk of stigma	
Indicated	Individuals at risk of developing drug use, but not meeting DSM-IV criteria for dependence	Reduce THC consumption in non-problematic users	Screening to judge the level of risk Risk of stigma Having risk factors does not necessarily mean that substance use disorder will result	

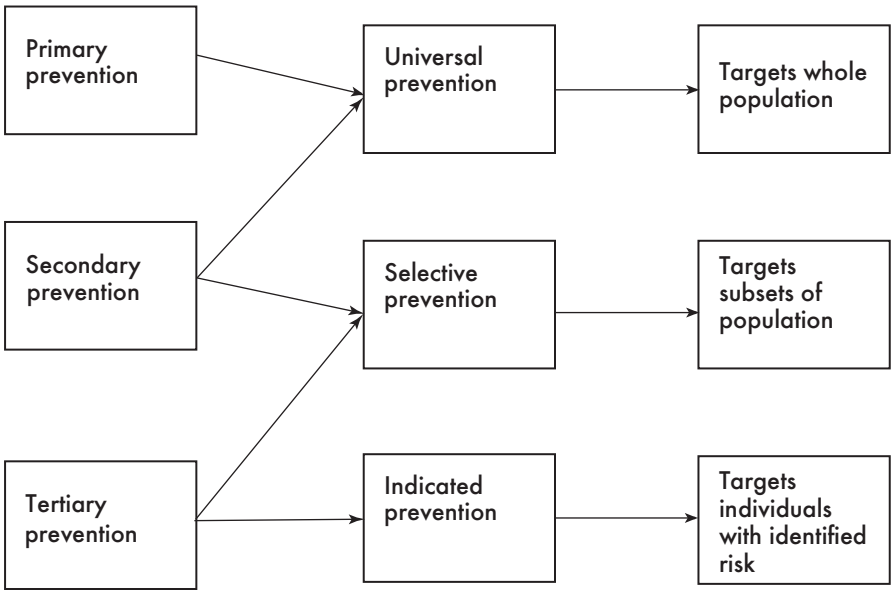

Figure 1.2: Overlap between the types of prevention (Meili, 2004).

Table 1.4: Major intervention types and levels of evidence (Toumbourou et al., 2007)

	Processes (population)	Level of evidence
Regulatory	Using law, policies and enforcement to reduce supply and demand (universal)	Effectiveness
Developmental prevention	Improving conditions for healthy child and adolescent development (targeted and universal)	Efficacy
Early screening and brief intervention	Brief motivational interventions to reduce high-risk use (targeted)	Efficacy
Treatment	Tertiary prevention of substance use disorders (targeted)	Further evaluation required to establish efficacy
Harm reduction	Reducing harm but not necessarily levels of use (targeted and universal)	Effectiveness

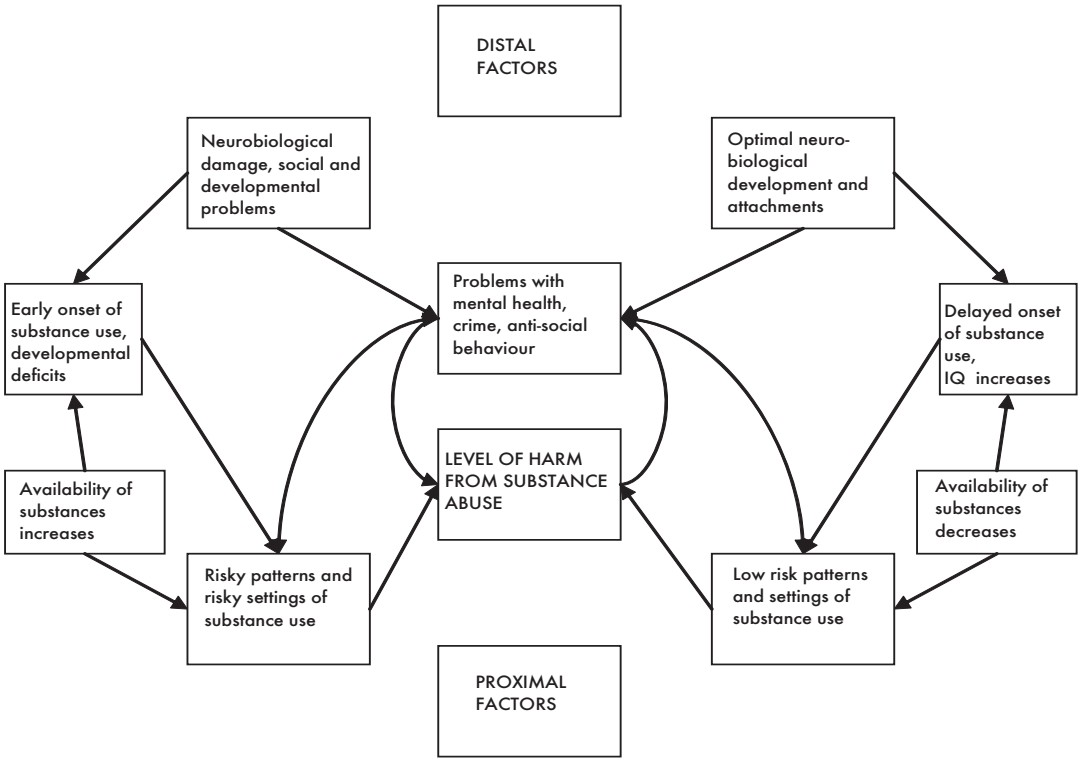

Figure 1.3: Protective and risk factors for substance use (after Toumbourou et al., 2007).

of drug use) factors (Toumbourou et al., 2007). Within this model, individual factors from the distal side and environmental factors from the proximal side both influence the possible level of harm from substance abuse. Whereas distal factors can be addressed through developmental, treatment and harm-reduction interventions, they argue that proximal factors can be addressed by regulatory, brief, treatment and harm-reduction interventions.

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) gives another definition ([2]). According to this view, indicated prevention strategies are designed to prevent the onset of substance abuse in individuals who are showing early danger signs, such as falling grades and consumption of alcohol and other gateway drugs.

The effort is aimed at individuals, with 'substance-abuse-like behaviour at a subclinical level', with the goal to identify these individuals and target them with special programmes.

The relevance of developmental psychopathology and child psychiatric research is mentioned, as individuals with a high risk of failing to meet developmental tasks (such as school, peer contacts) are often predisposed to an elevated risk of developing substance abuse and many child psychiatric disorders show a strong correlation with the development of a dependence.

Indicated prevention describes a preventive, individualised approach targeted at those at high risk of developing substance abuse or dependence later in life. That there is a need for indicated prevention is shown by the existence of strong indicators for the development of a later substance use disorder.

As indicated prevention can be seen to lie somewhere between treatment and selective prevention, it is necessary to identify the points at which these definitions overlap. Clear definitions of the target groups for the different interventions, based on their level of risk, will also be an important factor in determining efficacy.

However, the borders between the different intervention strategies are not clear-cut (Figure 1.4). In defining indicated prevention, the overlap between it and treatment is of special interest, as here the 'worlds' of prevention and treatment collide: this can create problems in a time of dwindling financial resources, as each side may argue that the other side might take care of this population.

The task of differentiating between treatment and indicated prevention is made more difficult by the fact that treatment itself is seldom clearly defined. In 'Guidance for the measurement of drug treatment demand' published by the United Nations

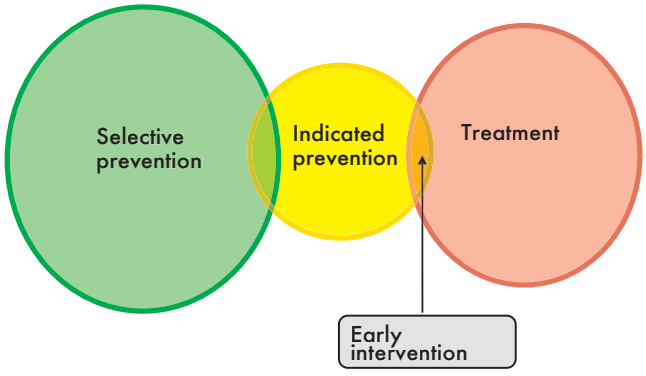

Figure 1.4: The prevention continuum.

([2]) See: http://www.emcdda.europa.eu/html.cfm/index19259EN.html

in collaboration with the EMCDDA (UNODC, 2006) 'drug treatment is considered to be any structured intervention aimed specifically at addressing a person's drug use.' However, this definition remains vague in its practical applicability. For example, insurance companies will pay for the treatment of classified and defined disorders (ICD-10 or DSM-IV), but not for the treatment of conditions. It should be stressed, though, that whenever a defined disorder (here, a substance use disorder) is present, 'treatment' is necessary.

Within the group that can be identified as requiring indicated prevention, there is a section for which 'early intervention' is appropriate. This sub-group includes people who show strong indicators of developing substance abuse later in life and who consume drugs, but not to an extent that permits an ICD-10 or DSM-IV diagnosis of substance use disorder or dependence. Compared to other prevention approaches, early intervention is closer to treatment and therefore often requires services from the medical system.

Early intervention describes an approach situated between the overlapping fields of indicated prevention and treatment. The target group is individuals who already use drugs, but who do not fulfil DSM IV or ICD-10 criteria for substance abuse or dependence.

Early intervention can be classified as prevention, though treatment is often required at this stage of substance use.

1.2 Estimating risk factors

As the spheres of indicated and selective prevention are separated according to the predictive power of the indicators (defining a likelihood of developing a substance use disorder later in the individual's life), it is necessary to understand how risk factors are used to screen individuals.

Here it is necessary to review the concept of conditional probabilities, which can be calculated using Bayes's Theorem ([3]). The central insight of the Bayesian approach is that 'a hypothesis is confirmed by any body of data that its truth renders probable' (Stanford Encyclopaedia of Philosophy, 2003).

The insight based on Bayes's Theorem is especially valuable when it comes to screening for certain indicators. In such a test for the prevalence of certain risk factors, terms such as specificity and sensitivity are used. The sensitivity describes the 'true positive' rate, which means the proportion of the population with a specific indicator that can be found through a certain test, whereas the specificity is the 'true negative' rate, describing the proportion of individuals without any indicators that tests negative. Knowledge of the specificity and sensitivity of a test, together with knowledge of the prevalence of a certain indicator in the population allows the prediction of the likelihood of a test result.

([3]) Bayes's Theorem was set out by Thomas Bayes, posthumously in 1764 in 'An essay towards solving a problem in the doctrine of chances'.

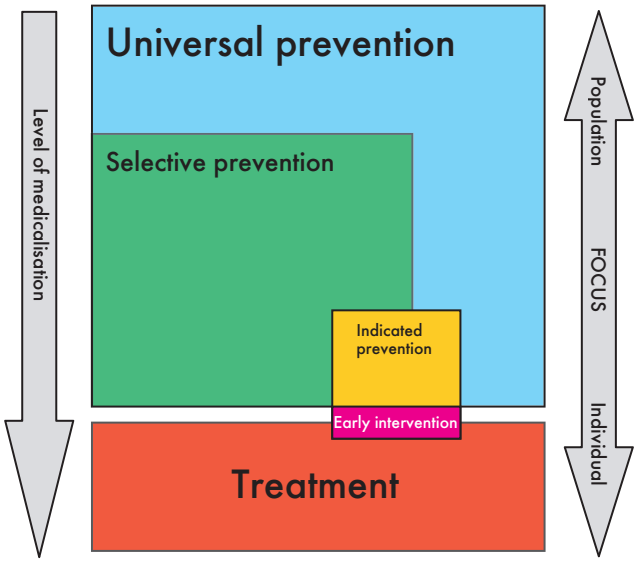

Figure 1.5: The USIP–treatment continuum.

Based on this approach, 'odds' can be defined as the probability of a hypothesis divided by the probability of its negation (if a racehorse's odds for winning are 7:5, it means that it has 7 out of 12 chances to win the race).

To define indicators of later substance abuse, it is necessary to look at conditional probability (meaning: how likely it may be that with the given indicators in given circumstances an individual will develop a substance use disorder), which is defined as:

$$\text{Conditional probability} = \text{unconditional probability} \times \text{predictive power}$$

From this equation, it is clear that knowledge of the predictive power of certain indicators is an essential requirement in this prevention approach.

In Figure 1.5, another approach at defining the relationships between USIP and treatment is presented. Inclusion in one of the groups is determined by whether the risk for a substance use disorder or substance use is prevalent. As stronger indicators are necessary for inclusion in the indicated prevention group, indicators need to reflect the specific circumstances of an individual more and more when moving from selective to indicated prevention and further on to treatment.

1.3 Conclusion

Indicated prevention can be summarised as:

- Preventive interventions that are targeted at the individual;
- The individual presents voluntarily or is referred to an expert, for example by parents, teachers, social workers, paediatricians;
- The individual is identified on an individual level based on a professional's evaluation;
- The individual might exhibit substance use, but does not fulfil criteria for dependence (according to DSM-IV or ICD-10) and/or shows indicators that are highly correlated with an individual risk of developing substance abuse later in life (such as psychiatric disorder, school failure, antisocial

behaviour). Substance use is not a necessary condition for inclusion in preventive interventions;
- Distinguished from selective prevention by the stronger correlation and individualised nature of indicators for the development of a substance abuse or dependence;
- Distinguished from treatment by the requirement of individuals to fulfil DSM-IV or ICD-10 criteria for substance abuse to receive treatment;
- The aim of indicated prevention is not necessarily to prevent the initiation of use or the use of substances, but to prevent the development of dependence, to diminish the frequency and to prevent 'dangerous' substance use (e.g. moderate instead of binge-drinking).

In addition, some indicated prevention measures are classified as early interventions, characterised as:

- The term 'early intervention' defines interventions targeted at individuals with identified strong indicators and substance use (but who do not warrant a DSM-IV or ICD-10 diagnosis);
- The field of 'early intervention' is within the overlapping borders of indicated prevention and treatment.

In the review presented in the following chapters, this definition is used to evaluate the prevention level within the literature and programme search.

Having now reviewed the definitions and scope of indicated prevention, the next chapter will look at the factors that may precede the development of a substance use disorder.

Chapter 2

Risk and protective factors in the development of substance use and substance use disorder

2.1 Introduction

Adolescence is the stage in life at which experimentation with substances usually takes place. Adolescents are highly vulnerable to social influences, have lower tolerance levels and become dependent at lower doses than adults (Fowler et al., 2007). However, the majority of adolescents who experiment with substances do not become problem users.

This chapter presents a review of risk and protective factors in the development of substance use and substance use disorders. Risk factors include personality, social and biological factors such as sensation-seeking, positive alcohol expectancies, family dysfunction, peer and parental drug use, genetic heritability and mental health problems. Influences that may moderate or buffer the effects of risk factors are regarded as protective factors and may include: strength of attachment or bond between adolescent and parents, personal attributes such as positive temperament and disposition, and positive external support systems. The trajectory of substance use can be determined by complex relationships between risk and protective factors as, for example, found for drinking trajectories (Masterman and Kelly, 2003). Examples of protective and risk factors from different domains of activity are given in Table 2.1.

Starting from a broad social context of at-risk populations, this overview will progressively narrow its focus to the individual at high risk. Following a survey of the neurobiological mechanisms on which drugs operate, the neurobiology of specific substances will be examined in detail.

Table 2.1: Risk and protective factors in six domains of activity ([1])

Domain	Risk factors	Protective factors
Individual	Early aggressive behaviour	Self-control
Family	Lack of parental supervision	Parental monitoring
Peer	Substance abuse	Academic competence
School	Drug availability	Anti-drug use policies
Institutions	Foster care, out of home placement	Professional monitoring, leisure activities
Community	Poverty	Strong neighbourhood attachment

([1]) Adapted and extended from Robertson et al. (2003) and Gee et al. (2006).

In sections 2.3–2.5, the focus is on the more individual domain, including not only personality factors but also the relationship with neurobiology and with psychopathology, since mental health status seems to influence strongly the outcome of substance use (alcohol, cigarettes, cannabis and/or other illicit drugs).

Section 2.3.4 deals with the course of substance use and abuse. Since there are many cross-sectional (retrospective) and short-term longitudinal studies of legal drugs and of cannabis, the focus here will be on prospective longitudinal studies with several time points and a sufficient sample size. Another selection criterion is an appropriate statistical analysis of change, preferably with models that take into account the variation in intra-individual change trajectories and the accompanying risk development. A limitation to the evidence base that should be borne in mind arises from the statistical problems in trying to perform a conjoint analysis of trajectories (for an example, see Muthén, 2001), as a result of which most of these studies concentrate on the course of one substance. Among adolescents, however, polyconsumption may often be the case.

2.1.1 Methods

The scientific literature was searched for publications on risk factors, trajectories of substance abuse, neurobiology of addiction and programmes of indicated prevention. The initial literature search was performed in PubMed, limited to publications dated after 1 January 2000 and until 31 July 2007.

The search terms used were: 'children, adolescence' and 'addiction, substance use, substance misuse, substance abuse, binge drinking, alcohol misuse, drug abuse, chemical dependency, under age drinking', which resulted in over 13 000 abstracts.

The following terms were used to focus on comorbidity aspects within the results: 'aggression, antisocial personality disorder, attention-deficit/hyperactivity disorder, ADHD, community, conduct disorder, depression, family, impulsivity, indicated prevention, intervention, mental health, oppositional defiant disorder, prevention programmes, risk factor, PTSD, foster care, addicted parents, deprivation, institutional care, out of home placement'. Papers with the terms 'prison, jail, custody and pregnancy' were excluded. In total, the search resulted in over 6 900 abstracts, which were then examined individually for relevance, leading to the selection of 390 studies for detailed analysis.

A further database search in EMBASE, Social Science Citation Index, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PsycINFO resulted, respectively, in 64, 254, 183 and 146 additional abstracts, of which 96 were selected after being vetted for relevance.

These studies were either included as part of the literature search on programmes of indicated prevention (see below), or they provided useful information for this chapter on risk factors and trajectories.

For the interpretation of the subsequent findings, one should keep in mind the following two points:

- The findings are 'unweighted', in other words, the results are reported without an 'in-depth' evaluation of the quality of each study (design, assessment instruments, sample size, statistical analysis). As all of the studies are published in peer-reviewed journals, the overall quality should be high. Nonetheless, there is an absence of meta-analyses, which would be helpful to estimate the absolute and the relative effect size of each factor or factor combination.
- Study results pertain to the group that was studied and can only be generalised to the population from which the study sample comes. Therefore, results for one group may not be valid for a group with a different background, and certainly not for the general population of adolescents.

These two caveats will be addressed in Chapter 6, where a comprehensive interpretation is given. As a further general remark, the selection of the studies has been determined by the search criteria, and only published results are included in this chapter.

Results are frequently stated in terms of an odds ratio (OR). The OR indicates to what extent the risk is elevated for a group in comparison to the reference group. For example, OR = 2 means that the risk for developing a substance use disorder is twice as high compared to the reference group. OR = 1 indicates 'same risk'. For a statistical test of significance, the confidence intervals of the OR must be computed and evaluated as to whether the confidence interval includes OR = 1.

2.2 Psychosocial and familial risk and protective factors

2.2.1 Peer group

Substance use among adolescents is strongly influenced by the peer group. Preston and Goodfellow (2006) examined social learning for alcohol use in adolescents (12–17 years). They used data of 17 709 adolescents from the 2002 National Household Survey on Drug Use and Health and divided them into two subgroups, drinkers (n = 6 176) and non-drinkers (n = 11 533). It was shown that social learning variables have an effect on frequency of alcohol use and alcohol abuse. Peer attitudes (prevalence of norms favourable to deviant behaviour), personal approval (adoption of deviant norms), and peer behaviour all affect how often the adolescent drinks alcohol and the likelihood of abuse or dependence. The frequency of alcohol use is increased by peer and personal approval of alcohol use and the number of peers who get drunk at least once a week.

In Switzerland, 3 925 students of eighth and ninth grade (mean age 15.3 years) and their 220 teachers, selected on the basis of a list of all classes in public schools, were assessed randomly (Kuntsche and Jordan, 2006). Having a substance-using peer group was a significant predictor of students' use of both alcohol and cannabis; school incidences (students came intoxicated to school) increased students' own use of cannabis, not that of alcohol; the higher teachers' indication of cannabis-intoxicated students in school premises and the higher the proportion of cannabis-using peers, the higher the students' own use of cannabis (Kuntsche and Jordan, 2006).

In a longitudinal study with a 1-year follow-up, Barnow et al. (2004) collected data from 147 adolescents, aged 11 to 18 years, and their parents. Both alcohol expectancies, measured using the AEQ-3 (Alcohol Expectancies Questionnaire) and peer delinquency/substance use (measured by a self-developed questionnaire) predict alcohol consumption of adolescents.

Kokkevi et al. (2007) undertook a cross-sectional European school population survey (ESPAD), which included 16 445 16-year-old high-school students from Bulgaria, Croatia, Greece, Romania, Slovenia and the United Kingdom. The students were examined in the classroom using an anonymous questionnaire, containing instruments measuring self-esteem, depressive mood, anomie and antisocial behaviour. They collected self-reported data on the use of tobacco, alcohol, cannabis and other illicit drugs. Related covariates were substance use by peers and older siblings. They showed high odds ratios for going out most evenings, especially in relation to smoking (OR = 3.0) and for substance use by peers and older siblings: the use of cannabis by peers and older siblings was associated with the adolescents' use of cannabis (OR = 2.5–3.6) and any illegal drug (OR = 2.3–3.5), peers' tobacco smoking was associated with the adolescents' smoking (OR = 3.3 for boys, 3.0 for girls).

Among 3 361 students aged 12 to 18 years (first to fifth grade of secondary school) in the Netherlands, who were assessed with a questionnaire including 20 'guess who' peer nomination items and attributes of an individual's peer group functioning, drinkers and smokers appear to be more self-confident, sociable and aggressive. Two categories of early adolescents who drink and smoke more than others were identified: those who are sociable and self-confident, and those, who are aggressive and emotionally insecure. Drinkers and smokers score lower on achievement and school performance, and score higher on aggression and inattentiveness (Engels et al., 2006).

A study conducted in the United States on 13 718 high-school students in eleventh grade (mean age 15.4 years) participating in the National Longitudinal Study of Adolescent Health (Add Health) showed that the strongest predictors were peer involvement with substances, delinquency and school-related problems in all stages of cannabis involvement (initiation of experimental use, initiation of regular use, progression to regular use, failure to discontinue, experimental use, failure to discontinue, regular use). In this population-based sample, 13% of nonusers at wave 1 had become involved with cannabis one year later (at wave 2, 10% experimentally and 3% regularly). More than half (55%) of adolescents who had experimented with cannabis at wave 1 continued to use cannabis either experimentally (37%) or regularly (18%). The great majority of regular users at wave 1 remained involved with cannabis (53% on a regular basis and 20% experimentally). These numbers indicate that initiation tends to result in continuation (Van den Bree et al., 2005).

In a population of 2 306 Finnish boys born in 1981 and assessed at the obligatory military call-up in 1999, Niemela et al. (2006) concluded that drunkenness-related alcohol use among 18-year-old Finnish boys is culturally normative and associated with social competence; drunkenness is less common among those with fewer social skills.

Social learning variables, peer attitudes (prevalence of norms favourable to deviant behaviour), personal approval (adoption of deviant norms), and peer behaviour have an effect on frequency of alcohol use and alcohol abuse.

Alcohol expectancies and peer delinquency predict alcohol consumption of adolescents.

Going out most evenings and the use of cannabis by peers and older siblings is associated with adolescents' use of cannabis.

Having school-related problems is a strong predictor in all stages of cannabis involvement (initiation of experimental use, initiation of regular use, progression to regular use, failure to discontinue, experimental use, failure to discontinue, regular use).

2.2.2 Family

There are several studies on the association between family factors and substance use in adolescents. In particular, parents' and siblings' substance use and parental supervision are predicting factors.

Merikangas and Avenevoli (2000) present some of the results of the Yale Family Study including 340 probands with substance use disorder, a psychiatric comparison group of probands with anxiety disorders and controls selected from the community. Information was collected on 1 626 first-degree relatives. The study followed 203 probands aged 7–17 for eight years. The results indicated familial aggregation of substance disorders in adults and children.

Substance use in families results in detrimental parent–child dynamics, which can increase a child's 'vulnerability' to later drug use (Kumpfer and Bluth, 2004). Adolescents whose parents use substances are more likely to be influenced by friends who use substances than are those whose parents do not use substances (Li et al., 2002).

In a study from the Pittsburgh Adolescent Alcohol Research Center with 14- to 17-year-old adolescents (194 from a clinical treatment programme, 170 from community sources), among the community subjects, adolescents with inadequate supervision were significantly more likely to drink alcohol in a variety of situations and were more likely to develop alcohol use disorder (Clark et al., 2005). On the other hand, perceiving high levels of family support appears to function as a risk buffer: it reduces risk associated with tension-reduction expectancies and with avoidant coping dispositions (Catanzaro and Laurent, 2004).

Authoritative parenting was identified as a protective factor that prevents or buffers cigarette and cannabis use measured in a population of 1 461 students (sixth–eighth grade public schools) in Colorado Front Range (Stephenson and Helme, 2006). Prosocial family processes (rules, monitoring and attachment) have a significant impact on child–peer association, decreasing involvement with antisocial peers and significant negative effects on substance initiation (Oxford et al., 2001). Independent decision making (e.g. freedom in choosing what to wear, eat, when to go to bed, television time and programme) predicted progression to regular use for boys; activities with the mother (e.g. discussing school grades and personal problems) predicted discontinuation of regular cannabis use for boys and girls (Van den Bree et al., 2005).

Adolescents who report healthy relationships and open communication with their parents, and perceive them as supportive are less involved in drug use (Stronski et al., 2000). Adolescent social bond did not moderate the relationships between earlier childhood behaviour and adult drug use (Ensminger et al., 2002).

Family monitoring and rules, family conflict, and family bonding predict the individual's risk of illicit drug initiation throughout adolescence. A warm and supportive family environment characterised by a strong bond to family members and a low level of family conflict predicts a lower risk for illicit drug initiation during adolescence. Good parental control and supervision, characterised by close parental monitoring and clear family rules for children's behaviour, may significantly reduce the risk of illicit drug initiation. A higher level of peers' antisocial activity predicts a significantly higher risk of illicit drug initiation in this study. This study also found that a higher level of peer prosocial activity predicts a significantly lower risk of illicit drug initiation (Guo et al., 2002).

Understanding the culture of the patient and his or her family may assist adolescent health care professionals in encouraging protective behaviours (Horigian et al., 2006).

Family risk factors in the development of adolescent substance use are: known familial substance use or abuse, and a lack of parental supervision. Protective factors are: warm and supportive family environment, prosocial family processes (rules, monitoring) and attachment.

2.2.3 Social activities

Aleixandre et al. (2005) found that subjects who claim to participate very often in social activities consume 54% more beverages (distilled and fermented alcohol) than those who claimed not to participate in these activities. Those who indicated taking trips increased their consumption of distilled beverages by 36% compared to those who do not participate in these activities. Taking trips is also predictive of greater cannabis consumption. Subjects who say that they customarily participate in cultural activities consume 48% less than subjects who do not participate in these activities (2.24 fewer cannabis cigarettes per week). Subjects who indicated participating in sports activities consume 59% less tobacco than subjects who do not participate in sports activities.

Religion (attending religious services, participating in youth groups etc.) reduced risk of initiation of experimental cannabis use for girls, of initiation of regular use for boys and girls

combined, and of continuation of experimental cannabis use in younger girls (Van den Bree et al., 2005).

One hundred Dutch high-school students in grade one (mean age 12.29) and four (mean age 15.53) of secondary education were evaluated in the national health survey (Thush et al., 2007). Participants were asked to categorise stimulus words as quickly as possible (implicit measure to assess the relation between alcohol and expectancies) and to answer statements on the (positive) effect of alcohol (explicit measure). Higher grade and heavier drinking were associated with stronger implicit and explicit positive alcohol-related cognitions, weaker implicit negative alcohol-related cognitions, and stronger explicit arousal alcohol-related cognitions. Interactions were found between gender and drinking-status (explicit negative alcohol-related cognitions, implicit arousal alcohol-related cognitions and implicit and explicit sedation alcohol-related cognitions). Overall, the implicit measures significantly added to the prediction of binge drinking after one year, whereas the explicit measures (as a group) did not. Three-way interaction between grade, gender and negative implicit associations significantly predicted binge drinking after one year. Both explicit and implicit alcohol-related cognitions appear to influence drinking in adolescents (Thush et al., 2007; Wiers et al., 2005).

From an ongoing longitudinal family study on the development of risk for alcohol and other substance use disorders, 258 initially preschool-aged boys and both of their biological parents (60% alcoholic families and 40% controls, all Caucasian Americans) were investigated. Early childhood sleep problems emerged to be a robust marker for substance use in adolescence. Sleep problems significantly increased the likelihood of early onset of alcohol, cannabis, and other drug use and for both occasional or regular cigarette use (Wong et al., 2004).

Social activities increase the consumption of alcohol and taking trips the consumption of cannabis, cultural activities reduce the consumption of cannabis and sport activities the consumption of tobacco.

Religiosity is protective in the initiation of cannabis use.

Both explicit and implicit alcohol-related cognitions seem to influence drinking in adolescents.

Sleep problems in early childhood significantly increase the likelihood of early onset of alcohol, cannabis and other drug use.

2.2.4 High-risk groups in schools

There are populations that can be identified as high-risk groups. As shown in a study by Sussman et al. (2000), drugs are used by a greater percentage of youth at continuation high schools (an alternative school for youth unable to remain in the regular school system in California, until the age of 18) than at regular high schools. Drug use in the last month measured at the baseline assessment (n = 702) was: cigarettes 57%, alcohol 65%, cannabis 55%, stimulants 21%, hallucinogens 13%, all other drugs 5–8%. Among tenth graders at comprehensive high schools (n = 1 208), use in the last month of these substances was: cigarettes 24%, alcohol 36%, cannabis 22%, stimulants 2%, hallucinogens 2%, all other drugs 1–3%.

The authors emphasise that continuation high schools do not cause adolescents to use drugs. The most consistent predictors of substance abuse and dependence in this study were addiction concern and current drug use and intentions and friends' drug use (Sussman et al., 2000).

2.2.5 High-risk groups in residential care

Youth diagnosed with conduct disorder (by means of the Diagnostic Interview Schedule for the DSM-IV for lifetime and current diagnosis of mental health disorders) were found to have higher rates of substance use and substance use disorder in a study of 406 17-year-olds in the foster care system in Missouri, with strong relationships found between being diagnosed with conduct disorder and all types of substance use and disorder, current and lifetime. Almost half of foster care youths in this sample had used illicit substances sometime during their lifetime. More than a third of these youths in the foster care system met criteria for a substance use disorder. Foster care youth who are using illicit substances may be using them seriously and may have abuse or dependence disorders (Vaughn et al., 2007).

Children and especially adolescents living in residential care appear to exhibit different risk factors compared to those living in private households. Ford et al. (2007) combined three surveys of British children looked after by local authorities (n = 1 453) and one survey of children in private households (n = 10 428). Children in care had a higher prevalence of psychiatric disorders than the most disadvantaged children living in private households. Care-related variables were strongly related to mental health. Looked-after status had the strongest association with disorders in which environmental factors are believed to have a leading role, such as post-traumatic stress disorder and conduct disorder. Girls were more likely to have post-traumatic stress disorder; boys were more likely to be diagnosed with hyperkinetic disorder and conduct or oppositional defiant disorder ([4]).

Schmid et al. (2006) studied 689 adolescents with a mean age of 14.4 years (SD = 2.9) from 20 residential care institutions. The findings of their research suggest that adolescents in residential care are a high-risk group concerning psychiatric disorders and substance use or abuse (Table 2.2).

High-risk groups of adolescents can be identified. These include students of continuation high schools and adolescents in foster or residential care. Adolescents in residential care are more likely to have a psychiatric disorder and are more likely to use substances.

([4]) Oppositional defiant disorder (ODD): ICD-10: F91.3. According to the American Academy of Child and Adolescent Psychiatry (AACAP) ODD 'describes pattern of uncooperative, defiant and hostile behavior toward authority figures that seriously interferes with the youngster's day to day functioning'. Symptoms may include: 'frequent temper tantrums, excessive arguing with adults, active defiance and refusal to comply with adult requests and rules, deliberate attempts to annoy or upset people, blaming others for his or her mistakes or misbehavior, often being touchy or easily annoyed by others, frequent anger and resentment, mean and hateful talking when upset, seeking revenge'. Further information is available at: http://www.aacap.org/cs/root/facts_for_families/children_with_oppositional_defiant_disorder

Table 2.2: Prevalence of different psychiatric diagnoses

Diagnosis	Prevalence	
	Residential care	General population
Conduct disorder (F 91, F 92)	26% (+ 22% F 90.1)	6%
ADHD (F 90.0 + F 90.1)	24%	3–6%
Depression (F 32, F 34)	10.4%	1–5%
Anxiety	4%	1.8–5.3%
Enuresis	6% (14 years)	2%
Substance abuse	8.8% (14 years)	4% alcohol (16 years) 1% cannabis (14 years)

The co-occurrence of high rates of psychiatric disorders and high risks of developing substance use disorders in certain sub-groups of the youth population indicates a need to take an in-depth look at juvenile psychiatric disorders on a more individual level.

2.3 Individual risk and protective factors

2.3.1 Gender effects

There is evidence that some risk and protective factors have different effects on boys and girls.

Pubertal maturation seems to have an influence on alcohol use. In a sample of 4 500 9-, 11- and 13-year-olds from public schools in North Carolina, early pubertal maturation predicted alcohol use in both sexes and alcohol use disorder in girls. The effect of morphological development was strongest in those who matured early. The highest level of excess risk for alcohol use was seen in early maturing youth with conduct disorder and deviant peers. Lax supervision predicted alcohol use in early maturing girls, while poverty and family problems were predictive in early maturing boys (Costello et al., 2007).

Those girls who have experienced early puberty are more likely to advance to substance use compared to their late-maturing counterparts (Chung et al., 2005).

Shy females were less likely to be adult cannabis users than non-shy females (Ensminger et al., 2002).

In a review, Essau et al. (1998) found that the prevalence of substance use disorders in adolescents was significantly higher in males than in females. Although rates of exposure are quite similar for males and females, males are approximately twice as likely as females to use regularly and four times as likely to be heavy users (Rey et al., 2004).

In self-reports of adolescents in residential care, Schmid et al. (2006) found that 27.4% of the boys reported occasional problems and 19% distinct problems with substance use, whereas the respective figures for the girls were 21.2% and 9.5%. In the report of the carers, the rates of substance use were slightly lower (Schmid et al., 2006).

Among a population of inner-city substance users in residential drug treatment, females reported greater crack or cocaine use and were more likely to be dependent on this drug compared to their male counterparts. However, no consistent gender difference was demonstrated in use and dependence across other drugs. No gender differences were found for any other substance across alcohol, cannabis and hallucinogens (Lejuez et al., 2007).

Boys, but not girls, with a history of depression were found to be at increased risk of substance use disorder. Anxiety increased the risk of substance use disorder in girls at age 16 (Sung et al., 2004).

Association between substance use and antisocial behaviour was also stronger for girls than boys (Kokkevi et al., 2007).

Religion reduced the risk of initiation of experimental cannabis use for girls and continuation of experimental cannabis use in younger girls. As a family risk factor, independent decision making predicted progression to regular use of cannabis for boys (Van den Bree et al., 2005).

Generally, boys are at a higher risk for substance use than girls. Concerning mental health disorders, the prevalence of conduct disorder is higher in boys, while internalising disorders and post-traumatic stress disorder are more common in girls. But, among children with antisocial behaviour, girls, and not boys, are at a higher risk for substance use.

2.3.2 Personality and temperament

Some personality traits and attitudes are associated with a higher risk of substance use. Temperament dimensions are related to substance use, and structural modelling shows

indirect effects through self-control constructs (Wills et al., 2001). Good self-control was found to lead to higher academic competence and had direct effects to less peer use and less adolescent substance use, while poor self-control had a path to more life events and deviant peer affiliation (Wills et al., 2001). Bergen et al. (2004) also showed that academic failure predicts alcohol, tobacco and cannabis use, even after controlling for socio-demographic factors and depression, anxiety and antisocial behaviour.

Being shy was protective for cannabis use (Ensminger et al., 2002): shy females were less likely to be adult cannabis users than non-shy females. Adolescent social bond did not moderate the relationships of earlier childhood behaviour to adult drug use (Ensminger et al., 2002).

Catanzaro and Laurent (2004) examined some reasons for drinking alcohol with the Alcohol Outcome Expectancy Questionnaire (AOEQ), the Negative Mood Regulation scale (NMR scale) and the Reasons for Drinking scale. Weak negative mood regulation expectancies potentiated any such risk. Recent drinking, lifetime drinking and drunkenness were all positively associated with stronger tension-reduction alcohol expectancies, and drinking to cope completely mediated these relations. The highest levels of drinking to cope and drunkenness were observed for those who scored on the 'riskiest' end of both interacting predictor measures (e.g., high levels of avoidant coping and tension-reduction expectancies).

Alcohol expectancies, measured by the AEQ-3 (Alcohol Expectancies Questionnaire) predicted alcohol consumption of adolescents (Barnow et al., 2004).

Assessment of sensation-seeking with the Brief Sensation-Seeking Scale (BSSS) and cigarette and cannabis use, intentions and attitudes showed that sensation-seeking was positively related to 9 of 12 outcome variables of smoking and cannabis use (e.g. lifetime use, regular use of cannabis, positive attitude toward smoking) (Stephenson and Helme, 2006).

Cohen et al. (2007) examined adolescents at the mean age of 13.7 years. Personality disorder was associated with increased risk of co-occurring substance use disorder as well as the increase of subsequent onset of cannabis use. Though, it should be added that among children of this age these symptoms are better regarded as personality traits, as personality disorders should not be diagnosed before the age of 16.

Good self-control leads to less adolescent substance use. Being shy may be protective for females for cannabis use. Weak negative mood regulation, stronger tension-reduction alcohol expectancies and drinking to cope increase the risk of drinking alcohol. Sensation-seeking is associated with cigarette and cannabis use.

2.3.3 Psychopathology

In the development of substance use, mental health problems have a strong influence. For example, the prevalence of problem behaviours such as antisocial behaviour, injuries, depressed mood and suicide attempts is clearly elevated among cannabis users compared to nonusers, and increased even more for users of illicit drugs other than cannabis (Stronski et al., 2000).

Even childhood mental behaviours presage adolescent alcohol problems. They are associated with the persistence of alcohol problems in adolescence and predict adult alcohol use disorder outcomes (Clark, 2004).

Poor adaptive functioning and psychological problems are connected with non-normative orientation to drunkenness. Both late-adolescent boys refraining from drunkenness and those with frequent drunkenness may be in need of mental health assessment. Frequent drunkenness is common among late-adolescent mental health service users (Niemela et al., 2006). Psychiatric disorders are strongly associated with the development of substance use disorders, both as premorbid risk factors as well as a sequelae (Merikangas and Avenevoli, 2000). Adolescents with substance use disorders have a number of problems, including comorbid psychiatric disorders (Bukstein et al., 2005).

In a survey on behalf of the Department of Health in England (Meltzer et al, 2003), 32 % of the 11- to 17-year-olds were current smokers and only 36 % had never tried smoking. Children with a mental disorder appeared to be much more likely to smoke. Over half of the young people with a mental disorder were current smokers compared with only 19 % of those with no disorder. Of the children with an emotional disorder, 65 % were current smokers. In the survey, 45 % of the 11- to 17-year-olds had never had an alcoholic drink and a quarter drank at least once a month. Children with a mental disorder were more likely to be regular drinkers than children with no mental disorder: 5 % of children with a mental disorder reported that they drank almost every day compared with none of the children with no disorder. Among children with conduct disorder, 6 % drank almost every day, and a quarter of the children with an emotional disorder drank once or twice a week.

Children with a mental disorder appeared to be more likely to start drinking at a young age: 27 % of the children with a mental disorder started to drink at age 10 or less, compared with 11 % of those with no disorder.

The most commonly reported drug was cannabis, which a fifth of 11- to 17-year-olds reported using at some point in their lives. Of these children, half (11 % of all the children) had used it in the past month. Cannabis use was more prevalent among boys and among older children. Children with a mental disorder were three times more likely than children with no disorder to have used cannabis in the past month: 19 % compared with 6 %.

Children with a mental disorder are more likely to start drinking at a young age and to have used cannabis in the past month.

2.3.3.1 *Externalising and internalising psychopathology and substance use*

Research on comorbidity has often been interpreted as demonstrating a dual pathway model in which substance use and substance use disorder are reached through both

deviant behaviour (particularly conduct disorder) and alternately, through internalising disorders (including anxiety and depression). In analysing data from the AddHealth study, Dierker et al. (2007) found some support for the dual pathway hypothesis: depression uniquely predicted assignment to the smoking group in young adult females. King et al. (2004) found that depression may predict initiation of licit substance use in early adolescence. While these results only pertain to smoking, Wittchen et al. (2007) could show that internalising disorders (depressive disorders and hypomania or mania) are associated with cannabis use and cannabis use disorder independently of externalising disorders (ADHD, oppositional defiant disorder, conduct disorder).

Conduct disorder and aggressive behaviour: The best evidence is given for the correlation between externalising disorders such as ADHD and conduct disorder. But problem behaviours such as aggressive behaviour (Unger et al., 2003) or antisocial behaviour (Kokkevi et al., 2007) are also strongly correlated with substance use. Physical aggression, measured in 631 continuation high-school students in California with a 14-item scale adapted from the original Conflict Tactics Scale, was associated with higher risk of cigarette, cannabis and other drug use (Unger et al., 2003). Non-physical aggression was associated with a higher risk of cigarette, alcohol, cannabis and other drug use. Nonaggression was associated with a lower risk of cigarette use.

Symptoms of a conduct disorder were a strong predictor for the development of alcohol use disorders in a population of 506 boys from the Pittsburgh Youth Study (a longitudinal study, seventh graders in 1987–1988, assessment in their early 20s; mean age 20.4) (Pardini et al., 2007).

Early-onset conduct problems were also found to increase individual vulnerability to later cannabis use among 2 436 Norwegian high-school pupils, 12 to 16 years old (Pedersen et al., 2001). Strong associations between conduct problems and cannabis initiation are also seen at levels of conduct problems that most probably are subclinical, measured with the Olweus scale of antisocial behaviour. Effects were significantly stronger for girls (Pedersen et al., 2001).

Delinquent behaviour (as measured by the CBCL) was a strong predictor of drug use (Ferdinand et al., 2001). Mason et al. (2003) found that delinquency predicted growth in substance use, but substance use did not predict growth in delinquency.

Studies of the natural course of conduct disorder and aggressive behaviour show that the core group of these patients has a high risk for delinquency. At the same time, reviews on arrested juvenile delinquents show a higher proportion of substance abuse and disorders in delinquents compared to the general population. In a sample of 350 court adjudicated adolescent males labelled as delinquent, Friedman and Terras (1999) found that social behaviour and peer relationship risk variables were more strongly related to the degree of substance use and abuse than were the family problem risk variables (36 % versus 12 % of the variance). Protective factors such as conforming social behaviour and conventional bonding were found to be more powerful than the degree of social behaviour risk factors in the prediction of treatment response and in the prediction of serious substance abuse outcomes. Therefore, many strategies in aggressive conduct disorders among children or adolescents with early delinquency focus on so-called multisystemic interventions. However, a Cochrane review on multisystemic therapy for social, emotional and behavioural problems in youth aged 10 to 17 years (Littell et al., 2005) showed ambiguous results after reviewing 266 titles and abstracts. The authors identified 35 unique studies out of these articles and came to the conclusion that while there is no evidence that multisystemic therapy has harmful effects in youth, the evidence for the effectiveness of multisystemic therapy compared with other interventions is contradictory. Woolfenden et al. (2006) conducted a Cochrane review on family and parenting interventions in children and adolescents with conduct disorder and delinquency. Out of 970 titles in the literature search, only eight trials met quality criteria for inclusion. A total of 749 children in their families were randomised to receive a family and parenting intervention or to be in a control group. The evidence from these trials suggests that family and parenting interventions for juvenile delinquents and their families have beneficial effect on reducing time spent in institutions and there is perhaps a possible effect of reduction of subsequent arrests.

Before being incarcerated, some delinquent and conduct disorder children live in the streets as so-called street kids or runaway kids. Thompson et al. (2005) described a particularly high risk for substance abuse in runaway youth. They compared runaway youth in emergency crisis shelters and in juvenile detention centres in the United States and found that runaway youth admitted to juvenile detention (n = 121) had proportionally higher levels of problem behaviours, including substance use, than youth admitted to shelter services (n = 156). Alcohol or cannabis use was strongly associated in both groups with the consumption of other substances.

In conclusion, the evidence shows that externalising psychopathology, especially conduct disorder, aggressive behaviour and delinquency, is related to a higher risk of later substance use disorders and early substance use behaviour. Special subgroups might be a target for indicated prevention approaches at the individual level. Selection processes have led to an over-sampling of these high-risk groups in children's homes and institutions, in shelters for homeless children and runaway youth and in the juvenile criminal justice system. Therefore, specific interventions could and should be designed for these high-risk groups.

Conduct problems, aggressive behaviour and delinquency are strong predictors for substance use.

ADHD: Attention-deficit/hyperactivity disorder (ADHD) has been identified by some researchers as a risk factor for developing substance use or abuse. Approximately one quarter of individuals entering inpatient substance use treatment met DSM-IV criteria for ADHD. However, among individuals with substance use disorders, there is a strong association between conduct disorder or antisocial personality disorder and ADHD (Schubiner et al., 2000).

In the Pittsburgh Youth Study, ADHD symptoms had little or no impact on the development of alcohol use disorders after controlling for co-occurring forms of psychopathology. The highest risk for developing alcohol use disorders by young adulthood was associated with co-occurring depressive

symptoms and conduct disorder symptoms (Pardini et al., 2007).

In a review, Lynskey and Hall (2001) came to the conclusion that much of the association between early ADHD and later substance use can be explained by the associations between ADHD and conduct problems, which have been shown to influence later propensities to substance use and misuse. It seems plausible that substance use problems are more likely to be associated with the hyperactive subtype of ADHD.

Recently, Fergusson et al. (2007) tested three models on the relation between conduct problems, attentional problems and substance use disorder.

The three models can be formulated as:

- conduct problems and attentional problems are reflections of a more general dimension of externalising behaviour;
- conduct problems and attentional problems have highly specific consequences (dual pathway theory);
- conduct problems and attentional problems combine non-additively to influence later outcomes.

Fergusson et al. (2007) have shown that:

- conduct problems are generally related to later substance abuse;
- attentional problems are largely unrelated to later substance abuse when controlling for conduct problems and confounders (exception: cannabis abuse).

Much of the association between early ADHD and later substance use can be explained by the associations between ADHD and conduct problems.

Internalising behaviour: An association between alcohol dependence or abuse and depressive disorders was demonstrated by Spak et al. (2000) in the Swedish multipurpose, population-based study 'Women and Alcohol in Goeteborg'. Having experienced psychological or psychiatric problems before the age of 18 years predicted both alcohol dependence or abuse and depressive disorders. Having psychological or psychiatric problems while growing up, as well as early alcohol intoxication was associated with both alcohol abuse or dependence and depressive disorders. Unfortunately, the psychological or psychiatric problems were not specified. No significant associations between either high alcohol consumption or high episodic drinking and depressive disorders were found.

Among a sample of adolescents with co-occurring major depression and substance use disorder, those who experienced major depression first were significantly more likely to have cannabis dependence (Libby et al., 2005).

Concerning suicidal behaviour, adolescent suicide completers and attempters represented in clinical and community samples have elevated rates of alcohol and illicit drug use and problems, compared with non-suicidal adolescents. Comorbid psychopathology, which is common among adolescent substance abusers, substantially increases risk for suicide completions and attempts. Rates of suicidal behaviour are elevated among adolescents with substance use disorders. Acute effects of alcohol may serve as proximal risk factors for suicidal behaviour (Esposito-Smythers and Spirito, 2004). It can be assumed that there is a reciprocal effect of depression or suicidality and substance use.

Adolescents with internalising problems related to anxiety or withdrawal seem to have a lower risk for developing alcohol use disorders (Pardini et al., 2007).

Cannabis use is related to depression (independent of age) (Fergusson et al., 2002). Furthermore, depression or anxiety and cannabis are related independent of individual and family backgrounds (including child's gender, mother's education, family income, maternal marital status and quality), and frequent use is associated with increased anxiety or depression (Hayatbakhsh et al., 2007).

Wittchen et al. (2007) found in a 10-year prospective longitudinal study that mood disorders (including bipolar disorders – hypomania and mania) predicted increased rates for cannabis use and cannabis use disorder, with the exception of dysthymia, which did not predict cannabis use disorder. This prediction could be confirmed even after controlling for the presence of externalising disorders. For anxiety disorders, results were variable, which may be explained by the observation that in the first decades of life, anxiety disorders have a relatively low stability (Wittchen et al., 2007).

Depressive disorders have an association with alcohol abuse or dependence and cannabis dependence. There are also reciprocal effects of suicidality and substance use. Mood disorders (including bipolar disorders – hypomania and mania) predict increased rates for cannabis use and cannabis use disorder. For anxiety disorders, results were variable.

Stressful life events and PTSD: Early sexual abuse is associated with substance use in both boys and girls in a sample of community adolescents aged 13 to 15 years in Australia and New Zealand (Bergen et al., 2004).

Youth with post-traumatic stress disorder (PTSD) were found to have higher rates of substance use and disorder, with strong relations found between being diagnosed with conduct disorder and all types of substance use and disorder, current and lifetime (Vaughn et al., 2007).

Lipschitz et al. (2003) investigated 104 adolescents who obtained medical care at a hospital-based adolescent clinic. Compared with traumatised girls without PTSD, girls with full and partial PTSD were significantly more likely to use nicotine, cannabis, and/or alcohol on a regular basis.

Levels of childhood abuse and neglect were reported to be high in a population of Turkish substance dependants seeking treatment. The findings support the view that childhood abuse and neglect contributes to the high prevalence of major depression, PTSD, specific phobia and personality disorders in substance-dependent populations. In addition, severity of depression and anxiety was related with childhood abuse and neglect (Evren et al., 2006a,b).

Morojele and coworkers (Morojele et al. 2006a,b; Morojele and Brook, 2006) came to the following conclusions. The greater the adolescent's involvement in the use of various drugs, the greater is his or her likelihood of having been a victim of more than one type of violence. Being more involved

in delinquent behaviour was also found to relate to greater victimisation. Peer alcohol and cannabis use were also related to multiple victimisation. Parental use of cigarettes and alcohol predicted the adolescents' likelihood of having been multiply-victimised.

Early onset conduct disorder is associated with earlier use of cannabis and more drug use five years later. Those who reported having had aversive experiences with discrimination very early in life (before the age of 12) are more likely to manifest conduct problems and to report early drug use. The combination of early discrimination and early behavioural problems puts them at higher risk for later use and possibly abuse (Gibbons et al., 2007). These findings, however, should be interpreted with caution because the two variables (conduct disorder and discrimination) are likely to be confounded. The discrimination was self-reported without any objective data.

Childhood abuse, neglect and post-traumatic stress disorder are associated with substance use and abuse.

As the evidence shows that individual variables can strongly affect the development of drug use and abuse, it seems necessary to focus on knowledge on subtyping and individual trajectories of substance use.

2.3.4 Substance-related risk trajectories

Many studies provide longitudinal information about the course of substance use and abuse in adolescents. Most of them deal with the course of alcohol consumption, and only a few with cannabis. As stated in section 2.1, studies are preferred that provide adequate analysis of change and are based on sufficient time points and sample sizes.

In longitudinal studies, a methodological distinction between two approaches can be made. Variable-based approaches typically rely on large samples, aggregate statistics (means, standard deviations) and standard or logistic regression models to make inferences about variables for the sample as a whole, or disaggregated by some major sociodemographic factor (Windle and Wiesner, 2004). The person-oriented approach explicitly recognises the importance of variation in intra-individual change trajectories. By statistical modelling then, it has to be determined whether the overall group trajectory contains within it different subgroups whose trajectories have different shapes (as well as different antecedents and consequences). In the remainder of this section, the focus is on the person-oriented approach. By using information on the course of subtypes and their potential influencing factors, the thinking about and planning of interventions can become more nuanced through understanding and working with on-going developmental trends.

There are several studies on the course of alcohol drinking and abuse during adolescence, in particular concerning binge drinking. Chassin et al. (2002) found four binge drinking trajectories: an early-heavy group, a late-moderate group and an infrequent group (the trajectory of the group of non-bingers, 40 % of the sample, was known in advance). All three drinking groups raised risk for later substance abuse or dependence compared with the non-bingers, with the early-heavy group at highest risk (Chassin et al., 2002).

A similar classification was already described by Hill et al. (2000). In the Seattle Social Development Project, they identified four distinct trajectories of binge drinking: early highs, increasers, late onsetters, and non-bingers.

Some of the most interesting results were found by Mitchell et al. (2006), who analysed data for 464 American Indians not only with regard to alcohol, but also to outcome expectations. They identified five subgroups (latent classes). The largest subgroup (n = 198) experienced initial increases in alcohol use and positive outcome expectancies until age 20, but then dropped. A second group had heavy initial use and then decreased, the others were labelled as moderate/decreasers, lower/increasers and slow initiators. Since positive alcohol outcome expectancy was related to change in alcohol use, these expectancies would be a logical point of intervention for this group. However, the intervention possibilities should be different for each subgroup. The heavy/decreasers would likely benefit from early problem recognition and treatment, while the moderate/decreasers would not necessarily require intervention. However, understanding what strategies they used to limit their drinking across the years could be extremely informative for programme developers. The other three groups also do not necessarily need any (additional) intervention (Mitchell et al., 2006). The study has limitations, as the authors state (e.g. only one American Indian tribe), but it shows that such subtyping is an important aid for targeting resources to the groups that need it most.

With regard to cannabis, Windle and Wiesner (2004) found five distinct trajectories in an adolescent school sample. The groups were labelled as abstainers, experimental users, decreasers, increasers (3.6 %) and high chronics (1.7 % of the sample at wave 1, mean age = 15.5). Coffey et al. (2000) also concluded that most cannabis use remained occasional during adolescence, but escalation to potentially harmful daily use in the late-school period occurred in 12 % of early users. Regular adolescent cannabis users appear to be on a problematic trajectory (Patton et al., 2007). These results were based on logistic regression; growth curve analysis was not performed. Categorical subtyping was also evaluated by Babor et al. (2002). They conclude that categorical subtypes may have relevance to the development of treatment interventions (without supporting their conclusion by trajectories).

Subtyping individuals according to a common trajectory of substance use (e.g., an early-heavy group, a late-moderate group) may be promising for detecting early antecedents and predicting outcomes for each subgroup separately.

Before looking more closely at individualisation, it may be worthwhile first to sketch out the neurobiological mechanisms through which the substances discussed here act on the brain.

2.4 Neurobiology of addiction

Addiction is now recognized as a chronic brain disease that involves complex interactions between repeated exposure to drugs, biological (i.e., genetic and developmental), and environmental (i.e., drug availability, social, and economic variables) factors.
Nora Volkow, NIDA, 2005

2.4.1 Introduction

In this section, a synopsis of the biological and physiological background of addiction is presented. Why are adolescents so vulnerable to develop substance use disorder? Why do addicted people often have other mental illnesses or – the other way round – why do mentally ill adolescents develop addictive behaviour rather frequently?

For two reasons, the focus will be mainly on the cerebral mesolimbic dopaminergic system, part of the so-called reward system in the brain. First, most drugs of misuse increase the neurotransmitter dopamine ([5]). And, secondly, it is the part of the brain that is involved in most psychiatric disorders. The period of adolescence will be given special consideration.

Adolescents make a lot of decisions that the average 9-year-old would say was a dumb thing to do.
Ronald E. Dahl, *NYAS Magazine*, November 2003

Adolescence is a period of dramatic transformation in the healthy human brain, leading to both regional and general brain volume changes (Figure 2.1). The period of adolescence is often defined as spanning the second decade of life, although some researchers expand their definition of adolescence to include the early twenties as well. Research into brain maturation in adolescence is particularly important, given that it is normally considered the peak period of neural reorganisation that contributes to normal variation in cognitive skills and personality. Additionally, it is seen as the period of major mental illness onset, such as schizophrenia. Despite growing evidence for pronounced changes in both the structure and function of the brain during adolescence and early adulthood, few studies have explored this relationship directly using in vivo imaging methods. Thus, little is still known about the relationship between adolescent behaviour and outcomes, and maturational effects on morphological and functional aspects of the brain.

What is known? Prominent developmental transformations are seen in prefrontal cortex and limbic brain regions (see also below and Figure 2.2) of adolescents across a variety of species, alterations that include an apparent shift in the balance between mesocortical and mesolimbic dopamine systems. Recent high-resolution magnetic resonance imaging (MRI) studies emphasise the effects of ongoing myelination, indicating a substantial maturation process (see Figure 2.1). Developmental changes in these stressor-sensitive regions, which are critical for attributing incentive salience to drugs and other stimuli, likely contribute to the unique characteristics of adolescence (Spear, 2000). Recent research could detect an uneven regional brain development, which obviously contributes to adolescent risk-taking (Galvan et al., 2005, 2006). Impulsiveness and risk-taking in adolescents is not only heightened compared to adults but also in comparison to children. Thus, the often incriminated immaturity of the frontal cortex (Figure 2.1), especially the orbitofrontal cortex, cannot be the only explanation, since this region is also immature in children. But only adolescents tend to make risky decisions. Indeed, Galvan et al. could confirm their hypothesis that earlier development of the nucleus accumbens (part of the brain's reward system; see below and Figure 2.2) relative to the orbitofrontal cortex probably underlies the risk-taking behaviour in adolescents. In an imaging study (functional magnetic resonance imaging, fMRI) investigating

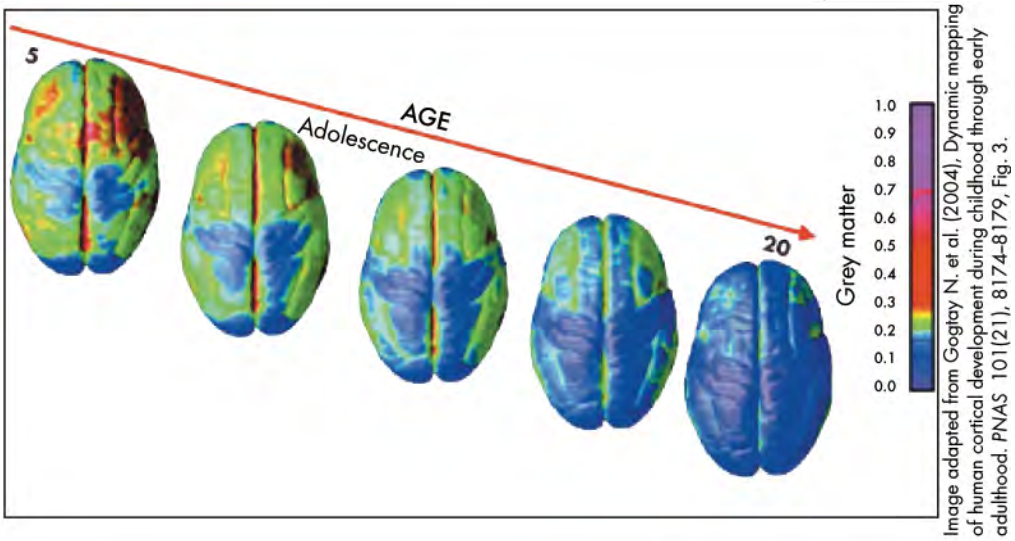

Figure 2.1: The above composite MRI brain images show top-level views of the sequence of grey matter maturation over the surface of the brain. Researchers found that, overall, grey matter volume increased at earlier ages, followed by sustained loss and thinning starting at puberty, which correlates with advancing cognitive abilities. Scientists think this process reflects greater organisation of the brain as it prunes redundant connections, and increases in myelin, which enhance transmission of brain messages. © Copyright for the original image is held by the National Academy of Sciences (USA).

([5]) Neurotransmitters are chemicals that are used to relay, amplify and modulate signals between a neuron and another cell.

Table 2.3: Classes of neurotransmitters

Amino acids	Monoamines		Soluble gases	Acetylcholine
	Catecholamines	Indolamines		
Glutamate	Dopamine	Serotonin	Nitric oxide	Acetylcholine
Aspartate	Epinephrine		Carbon monoxide	
Glycine	Norepinephrine			
GABA				

reward-seeking behaviour, they could show an exaggerated accumbens activity, relative to prefrontal activity in adolescents, compared with children and adults. They concluded different time courses of development for these regions, an explanation for the unique risk-seeking behaviour in adolescence.

In the following sections, an attempt will be made to delineate the different mechanisms participating in these maturing processes, the neurotransmitters involved and how drugs might affect this vulnerable adolescent brain system. This information may help to develop targeted interventions adapted to the adolescents' special needs.

2.4.2 The cerebral reward system and its connections

Dopamine is one of a number of neurotransmitters, the carriers of information between neuronal cells (Table 2.3), found in the central nervous system (Figure 2.2). Neuronal terminals are connected at locations called 'synapses'. Neurotransmitters such as dopamine are chemicals synthesised presynaptically (Figures 2.3A and 2.3B). Electrical stimulation of a neuron releases a neurotransmitter, which produces a physiological effect on a second neuron (postsynaptically) by interacting with receptors, which are the binding sites on the postsynaptic neuron. Activity is terminated by enzymatic degradation of the neurotransmitter and its reuptake into the presynaptic neuron.

Dopamine has received special attention from psychopharmacologists because of its apparent role in the regulation of mood and affect and because of its role in motivation and reward processes. Although there are several dopamine systems in the brain, the mesolimbic dopamine system (Figure 2.2) appears to be the most important for motivational processes. Most addictive drugs produce their potent effects on behaviour by enhancing mesolimbic dopamine activity.

Adolescents' sensitivity to rewards appears to be different than in adults, prompting them to seek higher levels of novelty and stimulation to achieve the same feeling of pleasure. (2003 Meeting of the New York Academy of Sciences entitled 'Adolescent Brain Development: Vulnerability and Opportunity'.)

2.4.3 The reward pathway

Figure 2.2 gives a view of the brain cut down the middle. An important part of the reward system is shown (Figure 2.2B) and the major structures are highlighted: the ventral tegmental area, the nucleus accumbens and the prefrontal cortex. The prefrontal cortex is implicated in such human characteristics as volition, planning, decision making and affect. The representations of goals and their values are encoded and updated in this region which therefore is part of the circuitry implicated in social interactions. The nucleus accumbens

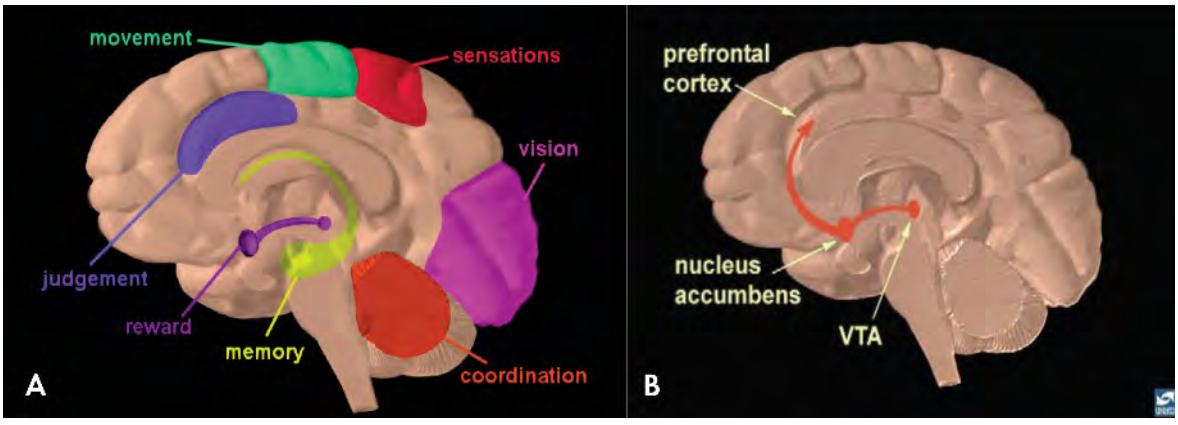

Figure 2.2: Median sagittal slices through the brain to demonstrate the position of the reward system. (A) Brain regions and neuronal pathways. Certain parts of the brain govern specific functions. For example, the cerebellum is responsible for coordination (red) and the hippocampus for memory. The nerve cells or neurons travel from one area to another via pathways to send and integrate information. (B) The reward pathway. The soma of the neuron is in the ventral tegmental area (VTA) (in magenta) and connects to the nucleus accumbens and then to the prefrontal cortex. This pathway gets activated when a person receives positive reinforcement for certain behaviors ('reward'). This activation also happens when a person takes an addictive drug. Source of original image: http://www.drugabuse.gov/pubs/teaching/Teaching.html, copyright not restricted.

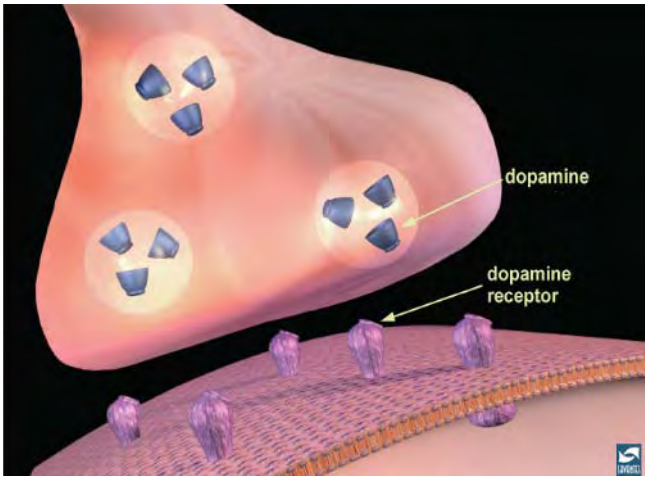

Figure 2.3A: A dopaminergic synapse. As an electrical impulse arrives at the terminal, it triggers vesicles containing a neurotransmitter, such as dopamine (in blue), to move toward the terminal membrane. The vesicles fuse with the terminal membrane to release their contents (in this case, dopamine). Once inside the synaptic cleft (the space between the two neurons) the dopamine can bind to specific proteins called dopamine receptors (in pink) on the membrane of a neighbouring neuron. Source of original images: http://www.drugabuse.gov/pubs/teaching/Teaching.html, copyright not restricted

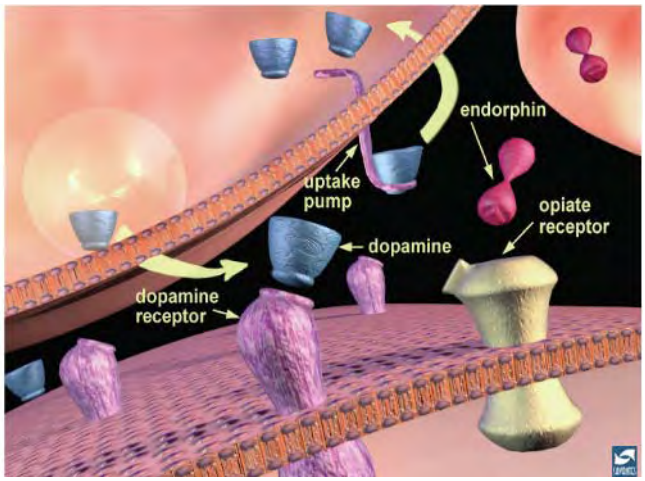

Figure 2.3B: Dopamine neurotransmission and modulation by endogenous opioids. Here a close-up of a dopaminergic synapse is shown. The neurotransmitter dopamine is synthesized in the nerve terminal and packaged in vesicles (presynaptic neuron in the left upper corner). The vesicle fuses with the membrane and releases dopamine. The dopamine molecules can then bind to a dopamine receptor (in pink). After the dopamine binds, it comes off the receptor and is removed from the synaptic cleft by uptake pumps (also proteins) that reside on the terminal (arrows show the direction of movement). This process is important because it ensures that not too much dopamine remains in the synaptic cleft at any one time. There are also neighbouring neurons that release another compound called a 'neuromodulator'. Neuromodulators help to enhance or inhibit neurotransmission that is controlled by neurotransmitters such as dopamine. In this case, the neuromodulator is an 'endorphin' (in red). Endorphins bind to opiate receptors (in yellow) which can reside on the post-synaptic cell (shown here) or, in some cases, on the terminals of other neurons. The endorphins are destroyed by enzymes rather than removed by uptake pumps.

is part of the ventral striatum. The striatum is formed by the caudate and putamen, parts of the basal ganglia. The nucleus accumbens is thought to play an important role in reward, laughter, pleasure and addiction. The pathway connecting these structures is highlighted (Figure 2.2B). The information travels from the ventral tegmental area to the nucleus accumbens and then up to the prefrontal cortex. This pathway is activated by a rewarding stimulus.

Dopamine is synthesised in the cytoplasm of presynaptic neurons from the amino acids phenylalanine and tyrosine. Dopamine exerts its effects on the postsynaptic neuron through its interaction with dopamine receptors (Figure 2.3). These receptors in turn activate second messenger systems with resulting changes in activity levels of enzymes or other proteins within the cell (Dunlop and Nemeroff, 2007).

2.4.4 Mechanisms of psychoactive substances

2.4.4.1 Alcohol

Surveys of adolescent behaviours and substance use show that, after nicotine, alcohol is the most common substance used by adolescents (Deas, 2006).

Alcohol indirectly stimulates dopamine release in the ventral striatum (see Figure 2.2, the striatum is made up of the nucleus caudatus and putamen, parts of the reward system). The neurobiology of alcoholism involves many different neurotransmitters, especially the gamma-aminobutyric acid (GABA)-ergic system and the glutamatergic system. GABA and glutamate are neurotransmitters (see Table 2.3). It is hypothesised that alcohol may inhibit GABAergic terminals in the ventral tegmental area and hence disinhibit dopamine neurons in that part of the brain. Alcohol may similarly inhibit glutamatergic terminals that innervate nucleus accumbens neurons. The influence of these systems retroacts on the dopamine release.

Alcohol inhibits the neurotransmitter GABA and glutamate thus leading to an amplified release of dopamine.

Given the dramatic changes in that are occurring in the brain during adolescence, it is no wonder that alcohol affects adolescents and adults differently in many ways.

During early brain development (from the third trimester of pregnancy to the third year of life, the so-called 'brain growth spurt') there is an overproduction of neuronal tissue.

During adolescence, many synapses and even neurons are pruned or eliminated (apoptotic processes) in a reshaping of the brain. These processes are influenced, at least in part, by interactions with the environment. Substance use or abuse is one of those environmental factors that influence these processes. The most powerful alterations can be observed in the frontal lobes, which still mature until the age of 20 or later (see Figure 2.1).

The temporal lobes, which are critically involved in memory formation, reach their maximum grey matter volume at the age of 16 to 17.

Because of these maturation processes, adolescents seem to be more vulnerable to some effects of alcohol while being less vulnerable to others (White et al., 2000; 2002).

They are much more vulnerable concerning memory formation (that means more sensitive to the effects of alcohol on long-term potentiation, a neuronal process that implies a transformation of electrical impulses into chemical synthesis, see above). In adolescents, compared to adults, alcohol has a much bigger impact on the activity of the so-called NMDA receptors (a subunit of the glutamate binding sites). This increased activity impedes intracellular changes that are necessary for memory formation.

In adolescents, alcohol consumption impairs learning and memory to a greater degree than it does in adults.

On the other hand, adolescents get less sedated by alcohol. And they have fewer problems with balance and muscle coordination. These facts lead to an even higher intake and an exaggerated opinion how much alcohol is tolerated.

2.4.4.2 Nicotine

Nicotine is the primary addictive component of tobacco smoke. A majority of habitual smokers find it difficult to quit smoking because of their dependence upon nicotine. However, although nicotine replacement therapy elicits a clinically valuable and significant improvement in the number of quit attempts that are ultimately successful, its efficacy ([6]) remains disappointingly low (Balfour, 2004).

There is evidence of complex interactions in the brain between nicotine itself and behaviour. Chaudhri et al. (2006) hypothesise that nicotine dependence develops due to both nicotine and nonpharmacological stimuli within the context of the drug self-administration.

Nicotine stimulates the release of dopamine in the nucleus accumbens. Habitual smokers frequently repeat the stimulation of the nucleus accumbens, thereby causing dependence due to complex activation of the core and shell of the nucleus (Balfour, 2002). Research indicates that opioid receptors, GABA B, cannabinoid C1 and dopamine D2 receptors are involved in nicotine dependence (Berrettini and Lerman, 2005).

Nicotine enhances the release of dopamine, which frequently leads to stimulation of the nucleus accumbens, a major part of the brain's reward system. This mechanism causes dependence.

Furthermore, tobacco use can serve as 'risk factor' in itself and has been much studied in the context of the development of a later substance use.

Experimental use of tobacco in early adolescence may lead to dependence within a few years (Best et al., 1988). International studies show that the prevalence of current smoking among youth starts to become evident at the ages of 13 or 14 (Bauman and Phongsavan, 1999).

The reasons for the later development of nicotine dependence are varied. There is evidence that human adolescence is a period of increased biological vulnerability to the addictive effects of all psychoactive substances. Chambers et al. (2003) hypothesised that a greater motivational drive in youth, together with an undeveloped inhibitory control system (a part of the motivational neurocircuitry), could be responsible for the experimental use of drugs. They suggested that the direct pharmacological effects of psychoactive substances such as tobacco on the dopamine system may be increased during adolescence and lead to permanent neural changes.

There are other common mediating factors that contribute to adolescents' vulnerability to psychoactive substances, such as nicotine. Smoking by itself, is significantly related to the number of adverse childhood experiences (emotional, physical, and sexual abuse), parental separation, and growing up with a substance abusing, mentally ill, or incarcerated household member (Anda et al., 1999). Other studies show that psychiatric disorders such as ADHD, depression and anxiety are related to smoking, and suggest that adolescents often use tobacco as a self-medication for these disorders (Moolchan et al., 2000). In addition to these comorbid factors, genetic studies show heritable factors to have an impact on certain components of nicotine dependence (e.g. urgency to smoke) among adolescents (Haberstick et al., 2007), with evidence for polymorphisms of the dopaminergic genes involved in nicotine dependence (Timberlake et al., 2006).

Depending on genetic and psychiatric vulnerability, experimentation and self-medication with tobacco increases the risk of consuming other psychoactive substances. There is abundant evidence that tobacco smoking is associated with other psychoactive substance use. Epidemiological studies show that tobacco smoking and the use of alcohol and cannabis are associated among youth (Degenhardt et al., 2001; Merrill et al., 1999; Wagner and Anthony, 2002). These questionnaire-based findings have also been partially replicated on the grounds of biological markers of substance use (Kapusta et al., 2007). In addition, adolescents' early experiences with alcohol and tobacco have been found to have an influence on the later development of their use of other substances (Höfler et al., 1999; Sutherland and Willner, 1998). Using data from the Youth Risk Behavior Survey 1995, Merrill et al. (1999) found those smoking cigarettes before age 13 to be at a higher risk of having used cannabis and alcohol than those who never smoked.

Some researchers suggest cigarettes to be a 'gateway drug' to other psychoactive substance use (Torabi et al., 1993; Lai et al., 2000). The progression from cigarette smoking to nicotine dependence and to other psychoactive substance disorders has been shown in ADHD youth (Biederman et al., 2006). This supports the hypothesis that vulnerability of the dopamine system (as found in ADHD) plays an important role in the biological susceptibility for psychoactive substances. The 'gateway drug' thesis is better characterised by a biological model. It would be more appropriate to speak of 'pharmacological priming' during experimentation with tobacco rather than of tobacco as a 'gateway drug'.

The initiation of smoking and the progression to nicotine dependence and other substance disorders are a complex interplay of biological, psychological and social factors

([6]) Efficacy and effectiveness need to be distinguished. According to Marley (2000) efficacy is a measure how well an intervention works in an (often randomised controlled) trial (trying to answer the question: 'What can work?'). Effectiveness can be defined as the extent to which an intervention achieves its intended effect in the usual clinical setting (trying to answer the question: 'What does work?'). However, as Windeler and Antes (2007) point out, definitions of efficacy and effectiveness vary broadly in the literature.

(Moolchan et al., 2000). Exposure to tobacco smoke is one of several risk factors affecting the regulation of the dopaminergic reward system. Because of its neurobiological influences on the developing brain, smoking, by itself, increases the probability for other psychoactive substance use as well as somatic disorders, and should be taken into account when applying indicated prevention methods to youth. Such interventions should include the aim of smoking cessation or, at least, smoking reduction.

2.4.4.3 Amphetamines and methylphenidate

The amphetamines are chemically related to the naturally occurring catecholamine neurotransmitter substances norepinephrine and dopamine (see Table 2.3). Despite the close chemical resemblance, amphetamines are not able to activate the cellular postsynaptic receptors normally stimulated by norepinephrine or dopamine. Instead, they act by stimulating the release of these natural neurotransmitters. Amphetamines not only block the dopamine reuptake transporter (Figure 2.3b, 'uptake pump'), but its most significant effect is to cause reverse transport of dopamine via the dopamine reuptake transporter (Hyman, 1996).

In contrast to amphetamines, methylphenidate is not taken up into the terminal by the uptake system. Instead, it blocks the transporter, and thereby prevents the reuptake of dopamine. The dopamine concentration increases in the synaptic cleft and leads to an altered stimulation of the dopamine receptors.

Psychostimulants also increase the level of dopamine by inhibiting the re-uptake into the neuronal cells. Again, the level of stimulation in the reward system is increased.

2.4.4.4 Cannabis

When a person smokes cannabis, the active ingredient, cannabinoids, especially tetrahydrocannabinol or THC, travels quickly to the brain. THC binds to THC receptors that are concentrated in areas within the reward system, as well as in other areas (Figure 2.4). The action of THC in the hippocampus explains its ability to interfere with memory, and the action of THC in the cerebellum is responsible for its ability to cause incoordination and loss of balance.

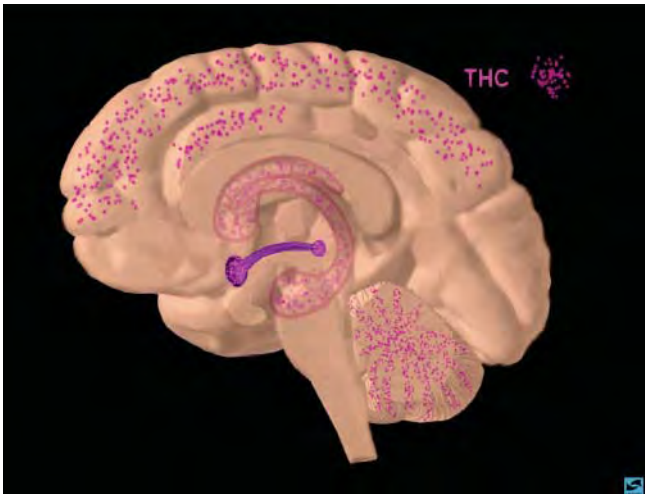

Figure 2.4: THC distribution in the brain. The ventral tegmental area, nucleus accumbens, caudate nucleus, hippocampus, and cerebellum, where THC concentrates, are highlighted. Source of original image: http://www.drugabuse.gov/pubs/teaching/Teaching.html, copyright not restricted.

Over the last few years, there has been intense study to discover where and how THC works. One theory is that it acts in a similar way to opiates. In the nucleus accumbens, THC binds to THC receptors on a neighbouring terminal of a dopaminergic neuron and this sends a signal to the dopamine terminal to release more dopamine. The THC receptor is probably a presynaptic receptor on GABA interneurons that control dopamine release.

THC enhances dopamine release by stimulation of THC receptors.

2.4.4.5 Cocaine

Cocaine inhibits the reuptake of dopamine. This increases the availability of dopamine in the synapse and increases dopamine's action on the postsynaptic neurons. The enhanced dopamine activity produces mood elevation and euphoria. Cocaine's effect is usually quite short, prompting the user to repeatedly administer cocaine to re-experience its intense subjective effects.

When a person smokes or snorts cocaine, it travels quickly to the brain. Although it reaches all areas of the brain, it concentrates in some specific areas: the ventral tegmental area, the nucleus accumbens and the caudate nucleus. Cocaine concentrates especially in the reward areas that are rich in dopamine synapses. Cocaine accumulation in other areas such as the caudate nucleus can explain other effects such as increased stereotypic behaviours (pacing, nail-biting, scratching, etc.).

When cocaine is present in the synapse, it binds to the uptake pumps and prevents them from removing dopamine from the synapse. This results in more dopamine in the synapse, and more dopamine receptors are activated.

As a result of cocaine's actions in the nucleus accumbens, there are increased impulses leaving the nucleus accumbens to activate the reward system. With continued use of cocaine, the body relies on this drug to maintain rewarding feelings. The person is no longer able to feel the positive reinforcement or pleasurable feelings of natural rewards (food, water, sex).

2.4.5 Summary

Drugs of abuse all activate the reward system through increasing dopamine neurotransmission.

Each substance (alcohol, nicotine, amphetamines, THC, cocaine) increases the activity of the reward pathway by increasing dopamine transmission. This happens even though the drugs act by different mechanisms. Because these drugs activate a particular brain pathway for reward, they may be abused.

As the knowledge of both the neurobiology of addiction and the neurobiology of psychiatric disorders increases, common pathways are being identified, leading to hypotheses on interactions between drugs and psychiatric disorders on a very fundamental level. The evidence shows that just as drugs can alter the individual's state of mind, so can the state of the

individual's mind determine, at least in part, the individual's response and vulnerability to drugs.

To explore further this point, the next section will review the neurobiology of the reward system in some common psychiatric disorders and the role drug use may play.

2.5 Alterations of the reward system predisposing to addiction in psychiatric disorders

Two examples are given for the concept of internalising and externalising behaviour.

2.5.1 Alterations in depression

Adolescence is a high-risk period for development of both depressive and substance use disorders (Rao, 2006). Adolescents with a history of anxiety or depression have twice the risk for later substance abuse compared to adolescents without such a history (Christie et al., 1988). Adolescents with onset of substance use disorder are more likely to experience depressive symptoms and attempt suicide (Bukstein et al., 1993).

Multiple sources of evidence support a role for diminished dopaminergic neurotransmission in major depression (Dunlop and Nemeroff, 2007). Motivation, psychomotor speed, concentration and the ability to experience pleasure are all linked in that they are regulated in part by dopamine-containing circuits. Impairment of these functions is a prominent feature of depression. The physiological alterations underlying reduced dopamine signalling in depression could be caused either by diminished dopamine release from presynaptic neurons or by impaired signal transduction, possibly due to changes in receptor number or function. Moreover, intracellular signal processing might be altered.

In some patients with depression, dopamine-related disturbances can be improved by treatment with antidepressants, presumably by acting on serotonergic or noradrenergic circuits, which, in turn, affect dopamine function.

As substances of abuse are able to increase the dopamine level in the synaptic cleft and as an altered dopamine transmission seems to play a role in depression, adolescents with depression are able to use those drugs as a 'self-medication'.

2.5.2 Alterations in ADHD

Attention-deficit/hyperactivity disorder (ADHD) is an early-onset, highly prevalent neurobehavioural disorder, with genetic, environmental, and biological aetiologies, that persists into adolescence and adulthood in a sizable majority of afflicted children of both sexes. It is characterised by behavioural symptoms of inattention, hyperactivity and impulsivity across the life cycle, and is associated with considerable morbidity and disability. Comorbidity is a distinct clinical feature of ADHD both in children and adults. Although its aetiology remains unclear, emerging evidence documents its strong neurobiological and genetic underpinnings (Spencer et al., 2007).

The idea that dysregulation of dopamine and norepinephrine circuits underlies ADHD was initially suggested by the action of drugs for the disorder, which increase the synaptic availability of these neurotransmitters (Biederman and Faraone, 2005), and by animals showing that lesions in dopamine pathways create animal models of ADHD, as shown in developing rats (Shaywitz et al., 1978) and monkeys (Schneider et al., 1994). As one of the most compelling animal models of ADHD, the spontaneously hypertensive rat (Sagvolden, 2000) shows dopamine release abnormalities in subcortical structures (Russell, 2000).

2.5.3 Links between psychiatric disorders and substance abuse in adolescents

Enhanced dopaminergic neurotransmission in the mesocorticolimibc system mediates the reinforcing effects of drugs of abuse, e.g. nicotine, ethanol, psychostimulants, opiates.

Vulnerability to develop a drug addiction is influenced by a combination of genetic and environmental factors (Kreek et al., 2005). The latter are described in detail in section 2.2.

The use and abuse of substances, including alcohol, nicotine, cannabis, inhalants and other drugs, is commonly found to be comorbid with psychiatric conditions in adolescents. This dual diagnosis requires special attention and treatment, especially as substance use often begins during this developmental period. Adolescents may be diagnosed with substance abuse, substance dependence, or substance use disorder not otherwise specified, which indicates a developing substance use problem that includes symptoms of but does not meet criteria for substance dependence ('diagnostic orphans').

Psychiatric disorders in childhood and adolescence predispose the individual to addictive behaviour and addiction.

Psychiatric comorbidity in adolescents who abuse substances is the rule rather the exception, and common comorbidities include depression, anxiety, bipolar disorder, conduct disorder and attention-deficit/hyperactivity disorder (ADHD). Treatment of the psychiatric disorder often helps to alleviate the substance use disorder as well.

A person's initial decision to use a drug is influenced by genetic, psychosocial, and environmental factors. Once it has entered the body, however, the drug can promote continued drug-seeking behaviour by acting directly on the brain. Research has increased the understanding of the neural processes that underlie drug-seeking behaviour.

A disturbed dopaminergic system plays a role in most psychiatric disorders. The changes that are involved in the maturation of the cerebral systems are a cause of psychological and emotional disturbances in adolescence, and makes adolescents vulnerable to developing psychiatric disorders. Once such a disorder has developed, the mentally ill subject is highly vulnerable to developing an addictive behaviour if they start to consume addictive substances. Take, for example, the mood of long-term depressed adolescents, which is permanently low, at least partly because neurotransmission in the dopaminergic and serotonergic systems is reduced. Substances such as alcohol, nicotine

and cannabis all increase neurotransmission in these systems and help make the adolescent feel much better. This use can be interpreted as a kind of 'self-medication', a form of drug use that is distinct from that carried out as 'novelty seeking' or increased 'risk taking' behaviour, which is common in adolescence. But, it is also obvious that this kind of self-medication is counterproductive. In adolescents with psychiatric disorders, the cerebral transmitter systems, especially the mesolimbic dopaminergic system, are highly reactive, and this can lead to patterns of addictive behaviour emerging more rapidly. Substances of abuse worsen the underlying psychiatric disorders by their broad, varied and rapid impact into the transmitter systems. As shown in Figure 2.5, the structure and function of the synapse is determined by genetic and environmental factors. This is the part of the network that is pathologically modified in psychiatric disorders, which in turn makes it more vulnerable to the changes that are necessary for the development of addiction.

Consumption of substances (alcohol, cannabis, cocaine) can lead to relapses into psychiatric disorders.

However, influences from the environment can also lead to changes in the morphology of the brain (which can be seen in structural brain changes after severe trauma or deprivation). Thus, a better understanding of neurobiology cannot lead to mere biological determinism, as it must take into account the role external factors might play in influencing the development of individuals.

2.6 Genetic influences and substance use

In the follow-up of the Minnesota Twin Family Study including 1 080 twins (mean age 20.7 years, 17.5 years at the intake assessment), there was evidence for the existence of a highly heritable factor that underlies the association among multiple forms of disinhibitory or 'externalising' psychopathology (McGue et al., 2006). Adolescent problem behaviour is weakly heritable; there is a strong phenotypic association between early problem behaviour and disinhibitory psychopathology. This association appears to be predominantly genetic and not environmentally mediated, such that individuals with an inherited vulnerability to develop disinhibitory psychopathology actively search out environments (e.g., peers, high-risk settings) that reinforce the expression of that vulnerability (McGue et al., 2006).

Rose et al. (2001) found that in Finnish twins, 76% of total variance in abstinence or drinking was explained by common environmental effects.

Fowler et al. (2007) explored the relationship between genetic and environmental influences on substance use in the Cardiff study (1 214 twin pairs aged 11–19 from Wales and the Northwest of England). For all three substances (cigarettes, alcohol and cannabis), environmental influences that make twins more similar (common environment) tended to be greater for initiation, while genetic influences were stronger for heavier use. They conclude that it may be more efficacious to focus interventions targeting alcohol use on risk factors for the development of heavier use rather than those associated with initiation of use. In contrast, interventions aimed at reducing the initiation of cigarettes and cannabis use may be more appropriate (Fowler et al., 2007).

Rhee et al. (2006) examined the causes of comorbidity between alcohol dependence and illicit drug dependence in adolescents. Thirteen alternative hypotheses for the causes of comorbidity were tested, and the results suggested that the comorbidity is a manifestation of a single general susceptibility to develop substance dependence.

Studies on genetic influences suggest heritability of externalising behaviour. Genetic factors seem to have a greater influence on the extent of use than on initiation of use.

While extended genotyping is not a practical option (due to gene polymorphisms and due to the fact that gene expression depends on gene–environment interactions), neurobiology offers the possibility of drawing a more complete 'clinical' picture of a person at risk, especially in the case of those who accumulate several risk factors (e.g. early alcohol consumption, ADHD and school failure; or parental alcohol dependence, depression and conduct disorder). Thus, institutions dealing with adolescents at heightened risk for substance use disorder in later life, but who present with a disorder that in itself is a risk condition, ought to be well informed about indicated prevention strategies and partners in this field, even though one part of indicated prevention will inevitably be the treatment of this condition.

Having attempted to answer questions concerning who to target, how and where to identify and what to acknowledge from a neurobiological perspective, the next chapters will focus on how to intervene.

Existing models of best practice standards can provide the basis on which to develop intervention standards in the future. As juveniles with psychiatric disorders are at a high risk for developing an substance use disorder later in life, it seems reasonable to report on the guidelines for the treatment of the disorders mentioned above to underscore the necessity of treatment and to present a rationale on how this sort of guideline might support the idea of sufficient and evidence-based interventions.

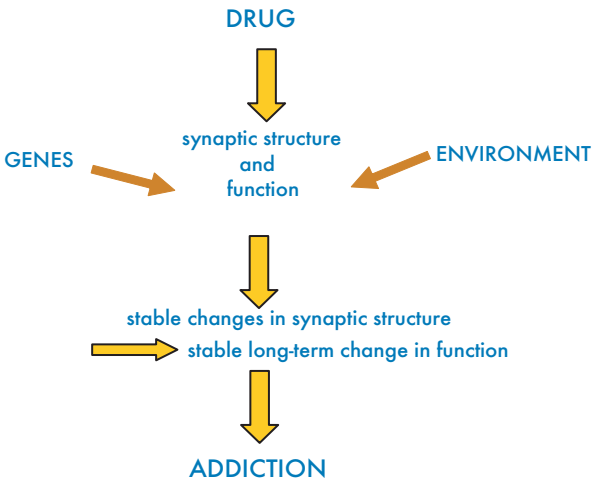

Figure 2.5: Scheme showing genetic and environmental factors combining to influence the process by which repeated exposure to a drug of abuse causes addiction (modified from Nestler, 2000).

Chapter 3

Guidelines and standards for the assessment and treatment of psychiatric risk conditions for adolescent substance abuse

As seen from the literature (cf. Chapter 2.3), different disorders in childhood constitute risk conditions (depressive and anxiety and other internalising disorders, aggressive, conduct and ADHD and other externalising disorders) for later substance abuse. Databases and the homepages of European child psychiatric associations (as linked to the homepage of the European Society of Child and Adolescent Psychiatry, www.escap-net.org) were searched for existing guidelines and standards, in addition to a letter to the ESCAP president (not yet answered). Guidelines were obtained from NICE in the United Kingdom and AWMF in Germany, and these serve as examples for early intervention and treatment in this chapter. Other guidelines exist (e.g. Netherlands), but could not be included in this overview as they were not received in time.

These papers differ in character. The NICE guidelines are approved by the United Kingdom health system following evidence-based, clinical as well as stakeholder (including patient representatives) and economic considerations. The German AWMF guidelines in child and adolescent psychiatry (CAP) are stage I–II, evidence levels are given, but a consensus process has not taken place with different medical fields, with health care representatives, or with stakeholders.

A publication in the journal *European Neuropsychopharmacology* on a 'consensus conference' on attention-deficit/hyperactivity disorder seemed to be the only existing consensus on a European level, yet this publication was not certified by CAP associations. In the absence of formally accepted Europe-wide guidelines, this one is cited below, but the reader may note that while this paper presents the opinions of some recognised experts, it is not of the standard of guidelines. In addition to these sources, United States standards as published in the AACAP Journal (*Journal of the American Academy of Child and Adolescent Psychiatry*) in the form of 'practice parameters' were also consulted.

All papers found were submitted to a qualitative text analysis and were evaluated as to statements on:

- Whether or not the condition described might predispose to later substance abuse;
- Special screening or assessment instruments to identify individuals at risk for or already suffering from the disorder;
- Standards for therapeutic interventions at an early level.

The results, sources of information, and the references and links are cited in the following tables.

Table 3.1: Established guidelines for the assessment and treatment of anxiety disorders

	United Kingdom	Germany AWMF	US AACAP
Diagnostic criteria, assessment	DSM IV and ICD 10 standards for adults only	F41; F93.0 ICD-10/DSM IV	DSM IV-TR
Symptoms	Flowsheet for symptoms	Checklist given Symptoms due to medication or drug abuse?	Clinical presentation, age differences
Diagnostic procedures	Exploration of personal history, self medication, cultural and individual characteristics, self-report screening instruments Comorbidities, especially substance abuse	Flowsheet given Exploration (children, parents, school if possible) Physical examination Testing Kinder-Angst-Test II, KAT-II, Angstfragebogen für Schüler – AFS, Childhood Anxiety Sensitivity Index – CASI, Selbstbeurteilungsbogen Angst – SBB-ANG	1) Routine screening recommended (parents report for < 8 years; children themselves >8 years) e.g.: Multidimensional Anxiety Scale for Children; Screen for Child Anxiety Related Emotional Disorders 2) If screening positive – formal evaluation (sections of Anxiety Disorders Interview Schedule (ADIS) 3) Considering differential diagnoses of other physical conditions and psychiatric disorders that may mimic anxiety symptoms (prescription- and non-prescription drugs)
Treatment, therapeutic procedures	1) Primary care intervention with psychological therapy (cognitive behaviour therapy, CBT) 2) Pharmacological therapy (SSRI, evaluation after 12 weeks – change might be needed) 3) Self-help (bibliotherapy) Difference made between panic and anxiety disorders	Multimodal treatment – difference made between panic disorder and anxiety 1) Psychological therapy, behaviour therapy or family therapy 2) Pharmacotherapy – may be first choice in severe panic disorders and generalised anxiety, SSRI first choice, short time benzodiazepines, β-receptor blockers	Multimodal treatment approach 1) Psychological therapy with integration of parents 1.1 Exposure-based CBT 1.2 Psychodynamic psychotherapy 1.3 Parent–child or family interventions 2) Pharmacotherapy 2.1 SSRI 2.2 Others – noradrenergic antidepressants, buspirone, benzodiazepines, venlafaxine
Intervention	1) Primary care intervention 2) Referral to specialist 3) Care in special mental health services	Outpatient treatment evaluation after 4 weeks (latest) – inpatient treatment might be needed Inpatient treatment rehabilitation following severity of impairment and other criteria	Prevention (e.g. community screening) Outpatient treatment Parent skills-training programme Inpatient treatment not specifically mentioned 'The clinician – after considering... diagnostic and treatment options available – must make the ultimate judgement regarding the care of a particular patient'
Outcome	All short self-completed questionnaires		
Commentary on abuse risk	To be asked for as a particular comorbidity	Confirmed comorbidity, especially in youths	Children with anxiety disorders have a higher risk for alcohol abuse or dependence in adolescence (Schuckit and Hesselbrock, 1994)
Evaluation	All treatments evaluated, evaluation of treatment required	Evaluation of the different treatment methods or medication done	Evaluation of the different treatment methods or medication done through studies
Research	www.nice.org.uk	DGKJP (ed.), Deutscher Ärzte-Verlag, Köln 2007 http://www.uni-duesseldorf.de/awmf/ll/ll_028.htm	J. Am. Acad. Child Adolesc. Psychiatry, 46:2, Feb 2007, 284–299

Note: no EU guidelines exist for this condition.

Table 3.2: Established guidelines for the assessment and treatment of depression in children and adolescents

	United Kingdom	Germany AWMF	US AACAP
Diagnostic criteria, assessment	Guidelines on symptoms ICD-10, DSM IV	F32; F33, F34 ICD-10, DSM IV, MAS	Diagnosis according to DSM IV
Symptoms	Flowsheet	Flowsheet for symptoms – age specific Symptoms due to medication or drug abuse?	Symptoms according to DSM IV
Diagnostic procedures	Exploration of children and parents, Questionnaires: self report mood and feelings questionnaire (MFQ), Nation Outcome Scale for Children and Adolescents (HoNOSCA) or Strengths and Difficulties Questionnaire (SDQ)	Flowsheet given Exploration (children, parents, school if possible) Physical examination, comorbidity Testing: IQ, fraction impairment of performance, TGT, Schwarzfuß-Test, Depressions-Inventar für Kinder und Jugendliche (DIKJ), Depressions-Test für Kinder (DTK), Attributionsstil-Fragebogen (ASF)	Exploration (children, parents, school if possible) Physical examination, comorbidity Testing: IQ, fraction impairment of performance, Several diagnostic classification systems required – standardised interviews, mood lifetime chart, symptoms checklists, rating scales
Treatment, therapeutic procedures	1) Psychological therapy, dependent on severity of depression 2) Parents support 3) Pharmacotherapy for severe depression only. Fluoxetine, as first choice (no paroxetine, venlafaxine or any tricyclic antidepressant) 4) Electroconvulsive therapy only for life-threatening depression or intractable and severe symptoms unresponsive to other treatments, not recommended for children (5–11 years)	Flowsheet given 1) Psychological therapy (behaviour therapy, individual therapy, family therapy 2) Pharmacotherapy – tricyclic antidepressants, SSRI, monoaminooxidase inhibitors, selective norepinephrine reuptake inhibitors, noradrenergic and selective serotonergic antidepressants, NDRI	Acute phase: 1) Psychotherapy (CBT, Interpersonal therapy, family therapy) 2) Pharmacotherapy (might be first choice for psychotic depression, severe symptoms that prevent effective psychotherapy), SSRI first choice 3) Psycho-education – to patient, parents and teachers Continuation therapy phase – (duration 6–12 months): 1) Psychotherapy 2) Medication if needed Maintenance therapy phase – if needed
Intervention	Outpatient setting preferred 1-step: healthcare professionals in primary care 2-step: child and adolescent mental health service, referral criteria given Inpatient treatment: only considered if patient is at significant risk of self-harm or needs intensive treatment or supervision not available elsewhere Rehabilitation	Outpatient treatment preferred Day time treatment Inpatient treatment (self harm) Rehabilitation	Least restrictive treatment that is safe and effective Outpatient treatment preferred Partial or day treatment, inpatient, residential as alternatives
Outcome	Questionnaire required		Comorbidity: 90% of children with depression have other psychiatric disorders, 20–30% have substance use disorder
Commentary on abuse risk	To be assessed, 'risk factor'	Confirmed comorbidity, especially in youth	Known to be frequently accompanied by substance abuse
Evaluation	Grading scheme for therapy, follow up for at least 6 months Evaluation of the different treatment methods or medication	Evaluation of different treatment methods or medication	Evaluation of the different treatment methods or medication Treatment evaluation during medication after 6 weeks, evaluation of psychotherapy after 6 months
Research	www.nice.org.uk	DGKJP (ed.), Deutscher Ärzte-Verlag, Köln 2007 http://www.uni-duesseldorf.de/awmf/ll/ll_028.htm	J. Am. Acad. Child Adolesc. Psychiatry 37:10, October 1998

Note: no EU guidelines exist for this condition.

Table 3.3: Established guidelines for the treatment of attention-deficit/hyperactivity disorder

	United Kingdom	European expert opinion	Germany AWMF	US AACAP
Assessment	DSM IV and ICD-10	DSM IV and ICD 10	F90	DSM IV-TR
Diagnostic criteria	Guideline in development		ICD-10/DSM IV	
Symptoms	Combination of hyperactivity, impulsivity, inattention At least 6 months	Impairment in attention and/or hyperactivity and impulsivity	Checklist given Attention deficit Hyperactivity and/or Impulsivity Beginning < 6 years, for more than 6 months	Attention deficit Hyperactivity and/or Impulsivity Beginning in childhood 6/9 symptoms resp. according to DSM IV list Impairment in > 2 areas lest impairment is severe
Diagnostic procedures		Should be done by a paediatric mental health professional 1) Clinical interview Multiple domains (school, home and community) and multiple informants (parents, teachers, youngsters) should be involved 2) Sensory receptive disorders (visual or hearing impairment), physical illnesses, developmental delays and substance abuse should be investigated 3) Culturally validated categorical and/or dimensional assessment tools should be utilised (Interviews: DISC, DICA, K-SADS, CAPA; dimensional scales: CBCL, IOWA CTRS, SKAMP, Conners, N-CBRF)	Flowsheet given, 1) Exploration (parents, child, school) of symptoms, history, comorbidity (DRUGS?), surrounding conditions 2) Observation 3) Physical examination 4) Testing (IQ, fraction impairment of performance, DiSYPS	1) Parent interview 2) Standardised rating scales DSM IV Symptom checklist, rating-scales (Academic Performance RS, Brown ADD RS, Child-Behavior-Checklist, Conners Parents and Teacher Rating Scales, Comprehensive Teacher Rating Scale, Barkley Home and School Situation Questionnaires (HSQ-R, SSQ-R), IOWA, SNAP-IV, SKAMP (see www.ADHD.net); Vanderbilt scales 3) Family history and functioning 4) Child diagnostic interview 5) Screen for medical conditions (e.g. foetal alcohol syndrome) 6) Referral to additional (neuropsychological or psychological) tests only if indicated (patient history, symptoms) 7) Assessment for comorbid disorders, older adolescents should be screened for SUD

Table 3.3 continued

	United Kingdom	European expert opinion	Germany AWMF	US AACAP
Treatment, therapeutic procedures	Still in development for children aged 3 years and older Including the management of common comorbidities in children, young people and adults	The identification of target symptoms at the beginning of treatment is essential ADHD without CD 1) Psychosocial intervention and parental training 2) Stimulant medication (Methylphenidate first choice), may be first choice for child > 6 years, first validation of response after 2–4 weeks ADHD with CD Psychosocial interventions and stimulant medication (methylphenidate 1st choice) First validation of response after 2–4 weeks, titrate to max. dose; add risperidone, validation of treatment after 4–6 weeks, titrate dose if needed Flowsheet given	Multimodal therapy a) Parental training, school training, self management b) Psychological therapy, behaviour therapy or family therapy c) Pharmacotherapy: 1) Methylphenidate – if no medical or drug abuse in social environment 2) Atomoxetine – second choice, first if medical or drug abuse known	Different for each age group – comprehensive treatment plan 1) Parental and child psycho-education 2) Medication and/or behaviour therapy With mild to moderate symptoms, behaviour therapy as initial treatment Medication: Stimulants first choice (FDA-approved), also long acting formulas; second: bupropion, tricyclic antidepressants, alpha-adrenergic agonists. ATX may be considered if active substance abuse 3) Linkage with community support and additional school resources 4) Regular reviews
Intervention	Still in development – covering the care provided by primary, community and secondary healthcare professionals	For ADHD without CD 1) Primary care 2) Specialist For ADHD with CD 1) Referral to specialist if available 2) Hospitalisation or residential treatment after 12 weeks of ineffective treatment	Outpatient treatment Inpatient treatment Placement of child or youth in foster care or children's homes or special school setting	Outpatient – no specific commentary on inpatient treatment
Outcome	Still in development	Outcome measurement tools suggested: CTRS-R, CPRS-R, IOWA CTRS, CTRS, SKAMP, SNAP-IV, N-CBRF		Discontinue therapy if symptom free for > 1 year 'Many children with ADHD will continue to have impairment into adulthood that will require treatment'
Commentary on abuse risk	Substance misuse confirmed comorbidity in adulthood	None with ADHD, youth with ADHD and CD are at high risk to develop substance abuse in adulthood	Confirmed comorbidity, especially for youth Noted, that adolescents might misuse or sell medication	15–19 % of patients with ADHD will start to smoke or develop other substance use disorders
Evaluation	Still in development	International consensus meeting for guideline 2002 – no official EU or ESCAP meeting	Continuous evaluation of treatment required (1–2 exhaustive trials/year for medication) Evaluation of the different treatment methods or medication done	Continuity of care with experienced clinician Monitoring of need for psychosocial intervention, medication efficacy and side-effects required Evaluation of the different treatment methods or medication done
Research	www.nice.org.uk	www.elsevier.com/locate/euroneuro European Neuropsychopharmacology 14 (2004) 11–28	DGKJP (ed.), Deutscher Ärzte-Verlag, Köln 2007 http://www.uni-duesseldorf.de/awmf	J. Am. Acad. Child Adolesc. Psychiatry 2007, 46:7, 894–921

Note: no EU guidelines exist for this condition.

Table 3.4: Established guidelines for the treatment of conduct disorder/oppositional defiant disorder

	United Kingdom	Germany AWMF	US AACAP
Assessment	ICD-10/DSM IV	F91, F92	DSM IV-TR: oppositional defiant disorder
Diagnostic criteria	No treatment standard – Review- 'Parent-training or education programmes in the management of children with conduct disorders'	ICD-10, DSM IV	
Symptoms	Widely vary in presentation	Symptom check list – age specific	Age specific symptoms
Diagnostic procedures	1) Assessment based on observations and interviews with child, parents and teachers 2) Several checklists (e.g. CBLC) 3) Risk factors environmental, family or children themselves (substance misuse)	Flowsheet given Exploration (parents, child, school) of symptoms, history, comorbidity (DRUGS?), surrounding conditions Physical examination Testing (IQ, fraction impairment of performance)	Practice parameters set up: Exploration (parents, child, school) of symptoms, history, comorbidity (drugs?), surrounding conditions Physical examination Testing (IQ, fraction impairment of performance) Instruments of use at diagnostic aid – special flowsheet given
Treatment, therapeutic procedures	1) Parental training or education programmes (tended to be focused on short term) 2) Child focused therapy – including behaviour therapy, cognitive therapy, social skills training, cognitive training 3) Family therapy 2) Pharmacotherapy required for comorbidity only	1) Parental training, school training, self-management 2) Psychological therapy 3) Pharmacotherapy (Methylphenidate, pipamperone, risperidone, valproic acid)	Age related long-term-treatment required 1) Prevention 2) Treatment of comorbid disorders 3) Family interventions: Parental training, arrangement of treatment (substance abuse) 3) Individual or group therapy 4) Psychosocial skill-building 5) Pharmacotherapy – should not be sole intervention (stimulants, atomoxetine)
Intervention	Outpatient Inpatient	Outpatient setting preferred Inpatient setting – if other severe diseases are present Rehabilitation Separate from peer-group Placement of child or youth in foster care or children's homes – social case management	Treatment should be carried out in the least restrictive setting Outpatient treatment Hospitalisation should be needed for crisis management only Day treatment or residential and hospitalisation facilities may be needed if family is unwilling or unable to collaborate, out-of-home community based alternatives or family preservation models are preferable

Table 3.4 continued

	United Kingdom	Germany AWMF	US AACAP
Outcome	Prognosis is particularly poor in early-onset conduct disorders, reinforcing the importance of early effective treatment. More than 60% of the 3-year-olds still exhibit problems at age of 8, many problems will persist to adolescence and adulthood Approx. 50% of the children with CD are later diagnosed an antisocial personality, are misusing substances or others		
Commentary on abuse risk	Substance misuse as risk factor Confirmed comorbidity, especially in youths	Confirmed comorbidity, especially in youths	Comorbidity with substance abuse Prevention for CD see also on www.modelprograms.samhsa.gov site of substance abuse prevention
Evaluation	Evaluation of different treatment methods or medication done Long evaluation and cost-effectiveness for different parental training	Evaluation of different treatment methods or medication done	Evaluation of different treatment methods or medication done through randomised studies
Research	www.nice.org.uk National Library for Health www.mentalneurologicalprimarycare.org	DGKJP (ed.), Deutscher Ärzte-Verlag, Köln 2007 http://www.uni-duesseldorf.de/awmf/ll/ll_028.htm	J. Am. Acad. Child Adolesc. Psychiatry 46:1; 126–141, 2007

Note: no EU guidelines exist for this condition.

Chapter 4

Strategies and programmes in indicated prevention

4.1 Introduction

This chapter aims to provide an insight on existing programmes of indicated prevention. The information presented here is the result of a systematic research of the scientific literature (described below) supplemented with data provided by government agencies in response to a request for European models of indicated prevention.

For the purpose of the review, programmes were classified as distinct preventive interventions if they had:

- A defined target group;
- A defined duration and frequency;
- An evaluation process (optional).

All programmes were labelled on three levels using the 'procedure for the classification of revised projects according to level of quality' (Hillebrand and Burkhart, in press), and a flow chart according to the logic model attempt by Hillebrand and Burkhart (in press) is provided for all programmes reaching level 3.

Expert rating of programmes was provided through a consensus process.

The programmes thus classified as 'indicated prevention' were in each case described in a frame consisting of general information (e.g. country, frequency, evaluation) and a graphic description, as given in the paper on quality criteria and assembled in the logic model for the EMCDDA database, developed by Hillebrand and Burkhart (in press). The logic model allows the elements of an intervention to be visualised and gives an overview of the interconnection of its different components (Figure 4.1). Use of the logic model helps to identify both the components that are included in the project design and those that may be absent.

Level 1	Level 2 Promising projects	Level 3 Model projects
A theoretical basis that is clearly related to the objectives	Clear project results	A theoretical basis that is clearly related to the objectives, the initial situation and the indicators
Evaluation indicators that relate to the objectives, initial situation	A theoretical basis that is clearly related to the objectives, the initial situation and the indicators	Research design-control group (CT/RCT, is the logic model plausible?)
Clear description of the evaluation design	Clear description of the evaluation design	Operational relevance and psychometric quality of measures
Project must be at least one year old	A meaningful overall description	Provision of all programme materials as well as evaluation tools

Hillebrand and Burkhart's classification of programme quality.

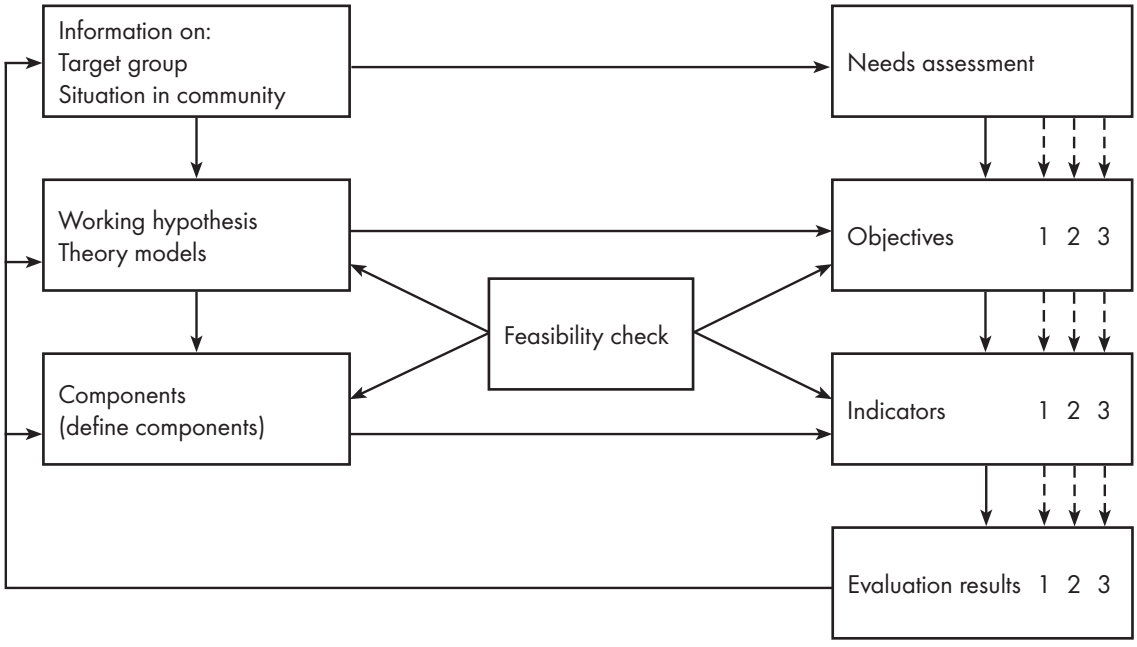

Figure 4.1: The EMCDDA logic model for interventions in drug prevention.

'Logic models, especially in the area of drug prevention, allow you to prove and graphically demonstrate that your intervention consists of a coherent interconnected set of components which are logically related to and derive from each other. A logic model increases the potential efficacy of an intervention by fine-tuning its elements in relation to each other and by allowing the continuous control of these logical relationships....' (Hillebrand and Burkhart, in press).

4.2 Results of literature search on indicated prevention

The search in the PubMed data base led to an initial sample of over 6 900 abstracts, from which, after closer inspection, 390 studies were selected for further assessment. Searches carried out in other databases (EMBASE, Social Science Citation Index, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PsycINFO), yielded 647 studies, of which a further 96 abstracts were selected. The selected studies were then assessed by a team of experts, who were able to find only 21 indicated prevention programmes that met the strict criteria for being included in this report.

The studies were labelled on three levels according to the 'procedure for the classification of revised projects according to level of quality' (Hillebrand and Burkhart, in press).

From experience, it is known that specific high-risk groups such as children placed in children's homes, youth in shelters for runaway youth and juvenile delinquents might be target populations for approaches of indicated prevention. As the literature search did not lead to many references of studies in that field, and as even the search of the European 'grey' literature identified only three programmes (from Poland, Hungary and Norway), an additional literature search was carried out including not only published articles in peer reviewed journals, but also dissertations and other scientific reports (databases: CDSR, ACP Journal Club, DARE, CCTR, CINAHL, PsychINFO, researched for the terms substance abuse and adolescence and delinquency from the year 2000). This research identified 78 papers not found by the previous search. However, even with this strategy, it was not possible to identify an evaluated indicated prevention approach in these high-risk populations. Several master theses pointed to the need of systematic screening of incarcerated youth by showing that among juvenile offenders, standardised tests are significantly better at detecting substance abuse problems than are standard informal interviews. There is a whole body of literature on 'motivational interviewing' and other motivational techniques, but these studies have been conducted with delinquents identified as suffering from a substance use disorder.

Motivational interviewing might be seen as a specific introduction into treatment. Access to preventive interventions and care seems to be quite difficult for these subgroups of youth. They might only get treatment if they have a undeniable disorder. That has an impact on their behaviour, for example during incarceration.

Given that adolescents under custody, in detention and in prison are a high-risk group easily accessible to researchers and follow-up-interviewers, a more extensive search was conducted including European doctoral theses and conference abstracts. However, this search did not identify any evaluated programmes in indicated prevention.

The programmes are categorised into those using motivational interventions, family centred interventions, interventions in youth with delinquent and disruptive behaviour and others.

4.3 Programmes from the literature

The programmes identified in the literature search are given in Table 4.1. The logic models can be found in the appendix.

Table 4.1: Programmes identified in the literature

Study	Description	Design	Country	Population	Instruments	Outcome	Level
Motivational interventions							
Marsden et al., 2006	Brief motivational intervention for people with ecstasy and cocaine use: 45–60 min. manualised intervention	RCT vs. group that only was provided with information	United Kingdom	16–22 years *n* = 342	Self-developed instrument MAP: Maudsley Addiction Profile (Marsden et al., 1998) SDS: Severity of Dependence Scale (Topp and Mattick, 1997) AUDIT: Alcohol Use Disorders Identification Test (Conigrabe et al., 1995)	6-month follow-up: not more effective than simple information for the reduction of stimulant and alcohol use	1
Walker et al., 2006	Adolescent cannabis users (min. within the last month): 2 sessions motivational enhancement therapy (MET)	RCT: treatment vs. Waiting control group	United States	14–19 years *n* = 97	GAIN-I: Global Appraisal of Individual Needs – Initial version (Dennis, et al. 2004a)	3-month follow-up: use reduced in both groups, no sign for efficacy of intervention	1
White et al., 2006	Students who broke campus rules concerning alcohol or drug use. Feedback sent home vs. motivational interview	RCT	United States	Mean: 18.6 years *n* = 222	SDS: Social Desirability Scale (Andrew and Meyer, 2003) Modified Daily Drinking Questionnaire (Dimeff et al., 1999) RAPI: Rutgers Alcohol Problem Index (White and Labouvie, 1989)	3-month follow-up: reduction (alcohol, nicotine, cannabis), no difference between interventions	3
McCambridge and Strang, 2005	Adolescents consuming illegal drugs: single motivational interviewing (1 h)	RCT	United Kingdom	16–20 years *n* = 200	Structured interview	No effects after 12 months, control group also got better	1
McNally et al., 2005	3 sessions motivational interventions for 'heavy drinking' college students. 30 min. (screening), phone contact and randomisation, second and third session	RCT	United States	Mean: 18.85 years *n* = 73	AUDIT (Saunders et al., 1993) Young Adult Alcohol Problems Screening Test (Hurlbut and Sher, 1992) Daily Drinking Questionnaire (Dimeff et al., 1999)	6-week follow-up: significant reduction (drinks/week, excessive drinking, etc.)	2
Tait et al., 2004; Tait et al., 2005	Brief intervention in emergency room in cases concerning AOD (alcohol or drug use). Information on where to get help is provided	RCT	Australia	12–19 years *n* = 127	Drug use of teenagers questionnaire (Ovenden and Loxley, 1994) FAD: Family assessment device (Epstein et al., 1983) GHQ-12: general health questionnaire-12 (Goldberg and Williams, 1988)	4-month follow-up: less 'hazardous' drug use, less drug use in those with therapy, more adolescents get into treatment 12-month follow-up: less admissions to emergency room because of AOD	3

Table 4.1 continued

Study	Description	Design	Country	Population	Instruments	Outcome	Level
McCambridge and Strang, 2004	Adolescents with illicit drug use (stimulants and cannabis), recruited through peers: motivational interviewing	RCT	United Kingdom	16–20 *n* = 200	SDS: Severity of Dependence Scale (Gossop et al., 1995) DAS: Drug Attitudes Scale (Parker et al., 1998) GHQ: General Health Questionnaire (Goldberg and Williams, 1988)	3-month follow-up: reduction of drug use Effect sizes: cigarettes: 0.37 alcohol: 0.34 THC: 0.75	3
Baer et al., 2001	High-risk drinkers: one time personal motivational interviewing, personalised analysis sent to individuals, phone contact with high-risk drinkers	RCT	United States	19 years *n* = 659	Self-developed instrument Rutgers Alcohol Problem Inventory (White and Labouvie, 1989) Daily Drinking Questionnaire (Collins et al., 1985) ADS: Alcohol Dependency Scale (Skinner and Horn, 1984)	4-year follow-up: bigger reduction of alcohol use in intervention group	2–3
Walters, 2000	Moderate to heavy drinkers: personalised feedback sent to them feedback	RCT (2 h Information + feedback vs. feedback only vs. no intervention)	United States	*n* = 40	DCU: Drinker's Check Up (Miller and Sovereign, 1993) AUDIT	6-week follow-up Effect size: 1.01 for sent feedback, vs. 0.36 without intervention vs. 0.60 for intervention + feedback	2
Family centred interventions							
Kamon et al., 2005	Adolescents with at least one use of cannabis within the last month: family based contingency management (money for drug free urine sample). 14 weeks, 1 session/ week. Adolescent and parents separately	Pilot	United States	15–18 years *n* = 19	TLFB: Timeline Follow back (Sobell and Sobell, 1992) CBCL, YSR Vermont Structured Diagnostic Interview (Hudziak et al., 2004) Alabama Parenting Questionnaire (Frick et al., 1999)	30-day follow-up: effective vs. substance use and externalising behaviour	2
FACS: Family and Coping Skills (Curry et al., 2003)	Substance use and depression in adolescents: parts of CBT and family interventions. Parent training, group and family sessions	Pilot	United States	14–18 years *n* = 13	CAPA: Child and Adolescent Psychiatric Assessment (Angold and Costello, 1995) CDI: Children's Depression Inventory (Kovacs, 1992) Own instruments	3-month follow-up: level of depression lowered, reduction of substance use	2

Table 4.1 continued

Study	Description	Design	Country	Population	Instruments	Outcome	Level
BSFT: Brief Strategic Family Therapy (Robbins et al., 2002)	Adolescent behaviour seen in context with environment, mostly 12–6 sessions (3–4 months)	Different studies: RCT vs. waiting control group	United States	6–17 years, 79 families (Coatsworth et al., 2001)	RBPC: Revised Behavior Problem Checklist (Quay and Peterson, 1993) ASI: Addiction Severity Index (McLellan et al., 1984) FES: Family Environment Scale (Moos and Moos , 1983) SFSR: Structural Family Systems Rating (Szapocznik et al., 1991)	Reduction of cannabis consumption, not of alcohol use (Coatsworth et al., 2001)	3
CYT: Cannabis Youth Treatment (Dennis et al., 2002, 2004a)	Cannabis use within the last 90 days, one symptom of dependence Interventions: motivational enhancement therapy (MET), cognitive behavioural therapy (CBT), family support network (FSN), adolescent community reinforcement approach (ACRA) or multidimensional family therapy (MDFT)	RCT	United States	12–18 years *n* = 600	GAIN: Global appraisal of Individual needs	12-month follow-up: all five interventions improved days of abstinence and percent of adolescents in recovery. Most cost-effective: MET or CBT (5 sessions), MET or CBT (12 sessions), ACRA	3
School-based interventions							
Preventure (Sully and Conrod, 2006)	School programme: UK (from Canada) Only for adolescents with identified risk factors. 4 personality types: anxiety sensitivity, sensation-seeking, impulsivity, negative thinking Duration: 1 x 90 minutes + 1 x 60 minutes	CT	United Kingdom	13–16 years	SURPS: Substance Use Risk Profile Scale (Conrod and Woicik, 2002)	12-month follow-up: binge drinking, frequency and quantity of drinking reduced (reduction also of: depression, truancy, panic attacks and impulsivity) Especially effective for sensation seekers	3
Project Options (Brown et al., 2005)	Adolescents, alcohol use a least once, school-based, 6 sessions, motivational enhancement, skills training, feedback, individual interventions or internet interventions	CT: self referral to intervention groups (non vs. individual vs. internet)	United States	mean: 15.9 years *n* = 1 249	Items from: Monitoring the Future Survey (Johnston et al., 2003) Youth Risk Behaviour Survey (CDC, 1990)	After interventions: best effects in heaviest drinkers	1–2

Table 4.1 continued

Study	Description	Design	Country	Population	Instruments	Outcome	Level
Interventions in youth with delinquent and disruptive behaviour							
UCPP: Utrecht Coping Power Programme (Zonnevylle-Bender et al., 2007)	Manualised cognitive therapy; 23 weekly sessions, 1.5 h children and parents Parents have to pay	RCT vs. TAU vs. healthy controls	Netherlands	8–13 years with disruptive behaviour disorder *n* = 61		5-year follow-up: reduction of smoking, reduction of cannabis use, no differences in delinquent behaviour	3
ATTAIN (Gil et al., 2004)	Delinquent youth	RCT: individual CBT intervention vs. family intervention (Guided self change) vs. Wait control group	United States	Mean: 15.7 years *n* = 213	TLFB: Timeline Followback interview (Sobell and Sobell, 1992) Structured Interview PRQ: Problem Recognition Questionnaire (Cady et al., 1996)	Reduction of alcohol and cannabis use in both intervention groups	2
Others							
Solhkhah et al., 2005	Retarded bupropion in adolescents with ADHD or mood disorder	OL, naturalistic	United States	12–19 years *n* = 14	DUSI-R: Drug Use Screening Inventory – Revised ADHD Symptom Checklist HAM-D: Hamilton Rating Scale for Depression CGI: Clinical Global Impression	6-month follow-up: reduction in DUSI, ADHD, HAM-D scores	2
Battjes et al., 2004	Mild-to-moderate substance abusers. Manualised, group therapy approach, 19 sessions		United States	*n* = 194	GAIN: Global Appraisal of Individual Needs (Dennis et al., 2002) Circumstances, Motivations and Readiness Scale (DeLeon et al., 2000) Client Evaluation Form (Simpson and Chatham, 1995)	6- and 12- month follow-up: cannabis use reduced, alcohol use stayed the same	2
Supra-f (Meili, 2004)	Adolescents with problematic behaviour. Admission through schools, youth court, parents 6 months, 1–5 times/week School and job work, problem analysis, problem solving skills, social competence training		Switzerland	11–20 years		Design presented	2
Waldron et al., 2001	12 h (24 h) therapy in one out of four therapy settings for adolescents with cannabis use	RCT: CBT vs. FFT vs. combination vs. psychoeducation in group	United States	13–17 years *n* = 120	CBCL: Child Behaviour Checklist (Achenbach, 1991) TLFB: Timeline followback interview (Sobell and Sobell, 1992) POSIT (McLaney et al., 1994)	4-month follow-up cannabis use: FFT and combination: less days with use. FFT, CBT and combination: more adolescents at minimal use level 7-month follow-up: combination and group: less days with use FFT, combination and group: more adolescents at minimal use level	1

Abbreviations: RCT, randomised controlled trial; CBT, cognitive behavioural therapy; CT, controlled trial; OL, open label study; TAU: treatment as usual, FFT, functional family therapy.

4.4 Programmes in Europe — information provided by governmental agencies

4.4.1 Search strategy

To gather additional information about existing programmes or programme initiatives in European countries, an attempt was made to question the various countries about their actual indicated prevention programmes. Based on the information available on the internet, addresses and, if possible, contact persons were identified for the following ministries: health, social affairs, education and justice. In some cases, because of the organisation of government services or the lack of an English version of the internet site, it was not possible to find contact addresses. A total of 100 letters were sent by post to government departments or agencies in 29 European countries.

Replies were received from at least one ministry or agency in 70 % of the countries. The answers obtained varied widely as to their quality. At the beginning, some new addresses were received from contact persons, or notice was received that the recipient had forwarded the letter to the responsible person. Beyond that, a few countries have special institutions for drug monitoring e.g. National Drug Commission, Drug Control Department under the government of the country. From the majority of governments contacted, more than one source of information was obtained. Most often the answers came from the ministry of health (49 %) followed by the ministry of justice (21 %) (see Figure 4.2).

From the responses of governmental agencies, it can be concluded that the prevention programmes differ widely between countries. Definitions of indicated prevention varied: although information was received on a large number of programmes, most could be defined as universal or selective prevention approaches. The majority of programmes were set up without any evaluation (or without sufficient information on evaluation). It also seems that the respective ministries or agencies are not well informed about other drug prevention activities in their country.

Out of 21 publications that met the criteria for a programme of indicated prevention, 16 could be classified as programmes on levels 2 or 3. Six out of the 16 programmes originated in Europe; among the 16, four qualified for level 3.

Information was also received on internet sites and project homepages, epidemiological studies, political intentions, research institutes, definitions of prevention, as well as on universal and more specific programmes. It was helpful that many homepages are available in English. An overview of the accumulated material is given in the section 'Programmes named by governments or associated institutions'. All the internet sites named by the ministries, and the letters giving information on national projects were evaluated. Every link was followed, with special regard concerning programmes of indicated prevention.

Interventions identified as programmes (i.e. those with a defined target group, a specified aim and a description of intervention) were evaluated more closely. Keywords on

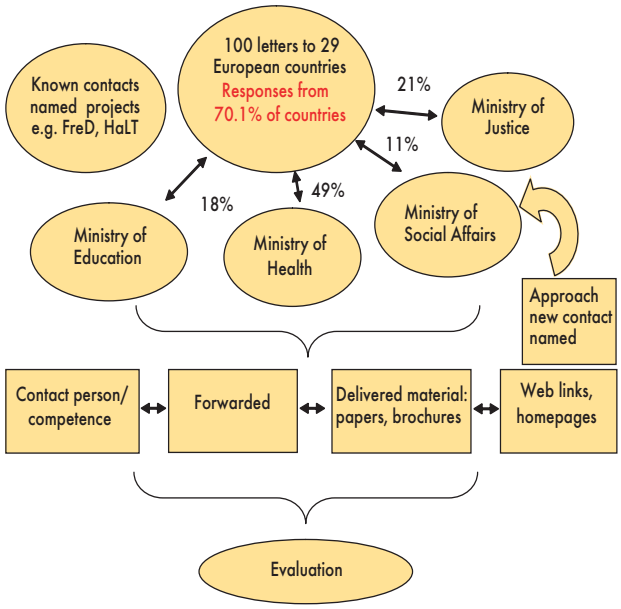

Figure 4.2: Search strategy of programmes in various countries.

theoretical framework, duration of the project, funding and evaluation strategies were noted if information was available.

The included programmes were rated by consensus of an expert group (three experts reviewed the programmes independently, and then entered a group discussion until a final category per programme was agreed) and categorised as universal, selected or indicated prevention.

Programmes classified as 'indicated prevention' had to meet the definition given at the beginning of this chapter. The group consensus process led to additional qualitative categories for inclusion and exclusion before a programme was permitted to proceed to the next step of programme description.

Programmes were not categorised as 'indicated' and thus not further described in this report if:

- Interventions were designed for an entire school population, even if they took place in schools for children with behavioural difficulties, without specific, substance abuse oriented interventions (e.g. Estonia and Hungary);
- Training was provided for professionals and staff and not aimed at individuals (e.g. Slovakia);
- The target group was not specified or only identified in a general sense, e.g. 'risk groups';
- Individuals were not selected by any kind of individual risk assessment (e.g. parental psychological problem, individual behavioural signs, delinquency) but only selected for living in a disadvantaged neighbourhood, being part of an ethnic subgroup etc. (e.g. Ireland, Slovakia);
- The programme was described to be 'in development' or 'create a network' (e.g. Poland) without further specification;
- The programme consisted of initiating self-help groups (e.g. Poland);
- The programme consisted mostly of treatment interventions or harm reduction (e.g. needle exchange);
- It was a non-interventional study or programme;
- The target group consisted of young adults above 18 years of age.

From the 53 internet sites selected, 23 programmes were finally categorised as indicated prevention.

The evaluation procedures in these 23 programmes were found to meet level 3 standards in one case, level 2 standards in two cases, level 1 in five cases. Fifteen programmes could not be rated on any level or did not give sufficient information. Two programmes had the required standards of indicated prevention and level 3 (IPL3) as defined in this chapter.

Apart from a programme from Switzerland, no programmes were found in both the literature and in the governmental search.

In summary, only a few of the studies could be described as being empirically sound and effective, and therefore serve as best practice models. In many of the other studies, the strength of the evidence of studies is limited by short follow-up intervals or insufficient numbers of participants. To prevent this problem, it is necessary to demand that studies adhere to a certain level of evaluation standards. Policymakers can play a role here by making adequate evaluation a condition for providing financial support for prevention projects. Future studies should rely on a randomised controlled design, powered by sufficiently large numbers (depending on the question which should be assessed) of individuals. At least a one-month follow-up should be achieved. It is crucial that even unsuccessful interventions are published in order to provide information on interventions that do not work, thus helping other researchers and partaking individuals to avoid repeating prevention programmes that have been found to be inadequate.

4.4.2 Programmes named by governmental agencies

Table 4.2. Programmes named by governmental agencies

Originator	Sources given	Global information	U	S	I	?	EI
Czech Republic	www.p-centrum.cz		X	X	1		
Germany	www.lwl.org/ks-download/downloads/publikationen/Cannabis-Expertise.pdf		X	X	1		
Hungary	www.drogfokuszpont.hu	X	X	X	2		X
Netherlands	http://www.lsp-preventie.nl/index.asp?content_id=37	X			6		
Poland	www.para.pl/parpaeng		X	X	3		
Slovakia	www.infodrogy.sk		X	X	1		
Sweden	http://www.socialstyrelsen.se/en/Subjects/	X	X	X	1		X
Switzerland	www.supra-f.ch				1		
United Kingdom	www.drugs.gov.uk		X	X	1		X
United Kingdom	http://guidance.nice.org.uk/type	X	X	X	1		
Czech Republic	www.prevcentrum.cz	Czech site only					
Czech Republic	www.web.telecom.cz/filia	Could not be found					
Czech Republic	www.podaneruce.cz		X				X
Czech Republic	www.extc.cz	Czech site only					
Czech Republic	www.poradenskecentrum.cz	Czech site only					
Czech Republic	www.anima-os.cz	Czech site only					
Czech Republic	www.auritus.cz	Czech site only					
Czech Republic	www.pppbruntal.cz/citadela	Czech site only					
Czech Republic	www.mestokladno.cz		X				
Czech Republic	www.vrakbar.wz.cz	Czech site only					
Czech Republic	www.kcentrum.cz	Czech site only					
Czech Republic	www.cnnfm.cz	Czech site only					
Czech Republic	www.os-semiramis.cz		X	X			
Czech Republic	www.fokusvysocina.cz	Czech site only					
Estonia	http://euks.tai.ee/?lang=en	X	X				
France	http://www.education.gouv.fr/cid1116/prevention-des-conduites-addictives		X	X			X
France	http://www.drogues.gouv.fr/article94.html	X					
France	www.sante.gouv.fr	X					
Germany	www.dbdd.de			X			
Germany	www.forumpraevention.de	X					
Germany	www.gesundheitsforschung-bmbf.de	X					

Table 4.2 continued

Originator	Sources given	Global information	U	S	I	?	EI
Hungary	www.gov.hu	X	X				
Ireland	www.sphe.ie		X				
Ireland	www.probail.ie/en/NationalDrugsStrategy/NationalDrugsStrategyFAQs		X	X			
Latvia	www.narcomainia.lv						
Latvia	www.aids.gov.lv						
Latvia	www.vvva.gov.lv						
Latvia	www.atkariba.lv						
Lithuania	www.nkd.lt						
Lithuania	www.vpsc.lt/vpsc_anglu			X			
Norway	www.shdir.no	X	X			X	
Poland	www.narkomania.gov.pl/brief/htm	X	X				
Poland	www.bpzgov.pl/anghtml/index2/html	X					
Switzerland	www.radix.ch	X					X
Turkey	www.yeniden.org	X					
United Kingdom	www.talktofrank.com		X				
United Kingdom	www.puplicationsteachernet.gov.uk	X	X				
United Kingdom	www.dh.gov.uk	X					
United Kingdom	www.deni.gov.uk/index/80-curriculumassessment_pg/80-curriculum_and_assessment-drugsguidance_pg.htm	X	X				
United Kingdom (Northern Ireland)	www.deni.gov.uk/index/80-curriculumassessment_pg/80-curriculum_and_assessment-drugsguidance_pg.htm		X				
United Kingdom (Northern Ireland)	www.deni.gov.uk/index/85-linkspage_pg.htm#elbs	X					
United Kingdom (Northern Ireland)	www.dhsspsni.gov.uk	X					
United Kingdom (Northern Ireland)	www.dhsspsni.gov.uk/drugs-alcohol-report-ni-review.pdf		X				

NB: The value in column I gives the number of indicated programmes on this site. Programmes are categorised as: U = universal, S = selective, I = indicated prevention, ? = not sufficient information given and EI = early intervention.

Table 4.3. Programmes received by postal package

Originator	Only global information	Name of programme	U	S	I	EI
Germany		HaLT, visits in intensive care units after alcohol intoxication and ongoing services			1	
Latvia		Support group for children under risk targeted to carry out prevention for children of high-risk groups			1	
Liechtenstein		Educational intervention after violation of protection of minors rules			1	
Norway		Juvenile contract			1	
Spain		Early detection and treatment of adolescents at risk for addiction			1	
Czech Republic	X	Me and my mother don't smoke	X			
Czech Republic		Smoking isn't normal	X			
Czech Republic		Smoking and me	X			
Czech Republic		Non smoking health care system	X			
Germany		FreD, early intervention for young people who consume drugs and attract attention for the first time		X		
Germany		Individual intervention to reduce consumption of cannabis				X

Table 4.3 continued

Originator	Only global information	Name of programme	U	S	I	EI
Hungary	X	Projects for the fight against violence in schools and other educational institutions	X			
Hungary		Projects to advertise risks of drug abuse in secondary, grammar and vocational schools	X			
Latvia	X	Programme for reduction of alcohol consumption and restriction of alcohol addiction	X			
Latvia		Riga Addiction prevention centre workers patrol a number of internet cafes and city night clubs	X			
Liechtenstein		Drug groups				X
Liechtenstein		Contest for school classes to stop smoking	X			
Norway	X	Internet based information	X			
Norway		Campaign against tobacco among young people	X			
Norway		School intervention programmes	X			
Norway		Collective treatment model for drug addicts				X
Norway		Drug treatments courts		X		
Norway		SNU projects				
Norway		Community sentences	X			
Norway		Serving prisons sentence in institutions for treatment care	X			
Norway		SNU projects		X		
Norway		NGOs	X			
Norway		Regionsprosjektet	X			
Slovakia	X	RO Topol'cany, sport against smoking, drugs for healthier life	X			
Slovakia		PHA SR Marihuana known–unknown	X			
Slovakia		Educational activities, such as lectures for children and adults; chats; seminars; competitions such as quit and win	X			
Slovakia		Publication activity, such as brochures, leaflets, films and media activity	X			
Slovenia		Strategy for dealing with prisoners with drug problems in Slovenian prisons				X
Spain		Programa Saluda, drug prevention	X			
Spain		Constuyendo Salud	X			
Spain		Als'Pals	X			
Spain		Programme against alcohol abuse		X		
Spain		SUSPERTU	X			

NB: The value in column I gives the number of indicated programmes on this site. Programmes are categorised as: U = universal, S = selective, I = indicated prevention, ? = not sufficient information given and EI = early intervention.

4.4.3 Overview on programmes on indicated prevention

An overview is presented here of the programmes on indicated prevention that achieved level 2 or 3. Those that were classified as indicated prevention, but which could not be rated as level 2 or 3 are listed in the appendix, where they are also presented as logic models.

Name:	**Bundesprojekt Hart am LimiT — HaLT Lörrach — HaLT Rostock — reactive**
Prevention:	Indicated
Country:	Germany
Target group:	Under 150 adolescents in intensive care after binge drinking
Description:	Accumulation of data on coma drinking nationwide; find out about reasons for risky alcohol consumption; find out about peer circumstances; find out about underlying psychiatric disorders and initiate therapy and rehabilitation if advisable. To prevent repeat visits to intensive care for problems related to alcohol
Initiation:	2003 first phase, 08/2004 extended phase
Frequency:	Individually scheduled, minimum 2 sessions, all types of counselling/treatment
Instruments:	Research questionnaire and monitoring sheet
Evaluation:	Programme designed questionnaire, statistics and report by PROGNOS AG, Switzerland
Level:	3

Name:	**Increasing the number and availability of therapeutic services for co-dependents and other members of alcohol-dependent families**
Prevention:	indicated
Country:	Poland
Target group:	Family members – see above
Description:	Training courses Conducting research/evaluation, focus on disorders suffered by the alcoholics' family members Announcements and publications in specialised press/journals
Initiation:	Since 1999
Frequency:	Not specified
Evaluation:	1998–2002
Level:	2

Name:	**Supra-f**
Prevention:	Indicated
Country:	Switzerland
Target group:	Youth at risk (of delinquency, drug use, depression, anxiety, conduct disorder, problems at school)
Description:	Different programmes between 3–42 h/week supporting and structuring the children's lives
Initiation:	Since 2000
Frequency:	3–42 h/week
Evaluation:	2003 and 2006 – still following up
Level:	3

4.5 Summary

A systematic search of the scientific literature was carried out to gather data on existing programmes of indicated prevention. In addition, information on indicated prevention projects was sought from governmental agencies.

Interventions having the following characteristics were classified as prevention programmes: a defined target group, a defined duration and frequency. Ideally, programmes included an evaluation process, but this was not a defining characteristic.

All programmes were rated through a consensus process.

Logic models were constructed for all those programmes classified as 'indicated prevention'.

The first source, literature research and assessment by a team of experts, yielded 21 clearly described programmes of indicated prevention out of more than 600 recent publications. Out of these, six programmes originated in Europe, and four were judged to be of the standard 'best practice'.

Most of the programmes identified in the literature search are from the United States and other anglophone countries, and are designed for adolescents after drug use initiation.

The few programmes in the literature from non-anglophone European countries refer to school identification, school-based programmes and individual group therapy for adolescents with identified problem behaviours or specific psychiatric disorders.

Many of the programmes are based on 'therapeutic' interventions with a high frequency and/or use some sort of brief, manualised intervention, such as motivational interviewing or a parent training programme ([7]). To address issues specifically related to drug or alcohol use, existing therapeutic interventions (such as cognitive behaviour therapy or family therapy) are sometimes used with only minimal changes.

Requests made to governmental agencies yielded 53 internet sites and several papers, out of which 23 programmes were categorised as indicated prevention. Approaches and definitions used in prevention differ widely between the various countries. Most of the programmes were judged as universal

([7]) One (United States) study offered psychopharmacotherapy.

or selective prevention approaches according to the definition used in this report. In the majority of cases there was either no evaluation or insufficient information. Thus, only three of the European programmes, each in a different country, could be described as 'best practice'. The fact that governmental agencies rarely referred to prevention activities carried out by other governmental agencies in their country appears to suggest that there is often a lack of coordination between these agencies. This finding underscores the need not only for programmes to be scientifically sound and evidence-based, but also for increased emphasis on the coordination of prevention activities within countries.

The 23 programmes of indicated prevention came from the Czech Republic, Germany, Hungary, Liechtenstein, Netherlands, Norway, Poland, Slovakia, Spain, Switzerland and the United Kingdom. These programmes are aimed mostly at children and young people with social and/or behavioural problems or children from families with drug-related problems or psychological problems. Some of them focused on emergency room visits or police contacts resulting from drug and alcohol consumption.

The interventions mainly consisted of group work focused on reinforcing self-esteem and stimulating positive interactions, in some cases including individual and family contacts.

Overall, the programmes that can be considered as best practice centre around different target groups including those in need of intensive care or other medical treatment related to substance use, otherwise identified users, individually assessed children identified in school settings, children of addicted parents and children referred by the courts. Thus, in most cases, the target group already uses substances. Many of the young people entering the programmes use substances as a means of coping with problems in their life.

At-risk children are referred to prevention programmes by various pathways: self-referral, school screening, peer recruitment, self-rating instruments at school, medical treatment condition, addiction treatment centres for parents.

All of the programmes also provide individual needs assessment and cooperate with a variety of help systems, though very few of them do referrals to local help systems in the sense of systematic 'care pathways'.

The outstanding programmes are: UCPP in the Netherlands, which aims to empower young delinquents who are users; the Supra-F projects in Switzerland, which provide individualised offers in different areas; and HaLT in Germany, which targets binge drinkers in intensive care.

Each of these programmes has its own limitations: consent and cooperation of parents is required in the Dutch and German programmes, and the Swiss programmes have very local prerequisites with questionable generalisability.

Most of the programmes found in the literature search are based in the United States or other anglophone countries. The majority are designed for adolescents after initiation of drug use. Programmes from European countries refer to school identification, school-based programmes and individual group therapy for adolescents with identified problem behaviours or specific psychiatric disorders.

Many of the programmes forwarded from the governmental agencies use behavioural methods for interventions with a high frequency, or more specific manualised interventions, such as motivational interviewing, or a parent training programme. To address the issues specifically related to drug or alcohol use, existing therapeutic interventions (such as cognitive behaviour therapy or family therapy) are sometimes used with only minimal changes.

Most of the programmes were categorised as universal or selective prevention according to the definition used in this report; the majority either had no evaluation or did not provide sufficient information. Only three programmes were judged to meet the standard of 'best practice'. In many cases, governmental agencies did not seem to be well informed about activities in the area of drug prevention carried out by other governmental bodies in the same countries. This illustrates the need for better coordination of prevention activities within countries.

Whereas all of the programmes provide for individual needs assessment and cooperate with a variety of help systems, very few of them have developed systematic 'care pathways'.

Chapter 5
Ethical issues

5.1 Introduction

In drug prevention, ethics is not a new theme. Nevertheless, the ethical issues that arise in indicated prevention need to be considered carefully, as the goal of this approach is to intervene in individuals with a well-defined risk of acquiring a substance use disorder later in life. This, at the very beginning, sets out the issues to be handled. First, by identifying individuals and working with them, they are placed in a special position apart from their peers, and this may entail the risk of being labelled and stigmatised. Secondly, the act of informing individuals that they are at an elevated risk of developing a disorder later in their life, may in itself increase the risk of this happening. Thirdly, there are the issues of adapting research on preventive efforts in order to fulfil scientific and ethical criteria.

One of the best-known works on ethical issues in medicine is that of the National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, which in April 1979 released the 'Belmont report', issuing 'Ethical principles and guidelines for the protection of human subjects of research' ([8]).

The basic ethical principles defined in this report, and which inform this chapter, are: respect for persons, beneficence and justice.

5.2 Respect for persons

As the Belmont report mentions, respect for persons incorporates at least two ethical convictions: the individual should be treated as an autonomous agent; and those with diminished autonomy should be protected.

These two points are essential when considering the issue of who it is that will make the decision on whether an individual participates or not.

As there is potential for a harmful outcome (which will be addressed later in this chapter), inclusion in a preventive intervention needs to be carefully thought over, especially as the Belmont report points out that persons 'in need of extensive protection' (which is true for children and adolescents) should be excluded 'from activities which may harm them'. In many EU Member States, and in European regulations on clinical trials, with the exception of vaccination, there is no legal or regulatory framework for research on preventive interventions in children or adolescents. Often, a trial on minors is justified by a potential individual or group benefit.

This potential group benefit can be readily described in the context of indicated prevention because individuals are screened or described on the basis of certain defined risks.

([8]) Available at: http://ohsr.od.nih.gov/guidelines/belmont.html

However, the intervention aims at reducing a risk for a not-yet-developed condition, such as substance use disorder. It must be established that a legal framework exists that allows clinical trials in individuals who are at risk, but at the moment of the intervention have not developed the targeted condition. From a substance abuse perspective, these individuals are still to be considered as healthy individuals. The example that comes to mind is vaccination. In comparison to a curative intervention such as medication treatment, it is expected that substances used for vaccination have a low number needed to prevent – meaning that vaccines are effective in nearly all individuals. Conversely, vaccination has a very high number needed to harm – the risk of suffering side effects from a vaccine should be much lower than those from a treatment ([9]). Three kinds of possible intervention can be distinguished: prevention, enhancement and treatment. The same drug or psychosocial intervention can be used for more than one of these interventions. For example, methylphenidate is the well-established treatment for ADHD. Methylphenidate can also be used as a universal enhancer with respect to several cognitive tasks relevant in school. Furthermore, the treatment of children diagnosed with conduct disorder and ADHD with methylphenidate could be preventive with respect to later substance abuse. In this example, RCT designs are appropriate to study the therapeutic efficacy of methylphenidate in the treatment of ADHD. But, the same risk–benefit ratio is not applicable when the goal is enhancement or prevention.

The example of vaccination does not apply to indicated prevention, as not even the best projects include interventions with very high response rates combined with excellent overall protective effects and no significant risk. In many ethical debates, this extreme benefit–risk ratio seems to justify vaccination trials in healthy children. But is that also true for prevention programmes that aim at reducing the risk of later substance abuse?

Even if the levels of safety and effectiveness of an intervention are found to be comparable to those of a vaccine, a second issue arises. The question is whether the intervention should be given only with the consent of the child and/or its care-givers or if the state should force persons at risk to undergo such an intervention. States vary in their regulations on obligatory or voluntary vaccination. In general, obligatory vaccination seems to be acceptable for those diseases that carry a high risk of handicap and where the effectiveness of the vaccine is high and the risk of unintended harm is very low.

([9]) 'Number needed to treat' (NNT) describes the number of people in a treatment setting that need to undergo a certain intervention, so that one person benefits from the intervention. If, for example, the NNT is 5, it means that an intervention (e.g. a medication) needs to be administered to five people, so that one of them benefits from it. A low NNT indicates an effective intervention. 'Number needed to harm' (NNH) describes the likelihood of a side-effect from an intervention. A low NNH indicates a high risk of side-effect.

No existing programmes of indicated intervention show risk profiles and levels of reliability and efficacy similar to those of vaccines. Therefore, forced or mandatory interventions, especially in juvenile justice settings, cannot be justified. When an intervention of this type is offered by the state, school or other agency, the willingness of the individual to partake must be established. For interventions in minors, many additional questions arise, including:

- Who can and should consent to the intervention?
- How important is the assent of the person who has to undergo the intervention?
- Can parents decide on preventive interventions while the children are too young to articulate their will or do not recognise the problems the parents have with their behaviour?
- Who defines the problems?
- Who decides about the 'cure' and who has to undergo it?

These issues need to be addressed. For minors, the decision on participating in preventive interventions cannot be based solely on the consent of the parents or legal guardians, but must also include the informed assent of the child or adolescent (according to EU regulations on clinical trials, assent from children from age 7 or older). The importance of the assent of the participant increases with the age and responsibilities of the adolescent. The inclusion of the minor in the decision-making process is also an important step in the creation of motivation.

5.3 Beneficence

Action that is done for the benefit of others falls under the ethical principle of beneficence. The Belmont report regards beneficence as an obligation and states two general rules under which such actions should be carried out: 'do not harm', and 'maximise possible benefits and minimise possible harms'.

There is evidence that not all interventions targeting adolescents are beneficial. Group interventions, in particular, have been criticised for their potential to exacerbate rather than reduce dissocial behaviour.

Negative treatment outcomes in substance abuse treatment have been observed; a recent review points out that 7–15% of patients get worse during treatment (Moos, 2005).

In a review of trials of substance use prevention aimed at young people, Werch and Owen (2002) found that 17 studies showed one or more negative effects.

The iatrogenic effects of programmes can be attributed to various causes, such as: more positive expectations about substance use; a decline in self-efficacy (the belief that one is capable of succeeding in specific situations) to avoid substance use; and increased offers and likelihood of use of cigarettes, alcohol and drugs from others met in the programme (Moos, 2005).

As high-risk adolescents tend to form groups, and seem to be especially vulnerable to malignant peer influences, these sorts of effects need to be considered and closely monitored, especially in group situations.

Such groups might provide the participant with model deviant behaviour, for example substance misuse – a possibility for 'deviancy modelling'. And influences from deviant peers might undermine the positive effects of such groups (Moos, 2005).

However, this effect may be attributed to 'norm narrowing' as Killeya-Jones et al. (2007) pointed out. They described how a deviant group may lower the individual's perception of deviant norms, thereby providing the individual with inadequate standards of behaviour. They suggested that 'teens are modelling the behaviour of their clique associates not because they like them but they want to be like them'.

As the body of literature on iatrogenic effects in prevention is growing, high standards in research need to be maintained to ensure the best possible outcomes for those taking part in preventive measures.

At the moment, the randomised control trial (RCT) model seems to be the best way to evaluate the beneficence of a treatment. RCTs, however, often are focused on improvements in primary end-points, usually within a short period of time. Interventions that target later substance use disorders aim at a long-term outcome. Given the risk of quitting and other effects intervening in the meantime trials measuring long-term outcomes need larger numbers of participants.

Reports of influences from group interventions on substance consumption stem from programmes for adolescents with problematic social behaviour. It has been reported that the probability for tobacco, alcohol and cannabis use was elevated in 15- to 16-year-olds after they had been in a group with dissocial peers at the ages of 13–14 (Dishion and Andrews, 1995). The same group also showed that tobacco consumption increased after a group training to strengthen prosocial behaviour (Dishion et al., 1999).

This may be due to the fact that in group discussions, social norms can be shifted through the influence of dissocial peers, as the individual gets positive feedback on his substance consuming behaviour.

Even in group programmes with a focus on substance use, increases in alcohol consumption have often been noted. Poor outcomes have been reported for programmes that aim to strengthen the ability to withstand peer pressure concerning substance use (Werch and Owen, 2002) and other interventions of behavioural training (Dishion and Dodge, 2005; Dishion and McCord, 1999)

In contrast to programmes in selective and indicated prevention, the efficacy of which have been tested, universal prevention programmes are scarcely questioned in this respect. A possible explanation for this could be that assessing such measures requires the following up of very large numbers of participants. Nevertheless, it seems short-sighted to presume that individuals can only profit from universal prevention.

As iatrogenic effects can be demonstrated even for apparently innocuous acts such as administering questionnaires in schools (Gould et al., 2005), the necessity of assessing interventions carried out in the classroom is clear.

The primary question of nonmaleficence (*primum non nocere* – first, do no harm) needs to be urgently addressed in the prevention setting.

This is also certainly true for the problem of stigmatising children and adolescents through a selection process. Where

interventions are built to identify high-risk individuals in a first step, and treat them in another step, those who are chosen for a preventive intervention may be at risk of being socially excluded from their peers, as a result of being identified as belonging to a risk group. The risk of stigmatisation can be reduced in autonomous requests for participation in preventive interventions.

A sound epidemiological knowledge is essential to be able to make any decisions concerning the definition of probable risk. No matter how excellent the sensitivity or specificity of an instrument might be, knowledge of the prevalence of risk factors in the assessed group is vital for further conclusions (Bayes's theorem, 1764). Bayes described the conditional probability as the product of the unconditional probability and a predictive power of a variable such as an identified risk factor.

The positive predictive value of any assessment instrument will be higher in a group with more at-risk individuals – a fact that underlines the importance of the setting in which the evaluation is undertaken (e.g. foster home versus private school).

After evaluating for individuals at risk, two further ethical problems arise. One concerns the level of risk above which intervention is recommended. The second problem is about who may define that level.

5.4 Justice

The questions on justice that are raised by the Belmont report stem from the principle that 'equals ought to be treated as equals', which means that benefits should be available to all equals and burdens should be imposed duly. With respect to preventive interventions, this point addresses the availability of prevention programmes for those in need. The literature review shows that some research has been done on providing adequate preventive support, even for those who are socially excluded, such as prisoners. However, little research is available in other high-risk fields such as foster care homes.

Justice, in the sense of availability, comes to the fore where individuals are willing to participate in a preventive intervention and the issue of autonomy has been addressed satisfactorily.

The principle of justice also applies to the evaluation of prevention. It seems unjust to apply preventive efforts to a group of people at risk while, at the same time, denying these efforts to another group of at-risk individuals by using them as controls. Of course, randomised controlled trials are desperately needed to evaluate a programme and check for its effects. Nevertheless, where a trial has shown an intervention to be effective, it should be mandatory that it be offered to those who served as its controls.

5.5 Conclusion

As prevention approaches can, at least in principle, be potentially harmful, they should be subject to the same considerations as treatment programmes. As stated in the Belmont report, 'research also makes it possible to avoid the harm that may result from the application of previously accepted routine practices that on closer investigation turn out to be dangerous', a possibility that seems to exist in prevention work as well.

This means that prevention programmes:

- should have been presented to an institutional review board to address ethical questions and should have a positive judgment for applying the proposed interventions to humans;
- need to be evaluated and assessed for their outcome: both short- as well as long-term, in order to avoid carrying out useless programmes;
- need to be built on a sound scientific basis and evaluation should follow scientific principles.

Finally, in analogy to the 'number needed to treat', which is a crucial outcome variable in pharmacological studies, a 'number needed to prevent' should be included in further studies on the outcome of preventive measures. This could be a valuable indication of the effectiveness of an intervention.

Chapter 6
Conclusions and recommendations

6.1 Conclusions

Indicated prevention is a relatively new branch of prevention, and this is reflected in the fact that various definitions of it exist. Among the approaches examined in this study, several that were not classified by their authors or by governmental agencies as indicated prevention do meet the criteria set out in the current report. There were also reports that claimed to perform indicated prevention, but did not meet any of the necessary criteria. Therefore, as a first step in this report, there was a clear need to develop a definition of indicated prevention. The existing EMCDDA definition of indicated prevention was 'strategies designed to prevent onset of substance abuse in individuals who are showing early danger signs such as falling grades and consumption of alcohol or other gateway drugs'. Thus, indicated prevention is targeted at the individual. Any individual to be elected for an indicated prevention approach must be identified via a screening procedure, or turn up in a given institutional context, voluntarily or involuntarily (e.g. juvenile justice system). The individual shows substance use, but does not fulfil criteria for dependence, and/or shows indicators that are highly correlated with an individual risk of developing substance abuse later in life (such as several child psychiatric disorders, antisocial or dissocial behaviour). This definition allows the targeting of individuals who have not yet started substance use. The aim of indicated prevention efforts is not to prevent the initiation of use, or the use of substances as such, but to prevent the development of dependence.

This definition, detailed in Chapter 1, was applied to the search of the literature and to 'grey literature', especially resources on the internet referred to by the governmental bodies of different Member States. The definition is applicable for classification issues and corresponds very well to the aim of a systematic check of the feasibility of the different approaches. The information collection was therefore guided by this definition in order to describe the principles, concepts and modus operandi of indicated prevention in the field of substance abuse. The study focused on understanding developmental aspects of risk behaviour, mental health problems constituting an individual risk for later dependence, and institutionalised care settings indicating individual selection processes that have taken place beforehand. In analysing these risk factors, a thorough review was made of the literature on well known psychosocial and familial risk and protective factors (substance-related cognitions; peer attitudes; familial substance abuse, lack of parental supervision and attachment) referring to high-risk groups that often present with cumulative psychosocial and individual risks, such as children in foster or institutional care or adolescents in the criminal justice system.

Given the large amount of studies on the risk factors for substance abuse, this review focused on empirically derived subgroups or trajectories that might be important to determine chances of successful indicated prevention in some of these subgroups. The research strategy of this study focused on longitudinal studies using statistical methods such as latent class growth analysis.

A major part in the description of developmental risks was an overview on individual and neurodevelopment perspectives. The growing body of neurobiological and genetic research in the last two decades opens up new insights into developmental pathways. Special risk factors including early maturation and personality or temperamental factors have also been taken into account. A special focus is given to well known child psychiatric psychopathology of disorders associated with a higher risk of developing later substance abuse. Categorical diagnostic approaches such as those of the ICD-10 or DSM-IV were distinguished from dimensional approaches such as those most commonly used in screening questionnaires on behavioural and emotional problems. A European network already exists connecting experts in order to miss fewer diagnoses of ADHD in adult patients with substance use disorders (Trimbos institute, ESAP study). Such an approach for adolescents is overdue – too many go undiagnosed, especially girls.

To be born female is a protective factor as to the risk of later substance dependence. However, if there are accumulating risk factors, the pathway to a substance use disorder seems to open up with a much higher overall risk, and an earlier transition from use to dependence.

There is a body of information showing that externalising as well as internalising psychopathology identified with dimensional instruments is related to a higher risk of later substance use disorder. Children referred for these behavioural problems to a medical institution or a counselling context are often diagnosed with categorical diagnoses such as conduct disorder, ADHD, PTSD and depression. Therefore, the literature was reviewed a detailed description was made of evidence-based treatment standards for these major indicators with respect to later substance abuse. From this it was concluded that children referred to specialised institutions for the treatment of one of these dimensionally described problems and/or diagnosed with one or more (comorbidity) of these disorders are a target population of indicated prevention. The individuals have to be identified by medical or psychological professionals working with children with behavioural problems in a setting that allows for individual attention, such as a private practice, an outpatient clinic, or part-time or full-time inpatient treatment.

These high-risk children are over-represented in institutional settings. This is especially so in institutional and foster care settings, where children with a traumatic and adverse family background who have developed these indicative psychiatric disorders and show early consumption of substances are over-

represented. In different countries these children are cared for in different settings. Foster care accounts for a particularly high proportion of younger children in care, but many European countries are increasingly relying on forms of foster care also for adolescents. Pedagogical institutions for these children (e.g. Foyers, Kinderheime, children's homes) are increasingly confronted with a selection of at-risk children. These children often have multiple placements in care in their short history of life and have been exposed to neglect or abuse by their parents. Often their parents suffer from psychiatric or substance use disorders or both. Thus, there may be a genetic component in this selection process. Research carried out by the current authors has shown that, for example, in the United Kingdom, more than 50% of these children in institutional care have one or more ICD-10 diagnoses with a high impact on everyday life functioning, and that early substance consumption occurs more often than in the general population. At the same time, access to professional care is limited for these groups. In Europe, there are currently hardly any programmes of indicated prevention that focus on children referred to psychiatric institutions for their high-risk behavioural disorders or for children in institutional care.

Incarcerated children also have higher rates of psychiatric disorders and show higher rates of substance use. And this is related to a higher risk of later developing substance use disorders. While in the United States there are plenty of preliminary studies employing motivational interviewing, from the information available it was not possible to confirm the existence of evaluated intramural programmes for juveniles in Europe, even though the appendix lists three programmes of indicated prevention with young offenders (Slovenia, Hungary, Norway). Considering that the United States justice system, with a much higher risk of short-term incarceration, 'shaped' the American programmes, the transferability of these studies may be limited. Though it was not possible to identify many programmes of indicated prevention aimed at incarcerated adolescents, it must be recommended that within the European Union, the development of new approaches of indicated prevention in delinquent children or runaway youth, or in children placed in institutions such as children's homes should be a major focus in the future.

As results from one risk group cannot be transferred to other groups in different situations, specific programmes are necessary for specific populations. In fact, in many countries, approaches in juvenile justice, youth care, social care and medical care are quite separated. There is little coordinated interaction between these fields.

As many identified high-risk individuals are taken care of by pedagogical and psychotherapeutically or medical institutions, the problem arises that often there is no substance use perspective in the everyday work of the professionals in this field. Interfaces between the substance abuse prevention system and the medical and pedagogical care system for high-risk groups are either not defined or insufficiently defined.

Institutionalised adolescents are omitted from nearly all the cohort studies providing information on the natural cause of disorders, as they are based on population samples. In fact, there is little prospective knowledge on cumulative risks and interactions of risks for later substance dependence in these high-risk populations.

The review of programmes from the literature and programmes forwarded by governmental agencies, showed a common lack of evidence-based, well established programmes in this field. Only 13% of the identified indicated prevention programmes forwarded by governments or affiliated associations can be called 'best practice'. A procedure developed by the EMCDDA was used to classify the projects and programmes according to the level of quality.

Among the published evaluation results, the search identified only a small number of empirically sound and effective programmes – 15 out of 21 publications could be counted as best practice models in indicated prevention, and only seven evaluated programmes among the best were European. Taking out one 'double hitter', the whole search rendered 10 programmes that give or are probable to give in the future, an evidence base on indicated prevention. Often, short follow-up intervals or insufficient numbers of participants diminished the evidence of studies. It might be hypothesised that many funders of research and many scientists in the field are more focused on developing new approaches than on evaluating their effects. Perhaps the RCT model of evaluation does not seem appropriate to many of the researchers in the field. Though, if the RCT approach has any role in prevention, a most suitable area must be in interventions based on defined risks in individuals, in approaches that often correspond to an early intervention.

The programmes that can be considered to be best practice centre around different target groups such as emergency room and intensive care patients in the medical system, otherwise identified users, individually assessed children identified in school settings, children of addicted parents, court-referred children. Overall, most of the target group already use substances.

The pathways used to identify children at risk include: self-referral, school screening, peer recruitment, self-rating instruments at school, need of intensive care or other medical treatment relating to substance use, addiction treatment centres for parents.

Most of the programmes use some sort of brief, manualised intervention, such as motivational interviewing, or a parent training programme. All of them also provide for individual needs assessments and cooperate with a variety of help systems. It is clear that in many of the youths recruited for the programmes, substance abuse was a manner of problem-solving.

Three outstanding programmes were identified: the Dutch approach to empowerment of young delinquents who are users (UCPP), the Swiss projects of individualised offers in different areas (Supra-f), and the German approach for binge drinkers in intensive care (HaLT).

The following conclusions can be made. First, there is a clear need for new programmes for at-risk groups that until now have received little attention, such as children in foster care or children placed in institutions and/or child psychiatric patients. Secondly, in all the fields where children with problem behaviour are screened in schools, in a family, in peer recruitment, or work context the instruments used to identify these groups must be harmonised across Europe. Finally, those interventions that were found to meet the highest standards in the classification (level 3) should be implemented in other countries – if necessary, adapted to national systems and culture.

6.2 Recommendations

Given these conclusions, the following recommendations can be made (in italics), with short explanations given.

6.2.1 Definitions

A common definition is needed. This should be based on the EMCDDA definition presented in this report. A European consensus should be achieved on the definitions of the two related fields of indicated prevention and early intervention.

Early intervention is, as defined here, located in the overlap between indicated prevention and treatment, and therefore has a strong association with the medical field. The relative importance of early intervention may vary between countries depending on the capacities, roles and performance of their educational, health and justice systems.

6.2.2 Research

As the professional background of care providers influences their methodological thinking, and as prevention will always be an interdisciplinary task, common standards of programme description, evaluation and implementation are needed.

In the more medicalised field of early intervention, the RCT paradigm of evaluation may be generally accepted, but this review has shown that a control group based approach with sufficient numbers to prove the efficacy of a model programme is quite rare. Thus, EMCDDA quality characteristics as described by Hillebrand and Burkhart (in press) are seldom adhered to. On the other hand, the intervention in itself must allow for a certain flexibility as individualisation is part of the definition.

The impact of risk factors in different cultures and subcultures must be assessed and weighed.

The review of the research literature showed that there is no scientifically based weighing of risk factors. Therefore, based on statistical laws such as Bayes's theorem, not a single identified predictor in one country (including the United States, rendering most of the studies found) might have the same impact in another European country with a different cultural background. A meta-analysis of identified risk factors in given subpopulations could help to weigh effect sizes of risk and protective factors.

Funding institutions should no longer focus on a multitude of approaches and the diversity of innovative programmes that could reach new populations. Instead, research should now focus on replication and enlarging the body of evidence in indicated prevention.

In addition to studying the effectiveness and efficacy of these programmes, they should also be evaluated for potential long-term harm and side-effects.

The review demonstrated that evaluation periods often were very short, and it is known that many negative side-effects of interventions might be rare (therefore not addressed in an RCT) or of late onset (also not addressed in an RCT). Long-term follow-ups of naturalistic populations and of populations included in RCTs are needed. Therefore, those included in an RTC should be invited to participate in an ongoing intervention of their own choice (comparable to an open label extension), for as long as they choose, after the trials.

6.2.3 Programmes

To achieve the above recommendations, there is a need for manualised, replicable programmes of indicated prevention, translated in different European languages, based on accessible diagnostic instruments with empirically derived, culturally valid norms (a list of instruments is provided in the appendix).

New programmes should target all risk groups, even if many of these individuals are not easily accessible and not easily retained in a programme, not excluding 'bad risks'.

New programmes should be developed in a focused research effort for children in foster and institutional care and children in medical or psychological care for behavioural and emotional disorders, who are prone to substance use. Programmes should be able to make offers to drop-outs, to mentally retarded adolescents and to those already 'seen' and care for, alike.

6.2.4 Ethics

An ethical debate on national versus individual interests and on the possible enforcement of prevention is needed.

Indicated prevention approaches focus on risks with a high impact on functioning. More information is need on the weight of different risks in different situations in order to address ethical questions of individual (parent–child) decisions and compulsory treatment or prevention. The approaches taken in different countries, especially in the juvenile justice system, may differ.

6.2.5 Policy

The problem of a multitude of co-responsibilities in the interface between different institutions and areas of shared concern between systems has to be addressed at both national and European level. A European debate on policies regarding adaptability, transfer and impulses for research in service provision is needed.

Systems differ tremendously as to the provision of care for adults and for children, for legal and illegal substance users, for prevention and early intervention. The transferability of programmes across Europe is also threatened by lack of system flexibility and by non-shared information, even though in the public opinion as well as in health economics, addiction and dependence are major issues, and will remain so for years to come. There might even be a need of new developments 'de lege ferenda' (meaning 'what the law ought to be', as opposed to what the law is at the moment).

Aspects of gender and cultural diversity have to be addressed when defining an overall European strategy. Studies should recruit adequate proportions of females (in substance users 25–33 %) and ethnic minorities (depending on the national microcensus), or at least specify the population included by gender and cultural background.

Most of the information currently available comes from studies that recruited male subjects in English-speaking or Scandinavian countries.

The implementation of evidence-based programmes of indicated prevention of substance use disorders needs an integrated interdisciplinary approach.

As findings from neurobiology show that addiction and some child psychiatric disorders share common biological foundations within the dopamine system (the reward system in the brain), modern approaches to prevent addiction in individuals should be able to address a higher biological risk. Biological and social risks ought to be identified on the individual level and selected by a screening procedure or referral. This has to be based whenever possible on the knowledge base, concerning the pathophysiology and the treatment of developmental disorders with special regard to the dopaminergic reward system. A theoretical basis of interventions in that field should include childhood psychopathology and the biological function of early smoking and early alcohol consumption in the development of later substance abuse in high-risk individuals as well as the interaction of these factors with family dysfunction, deviant peer groups, and school, recreational and vocational failures. Cooperation between the medical field and pedagogical and psychosocial domains is needed to solve the challenges in indicated prevention of substance abuse in children and adolescents. On the other hand, indicated prevention seems a promising approach, as far as is known, especially for youngsters in a multiproblem context.

The health economics of systems dealing with children and adolescents with drug problems should be analysed first, if decisions are to be made in the light of the costs and benefits of different treatment options.

Considering that the allocation of resources may vary among European Member States, public health or health economic analysis of the costs and benefits of these interventions should be made for each country.

6.3 Final remarks

There are several limitations to this review, however. First, the research group was able to read English, French, Polish, Spanish, German, but not all other European languages. Thus, some internet sites named by governmental bodies were not accessible for analysis, and the search might have missed some programmes.

Secondly, the information given was evaluated without any further search being made. Thus, it is possible that programmes that provided no information on evaluation have, nevertheless, been evaluated. Such programmes will have been considered 'unevaluated' in this report, and will have been given a lower rating than they would otherwise have received.

Thirdly, searching the literature by screening abstracts might also have led to some relevant papers not being included. This applies particularly to reports not published in peer-reviewed journals, which are not accessible by a systematic literature search and will to a large extent have escaped attention.

Fourthly, expert ratings and qualitative analyses are prone to personal biases that, due to limited time and resources, could not be eradicated by doing the same process double-blind or twice.

Fifthly, the translation of the accumulated knowledge and best practice models into politics will have to be deepened by policymakers in the various countries. From this search, nothing can be said about the transferability of one national model to another nation, and nothing can be said about prevention as a whole in the respective countries – only a general overview on all activities in universal, selective and indicated prevention might give a realistic picture.

As a first step for the future, this study recommends a new programme of the European Union in indicated prevention with two major foci.

First focus: large trials with established best practice programmes for at-risk individuals identified by screening methods in different contexts. These programmes should pay special attention to the feasibility of a study roll-out in the community, in the sense of external validity, and on the interrelations and synergies of different services and care systems within a given society.

Second focus: development, description and manualisation, evaluation and implementation of new specific programmes for children referred to psychiatric or psychological institutions, for children in foster and institutional care and perhaps for incarcerated adolescents. Special attention should be given to determining the feasibility of these programmes, based on cost-benefit analysis with particular attention to the frequency of interventions.

Summary

Indicated prevention describes a preventive individualised approach targeted at individuals at high risk of developing substance abuse or dependence later in life. The need for indicated prevention is defined by the existence of strong indicators for the development of a later (not as yet present) substance use disorder. The target is the individual identified by screening procedures or who turns up voluntarily. Instruments used for such screenings are presented along with their sources.

Individual risks include early developmental problems such as sleep problems, externalising and internalising behaviour problems, several child psychiatric disorders (ADHD, conduct disorder and especially the association between these two, depression), post-traumatic stress disorder and events leading to it (e.g. childhood abuse, neglect), school failure, dissocial behaviour and delinquency. Personality traits such as sensation-seeking may also contribute. Social learning variables including peer attitudes (prevalence of norms favourable to deviant behaviour), as well as personal approval (adoption of deviant norms) constitute separate risks. In addition, academic failure and problems related to school contribute to risk situations. Family factors such as familial substance use or abuse and lack of parental supervision constitute additional risks. Generally, boys are at a higher risk for substance use than girls.

Identified high-risk groups include adolescents in foster or residential care.

Subtyping individuals according to a common trajectory of substance use may be promising for detecting early antecedents and predicting outcomes for each subgroup separately.

As explained in the chapter on neurobiological mechanisms, psychiatric disorders and substance abuse are linked. Psychiatric disorders in childhood and adolescence predispose the individual to addictive behaviour and addiction, and consumption of substances (alcohol, cannabis, cocaine) can lead to relapse to psychiatric disorders. The cerebral neurotransmitter systems, and especially the mesolimbic dopaminergic system, are affected in psychiatric disorders; as a result, addictive behaviour emerges much more rapidly. Genetic and environmental factors shape synaptic structure and function. This is the part of the network that can be pathologically modified in psychiatric disorders, which may increase its vulnerability to the changes necessary for the development of addiction. Influences from the environment can also lead to changes in the morphology of the brain; a better understanding of neurobiology cannot lead to mere biological determinism, as it must take into account the role that external factors might play. The challenge for neurobiology, in this area, is to explain how certain factors affect the development of the brain in such a way as to lead to a greater risk of the development of substance use disorders.

The aim of indicated prevention efforts is not to prevent the initiation of use or the use of substances, but to prevent the development of a dependence, to diminish the frequency of substance use and to prevent 'dangerous' patterns (e.g. moderate instead of binge-drinking).

Guided by this definition the scientific literature was systematically searched for reports on indicated prevention. In addition, governmental agencies in Europe were approached for information on their indicated prevention projects.

An expert consensus team rated the abstracts identified by the literature search, and selected 150 papers for review as full text versions. Of these, only 21 clearly described programmes of indicated prevention. Out of the 21 recent (since 2000) publications, 16 could be classified as programmes on level 2–3 (promising or model projects). Six out of the 16 programmes originated in Europe, among these, four qualified for level 3 (model projects).

Most of the programmes from the United States and other anglophone countries such as Australia and the United Kingdom are designed for adolescents after drug use initiation. The few programmes from other European countries refer to school identification, school-based programmes and individual group therapy, for adolescents with identified problem behaviours or specific psychiatric disorders.

Interventions often were of high frequency, used manualised interventions such as motivational interviewing, or a parent training programme. To address issues specifically related to drug or alcohol use, existing therapeutic interventions (such as cognitive behavioural therapy or family therapy) are sometimes used with only minimal changes.

Programmes forwarded by governmental bodies were classified as indicated prevention if they had a distinct preventive intervention with a defined target group, a defined duration and frequency and an evaluation process (optional). All programmes were rated through a consensus process. The programmes thus classified as 'indicated prevention' were in each case described schematically according to the EMCDDA's logic model.

On the 53 internet sites named or from the information given on paper, 23 programmes were categorised as indicated prevention. The evaluation procedures met level 3 standards in one case, level 2 standards in two cases (8.6%), level 1 in five cases (21.7%). 15 programmes (65.2%) could not be rated on any level or did not give sufficient information. Two programmes met the required standards of indicated prevention, with level 3 evaluation. The majority of programmes were set up without any evaluation (or without sufficient information on evaluation).

The 21 programmes of indicated prevention originated from the Netherlands (6), Poland (3), Hungary (2), Spain (1), Norway (2), United Kingdom (2), Germany (1), Switzerland (1), Slovakia (1), Czech Republic (1) and Liechtenstein (1).

Mostly, the programmes tried to reach children and adolescents with social and/or behavioural problems or children from families with drug related or psychological problems.

The interventions mainly consisted in group work focused on reinforcing self-esteem and stimulating positive interactions and leisure activities, including sports or cultural and creative activities. Some of them focused on emergency room visits or police contacts due to the sequelae of drug and alcohol consumption.

All of the programmes include individual needs assessment. They all cooperate with a variety of help systems, though very few of them do referrals to neighbouring help systems in the sense of systematic 'care pathways'. Cooperation between the medical field and the pedagogical and psychosocial domains is needed to meet the challenges in indicated prevention of substance abuse in children and adolescents. Yet, indicated prevention seems a promising approach, especially for youngsters in a multiproblem context.

Further trials with established best practice programmes are needed, with special emphasis on their transnational transferability and cost-effectiveness. In fields where programmes exist and are described in the present report, the emphasis should not be on developing new programmes. Rather, in these cases, what is needed is evaluation and replication in different countries. For some sectors, such as children in institutional care, programmes should be developed and evaluated.

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Brain Briefings: The adolescent brain. Retrieved September 17, 2007, from http://www.sfn.org/index.cfm?pagename=brainBriefings_Adolescent_brain

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http://www.who.int/substance_abuse/publications/en/Neuroscience

Stanford Encyclopaedia of Philosophy: http://plato.stanford.edu/

Appendix

Assessment instruments

In the following, a list of instruments for screening or assessing the degree of specific psychopathological disorders is given. The list is compiled according to frequency of use in scientific literature, psychometric evaluation, availability of norm data in different countries, and recommendations in guidelines, but should not be treated as a definitive selection. Adequate assessment instruments should always be chosen in the context of the design of a study.

Screening for psychopathology

Self-report:

Youth Self Report (YSR – Achenbach, T.M. 1991. Manual for the Youth Self Report. Burlington: University of Vermont, Department of Psychiatry).

YASR (Young adult version of YSR)

Strength and Difficulties Questionnaire (SDQ – Goodman, 1997). Age: 4–16 years (public domain).

Available at: http://www.sdqinfo.com

Rating by others:

Child Behaviour Checklist (CBCL – Achenbach, T.M. 1991. Manual for the Child Behavior Checklist/4–18. Burlington: University of Vermont, Department of Psychiatry).

YABCL (Young adults version of CBCL)

Strength and Difficulties Questionnaire (SDQ – Goodman, 1997). Age: 4–16 years (public domain).

Available at: http://www.sdqinfo.com

Diagnostic interviews

There are several clinical semi-structured diagnostic interviews, e.g. the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) (http://www.wpic.pitt.edu/ksads/default.htm) or the Diagnostic System for Mental Disorders in Childhood and Adolescence (DISYPS-KJ).

These diagnostic systems also include checklists for assessing the severity of several specific disorders, e.g. the DSM-IV criteria check list for ADHD (American Psychiatric Association, 2000).

Assessment of depression

Self-report:

Center for Epidemiologic Studies – Depression Scale (CES-D – Radloff, 1977, public domain).

Beck Depression Inventory II (BDI-II – Beck, Steer and Brown, 1996. San Antonio, TX: The Psychological Corporation).

Rating by others:

Child Depression Rating Scale-Revised (CDRS-R – Poznanski, E.O. and Mokros, H.B., 1996. *Children's Depression Rating Scale, Revised (CDRS-R) Manual*. Los Angeles, CA: Western Psychological Services).

Assessment of anxiety

Self-report:

State–Trait Anxiety Inventory for Children (STAI-C – Spielberger, C.D., Edwards, C., Lushene, R. Monturi, J. and Platzek, S. 1973. *The State–Trait Anxiety Inventory for Children*. Palo Alto, CA: Consulting Psychologists Press).

Assessment of aggression/delinquency

Subscales of the YSR and CBCL

Assessment of ADHD

Subscales of the YSR and CBCL

Programmes categorised as 'indicated prevention programme'

Name: **Children's day care**
Prevention: Indicated
Country: Czech Republic
Target group: Children aged 6–15 years, referred by psychiatrists, detention centres, municipal social departments etc. because of serious problems with communication and behaviour
Description: Structured group programmes and individual programmes if needed. Regular weekend and holiday activities are organised as well
Initiation: Since 2003
Frequency: 'Once a week in four different groups'
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **At-risk groups and families**
Prevention: Indicated
Country: Hungary
Target group: Young people with social problems and/or learning difficulties and/or living in deprived neighbourhoods
Description: Camps and clubs, recreational activities, joint recreation of parents and children, party service
Initiation: Not specified
Frequency: Not clearly defined
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Prevention in prisons**
Prevention: Indicated
Country: Hungary
Target group: Inmates
Description: Educational documentary series of nine video-tapes, discussions in group activities – parents of juvenile delinquents may organise meetings in which they are also informed on anti-drug activities
Initiation: Since 2003
Frequency: 3- to 5-week intervals
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Psycho-educational family intervention**
Prevention: Indicated
Country: Netherlands
Target group: Families where one or both parents have a severe psychological problem, with at least one child in the 8–14 age group
Description: Support communication in family; enhance children's resilience; increase understanding for disorder; provide information on early signs of depression in children
Initiation: Not specified
Frequency: Seven sessions alternately with parents and children separately and with everyone together
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Tailor made prevention**
Prevention: Indicated
Country: Netherlands
Target group: Families where one or both parents have a severe psychological problem, with at least one child
Description: Providing parents and children with targeted information and support. Dealing with the seriousness of the problem potentially facing the child and improve parental capability
Initiation: Not specified
Frequency: Not specified
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Doing and talking group CPPP 8–12**
Prevention: Indicated
Country: Netherlands
Target group: Youngsters with one or both parents with psychological or addiction problems
Description: Explain and understand home situation; provide support, contact among people in the same situation, reinforce social and emotional skills
Initiation: Not specified
Frequency: Not specified
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Group course CPPP 12–15**
Prevention: Indicated
Country: Netherlands
Target group: Young people with one or both parents with psychological or addiction problems
Description: Explain and understand home situation; provide support, contact among people in the same situation, reinforce social and emotional skills
Initiation: Not specified
Frequency: Not specified
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Group course CPPP 16+**
Prevention: Indicated
Country: Netherlands
Target group: Young people with one or both parents with psychological or addiction problems
Description: Group course via internet, explain and understand home situation; provide support, contact among people in the same situation, reinforce social and emotional skills
Initiation: Not specified
Frequency: Not specified
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: **Mother–baby intervention**
Prevention: Indicated
Country: Netherlands
Target group: Mentally ill mothers with babies

Description: Stimulate the positive interaction between the mother and baby
Initiation: Not specified
Frequency: Not specified
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: Increasing the number and availability of therapeutic services for co-dependents and other members of alcohol-dependent families
Prevention: Indicated
Country: Poland
Target group: Family members of alcohol dependent persons
Description: training courses
Conducting research and evaluation focusing on disorders suffered by the alcoholic's family members
Announcements and publications in specialised press and magazines
Initiation: Since 1999
Frequency: Not specified
Evaluation: 1998–2002
Level: 2

Name: Development of socio-therapeutic club rooms
Prevention: Indicated
Country: Poland
Target group: Children from families with alcohol related problems
Description: Increase the competence of staff and tutors, dissemination of work technologies, increase accessibility of socio therapeutic institutions, develop network of support groups
For children: 'Parpusiak bears family'; 'Together jauntfully'
Initiation: Since 1999
Frequency: Not specified
Evaluation: Research programme 1999–2002
Level: No level of evidence-based evaluation

Name: Children coming from families who have alcohol-related problems, staying in care-educational centres
Prevention: Indicated
Country: Poland
Target group: Children from families with alcohol-related problems
Description: Work out psycho-educational work methodology for children coming from families with alcohol related problems deserving special attention
Initiation: Pilot programme since 2000, training programme since 2003
Frequency: Not specified
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: Development of secondary and tertiary prevention of drug addiction among children in court-imposed institutional care
Prevention: Indicated
Country: Slovakia
Target group: Inmates of institutional care facilities
Description: For work with children and youth addicted to drugs, creation of two specialised educational groups in children's homes for children and youth exposed to the threat of drug addiction
Initiation: Not specified
Frequency: Not specified
Evaluation: Qualitative interpretation
Level: No level of evidence-based evaluation

Name: Institutional model (MulitfunC)
Prevention: Indicated
Country: Norway and Sweden
Target group: Young people with severe behavioural problems
Description: Residential treatment of behaviour problems
Initiation: Since autumn 2005
Frequency: Currently
Evaluation: Of the implementation process (IMS) and the treatment effects (Behavioural Centre, Oslo)
Level: 1

Name: Supra-f
Prevention: Indicated
Country: Switzerland
Target group: Youth at risk (of delinquency, drug use, depression, anxiety, conduct disorder, problems at school)
Description: Different programmes between 3–42 h/week supporting and structuring the children's lives
Initiation: Since 2000
Frequency: 3–42 h/week
Evaluation: 2003 and 2006 – still following up
Level: 3

Name: Every child matters
Prevention: Indicated
Country: United Kingdom, a number of High Focus Areas have been selected. These areas will be expected to make more rapid and sustained progress in implementing the vision and priorities set out in this plan during 2005/06. They include deprived or high crime areas where drug misuse problems are prevalent.
Target group: Children of problem drug users, young people in contact with the criminal justice system. Persistent truants and school excludees. Children in custody.
Description: The twin objectives of the work in the high focus areas are: to develop and test a best practice model for wider dissemination; and to make an early and sustained impact on delivery of drug services for children and young people.
Early assessment of all vulnerable children and young people in key risk groups for drug

misuse problems, as part of wider needs assessment
Care management and appointment of a lead professional for all children and young people who need support and intervention on drug misuse, in line with Every Child Matters: Change for Children
Integrated information systems to help agencies work together to track interventions with individual children and young people

Initiation: April 2005
Frequency: Not specified
Evaluation: On-going self-evaluation and annual performance assessment. Local areas will be expected to monitor their own performance against the five outcomes, and as part of the annual assessment process they will provide a self-assessment each spring. There then follows a review meeting involving inspectorates, central government field forces and local partners each summer, following which a rating is provided by the inspectorates for children's services
This rating provides the score for the children's services element of the Comprehensive Performance Assessment. Children's services in an area will also receive a Joint Area Review, initially on a three-yearly cycle
Level: 1

Name: Community-based interventions to reduce substance misuse among vulnerable and disadvantaged children and young people

Prevention: Indicated
Country: United Kingdom
Target group: Disadvantaged people under 25 for (1) and (2). Children under 12 for (3) and (4). People under 25 with problematic substance misuse for (5)
Description: (1) Developing and implementing a strategy to reduce substance misuse among vulnerable and disadvantaged people under 25 years
(2) Use existing screening and assessment tools to identify vulnerable and disadvantaged children and young people aged under 25 who are misusing – or who are at risk of misusing – substances
(3) Family-based programme of structured support over 2 or more years, drawn up with the parents or carers of the child or young person and led by staff competent in this area
(4) 'Group-based behavioural therapy' over 1 to 2 years, before and during the transition to secondary school. Sessions should take place once or twice a month and last about an hour
(5) Motivational interview (one or more if needed)
Initiation: Since July 2004
Frequency: Different for each part
Evaluation: Evidence-based, evidence lack shown; update and evaluation planned between 2010 and 2012
Level: 1

Name: Educational intervention after violation of protection of minors rules

Prevention: Indicated
Country: Liechtenstein
Target group: Adolescents breaching the legal protection for children and young persons
Description: If adolescents breach the legal protection for children and young persons, they get an admonition. If it is a repeated or a serious offence, adolescents together with their parents get an invitation for an interlocution in the social office, where possible reasons and solutions are considered. After that they decide on the educational measures to be taken. In Liechtenstein, this procedure is positioned in the law
Initiation: 2000
Frequency: Individually based
Evaluation: Unspecified evaluation
Level: 1

HaLT

Name: Bundesprojekt Hart am LimiT — HaLT Lörrach — HaLT Rostock — reactive

Prevention: Indicated
Country: Germany
Target group: Under 150 adolescents in intensive care after binge drinking
Description: Accumulation of data on coma drinking nationwide; find out about reasons for risky alcohol consumption; find out about peer circumstances; find out about underlying psychiatric disorders and initiate therapy and rehabilitation if advisable. To prevent repeat visits to intensive care for problems related to alcohol
Initiation: 2003 first phase, 08/2004 extended phase
Frequency: Individually scheduled, minimum two sessions, all types of counselling and treatment
Instruments: Research questionnaire and monitoring sheet
Evaluation: Programme designed questionnaire, statistics and report by PROGNOS AG, Switzerland
Level: 3

Name: Juvenile contract

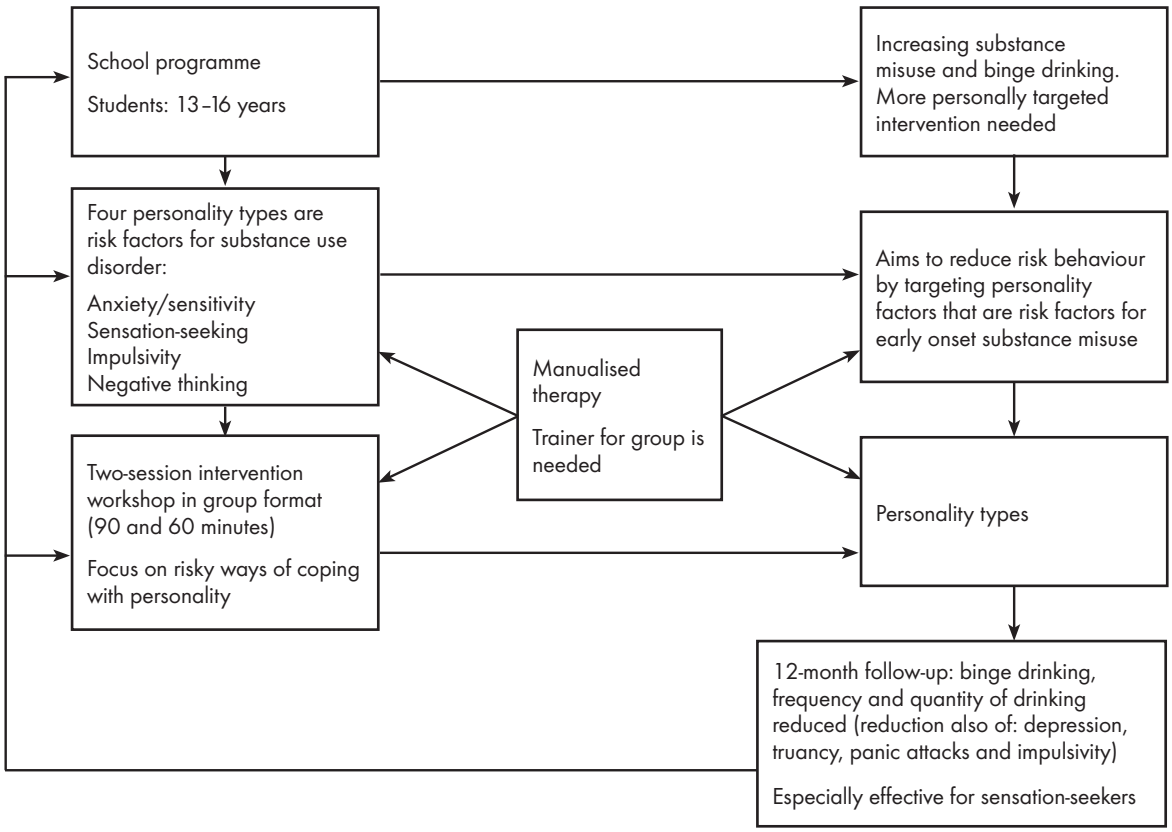
Prevention: Indicated
Country: Norway
Target group: Young offender
Description: Agreement between a young offender on the one side and police and the Municipality on the other side. The intention of the contract is to stop the development of a criminal life style. The contract contains normally a mixture of sanctions and positive incentives. So far our experience with such contracts is limited
Initiation: Not specified

Frequency: Individual
Evaluation: Not specified
Level: No level of evidence-based evaluation

Name: Early detection and treatment of adolescents at risk for addiction
Prevention: Indicated
Country: Spain
Target group: Persons with risk factors according to Screening on Risk Factors in Schools, e.g. ADHD, aggression, depressive withdrawal
Description: The aim of the programme is to reduce risk factors and build up protective factors to prevent drug abuse. The main interest is the person, his wellbeing and the prevention of future problems. The programme offers an intervention for the parents, the pupils and the teachers. For identification, screening instruments are used, e.g. CSAT, EDAH, ADI, DAP, ADIS, PESQ
Initiation: Not specified
Frequency: Not specified
Evaluation: Mentioned, but not specified
Level: 1

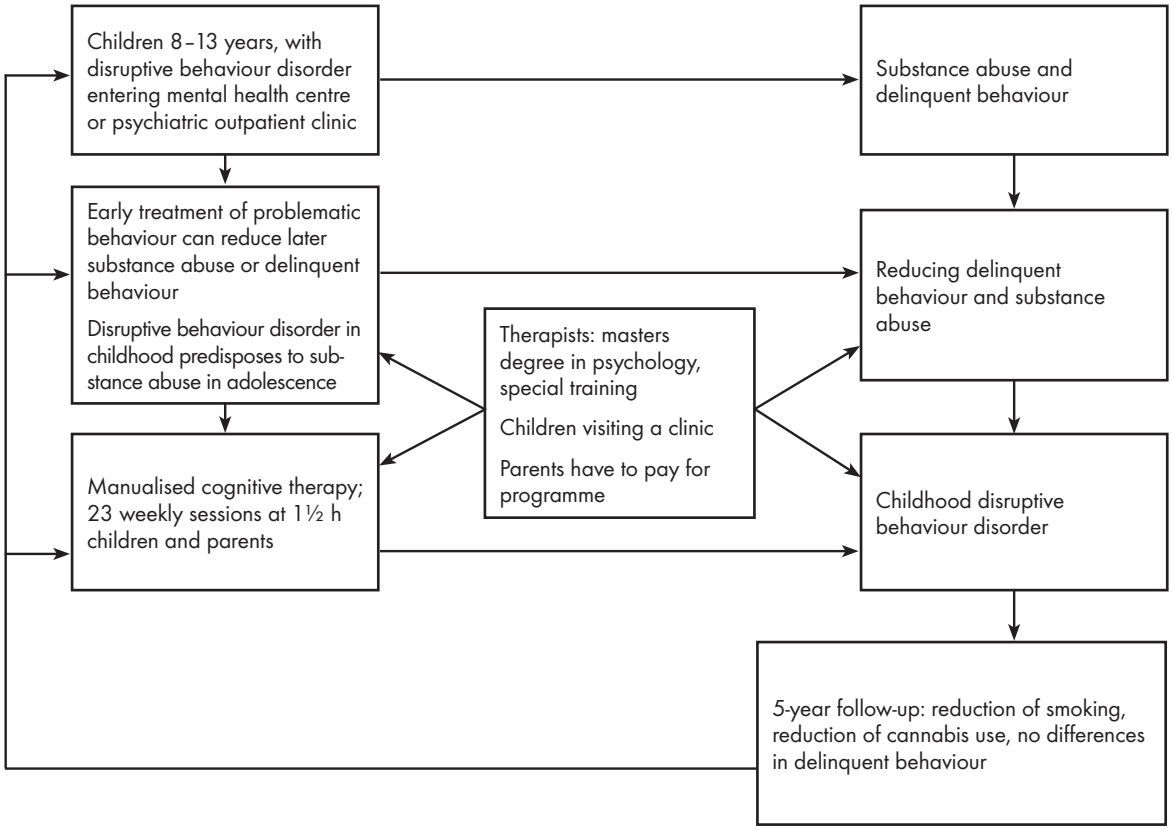
Name: Empecemos — multi-component intervention for behavioural problems in primary education prevention:
Country: Spain
Target group: Children between the ages of 8 and 10 with disruptive behavioural problems in the classroom (impulsiveness, aggressiveness, attention problems, hyperactivity)
Description: The programme includes specific components for parents, children and teachers. In total, 21 children, 26 families and 33 teachers have been reached through the implementation of the programme. It has also enabled the feasibility of the different components of the programme to be verified, and helped improve its coordination, while providing initial results on its efficiency and its reception by parents and teachers
Initiation: January 2005
Frequency:
Level: 3

Logic models of programmes on indicated prevention from the literature



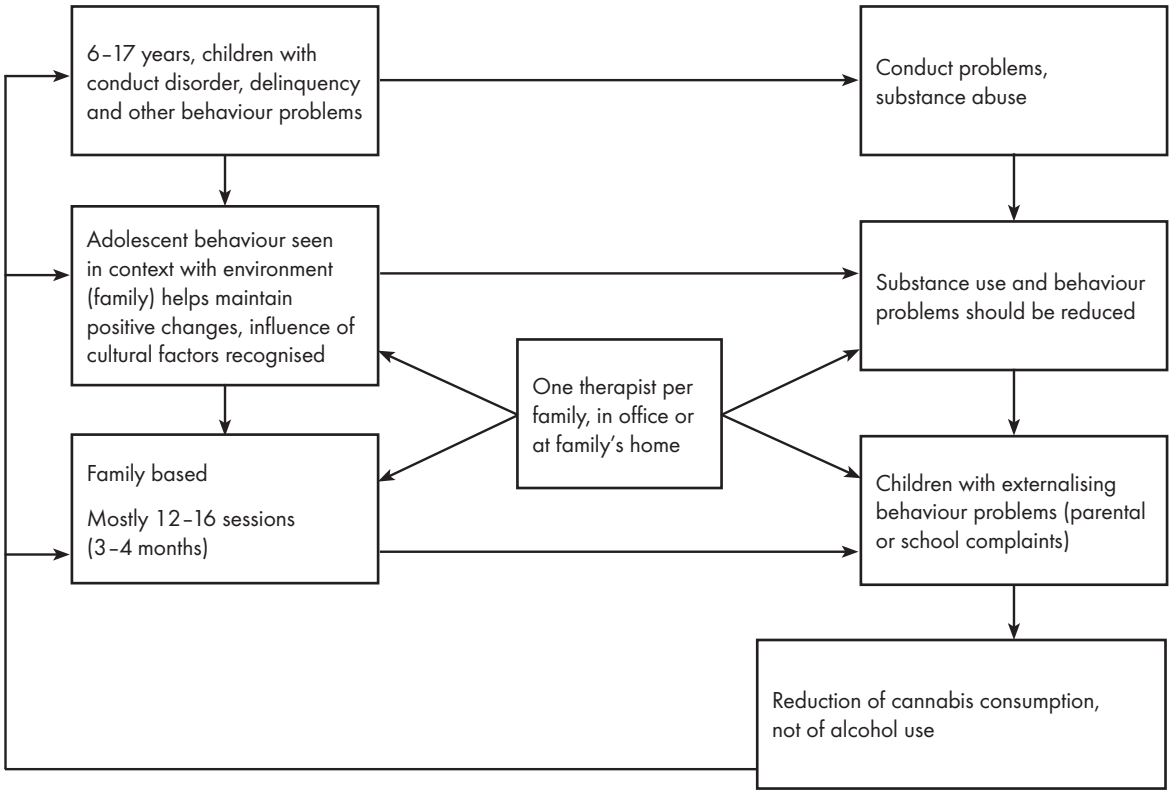
Preventure: Sully and Conrod (2006)

Level: 3



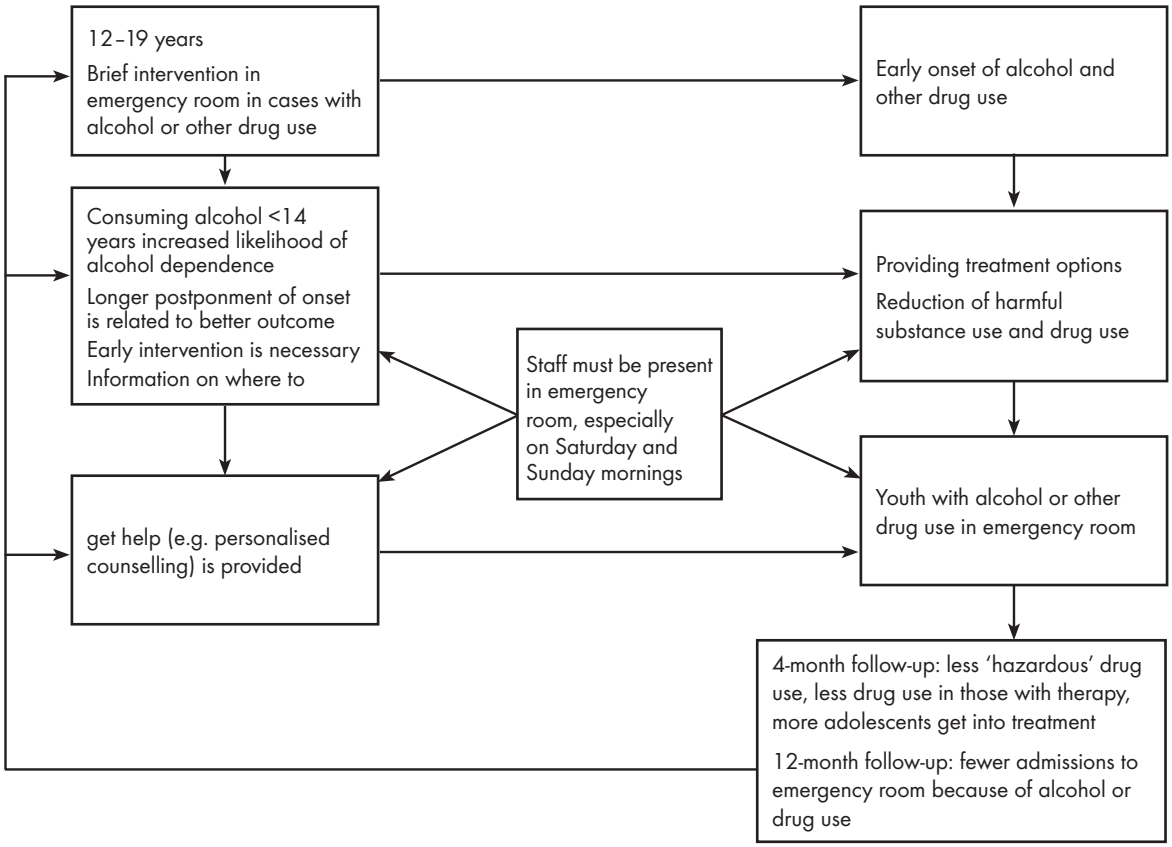
UCPP: Zonnevylle-Bender et al. (2007)

Level: 3



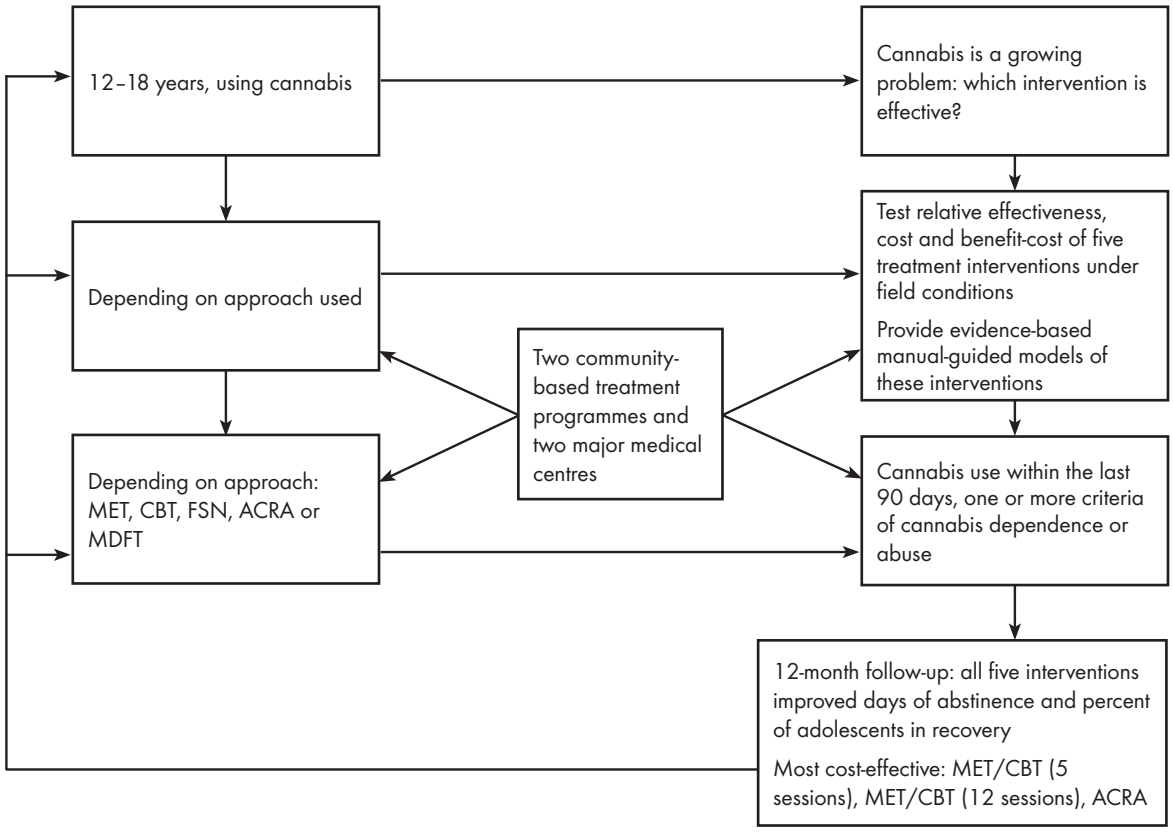
BSFT: Robbins et al. (2002), Santisteban et al. (2003)

Level: 3



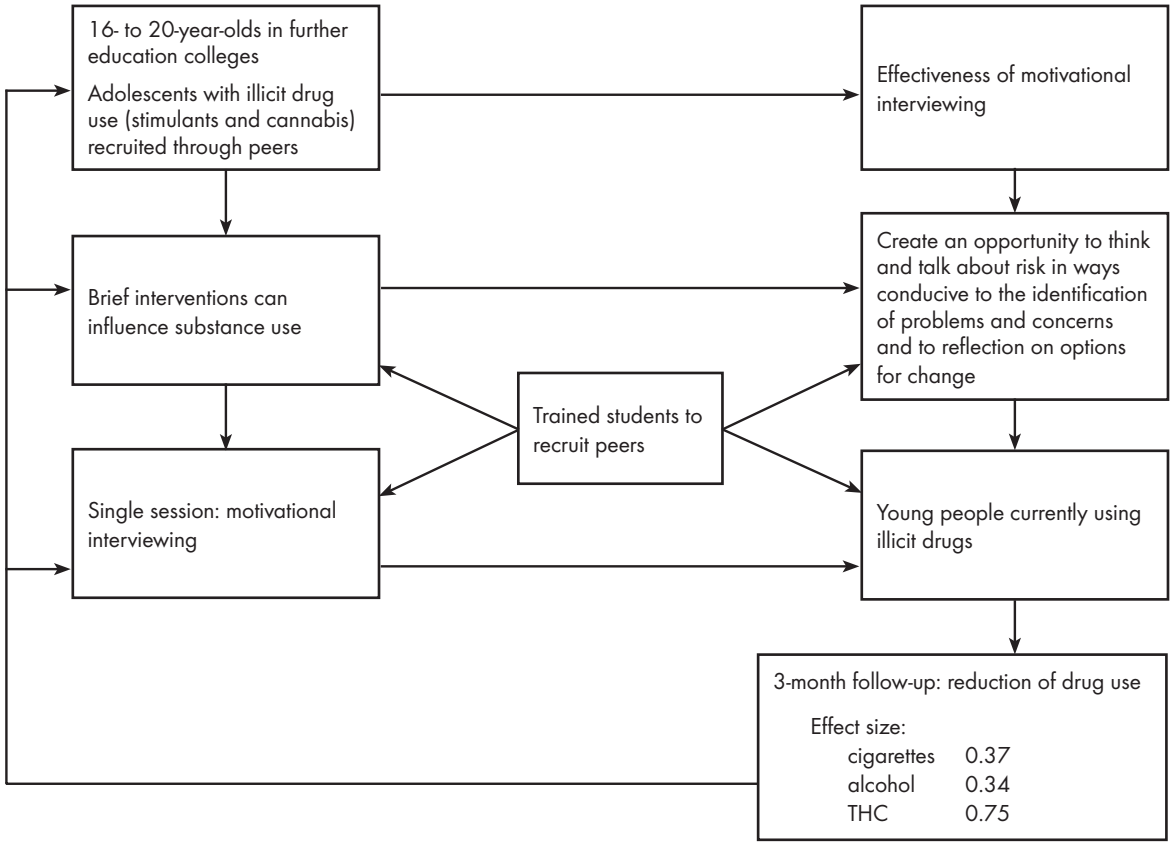
Tait et al. (2004)

Level: 3



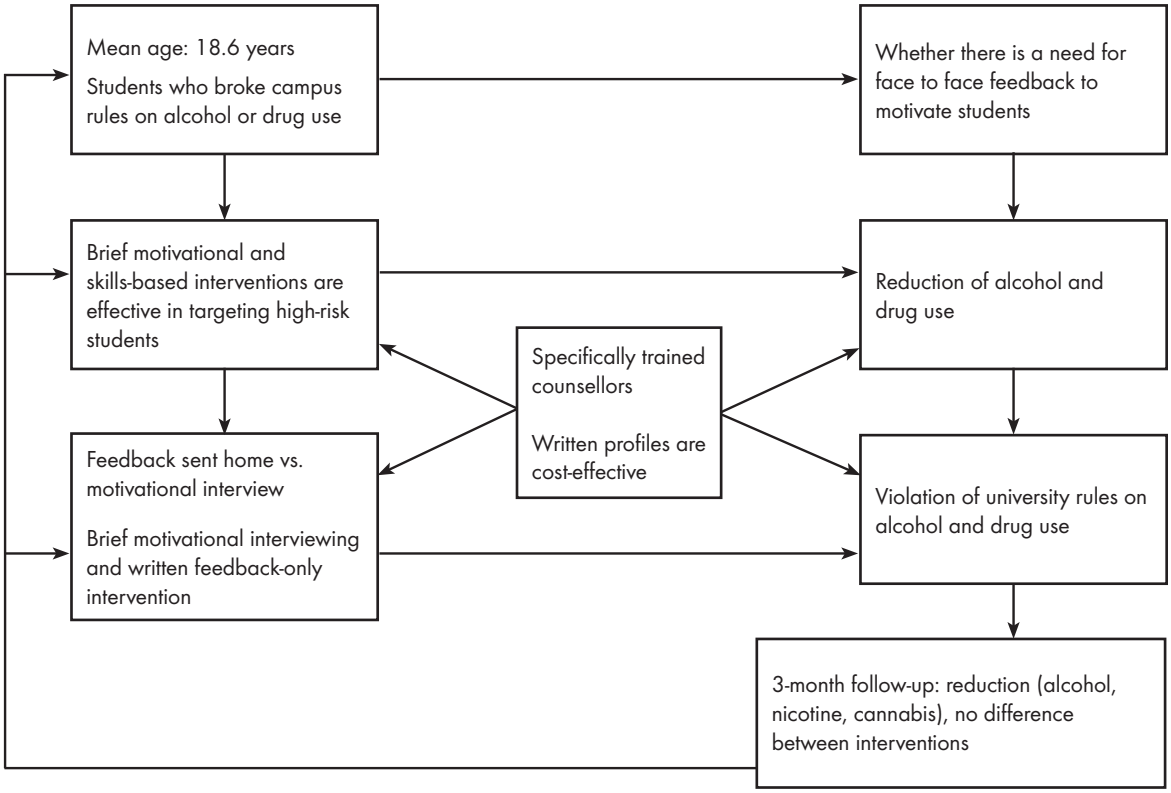
CYT (Cannabis Youth Treatment), Dennis et al. (2002, 2004b)

Level: 3



McCambridge and Strang (2004)

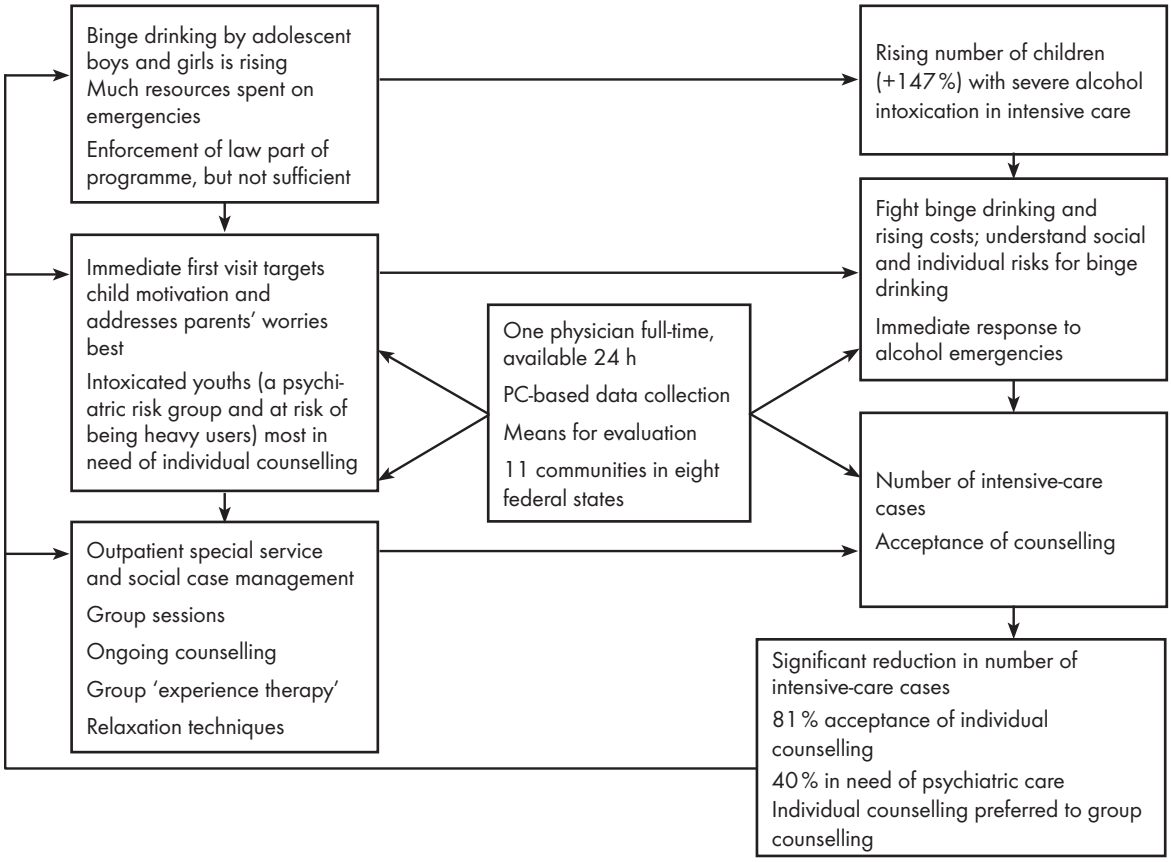
Level: 3



White et al. (2006)

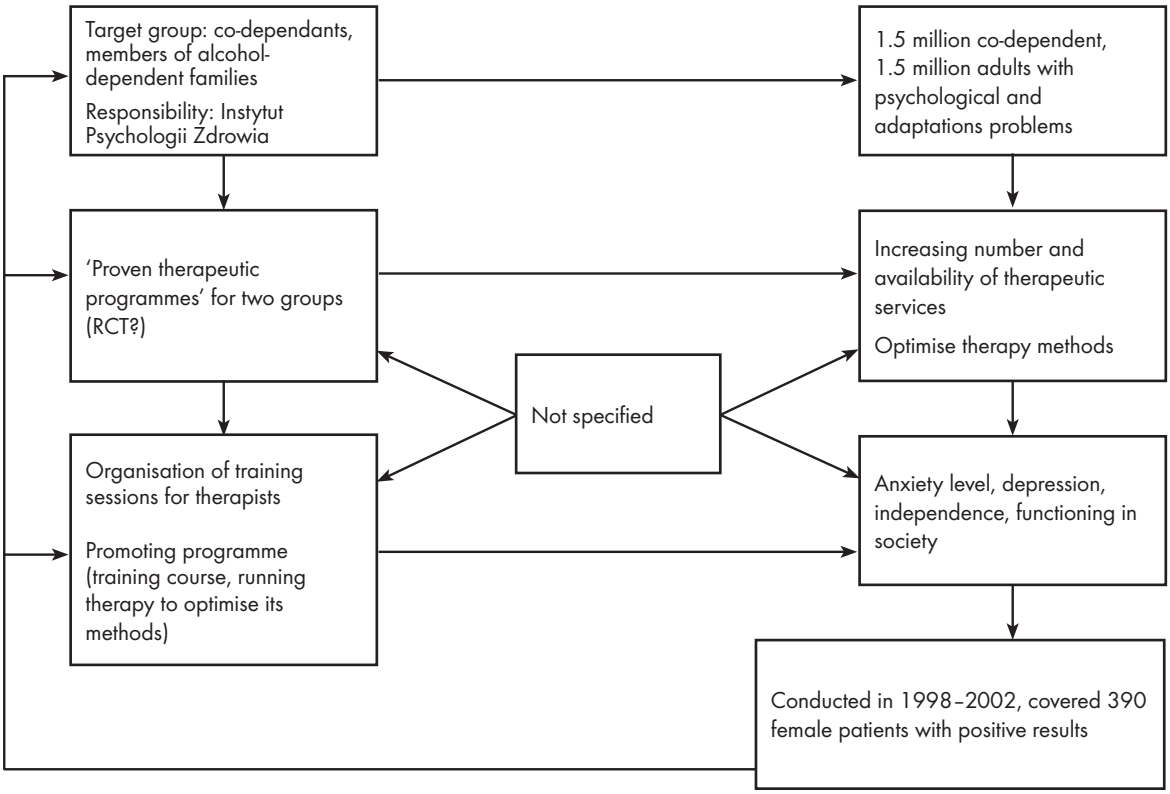
Level: 3

Logic models of programmes on indicated prevention from European governmental agencies



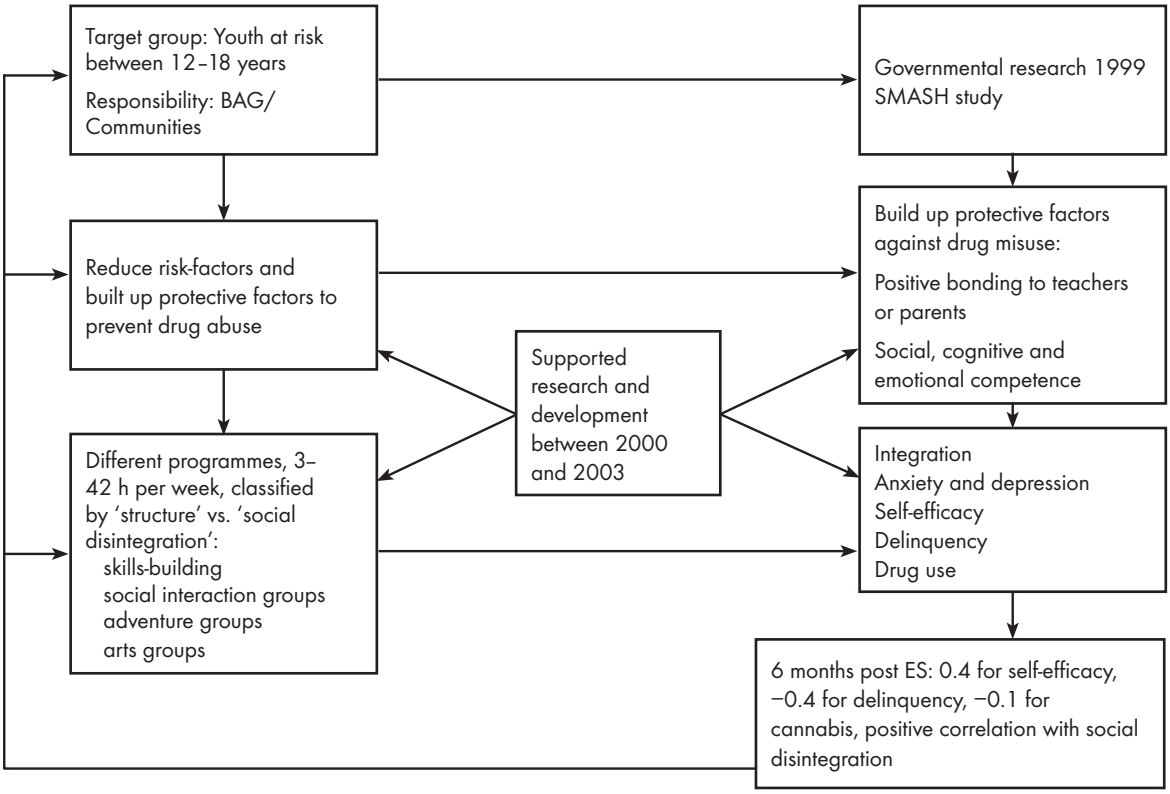
Germany, HaLT

Level: 3



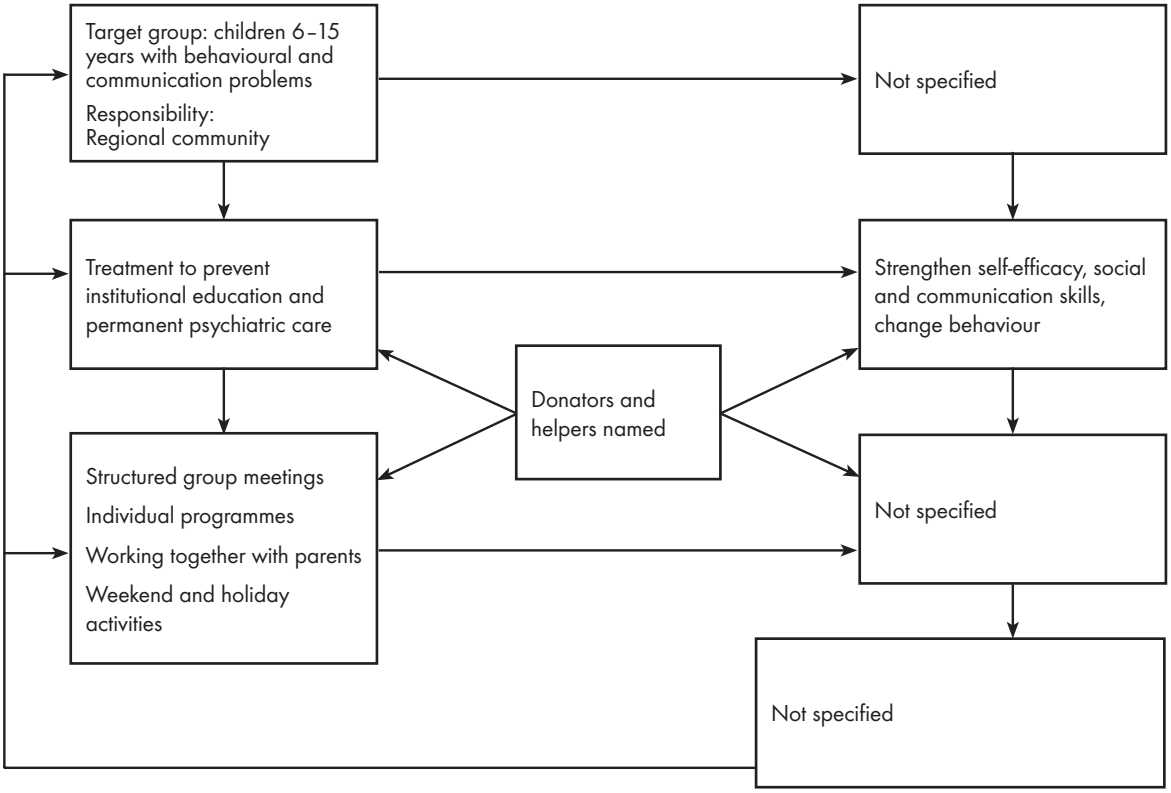
Poland, 'Increasing the number and availability of therapeutic services for co-dependents and other members of alcohol-dependent families'

Level: 2



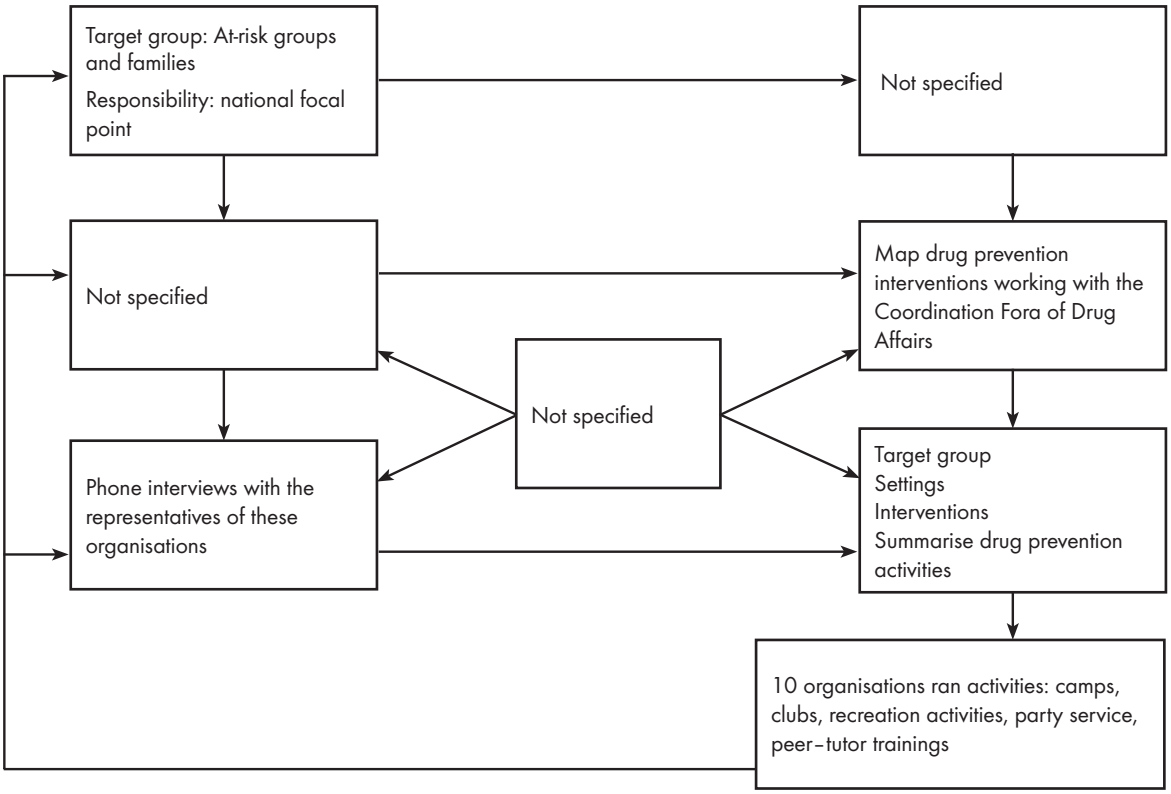
Switzerland, Supra-f

Level: 3



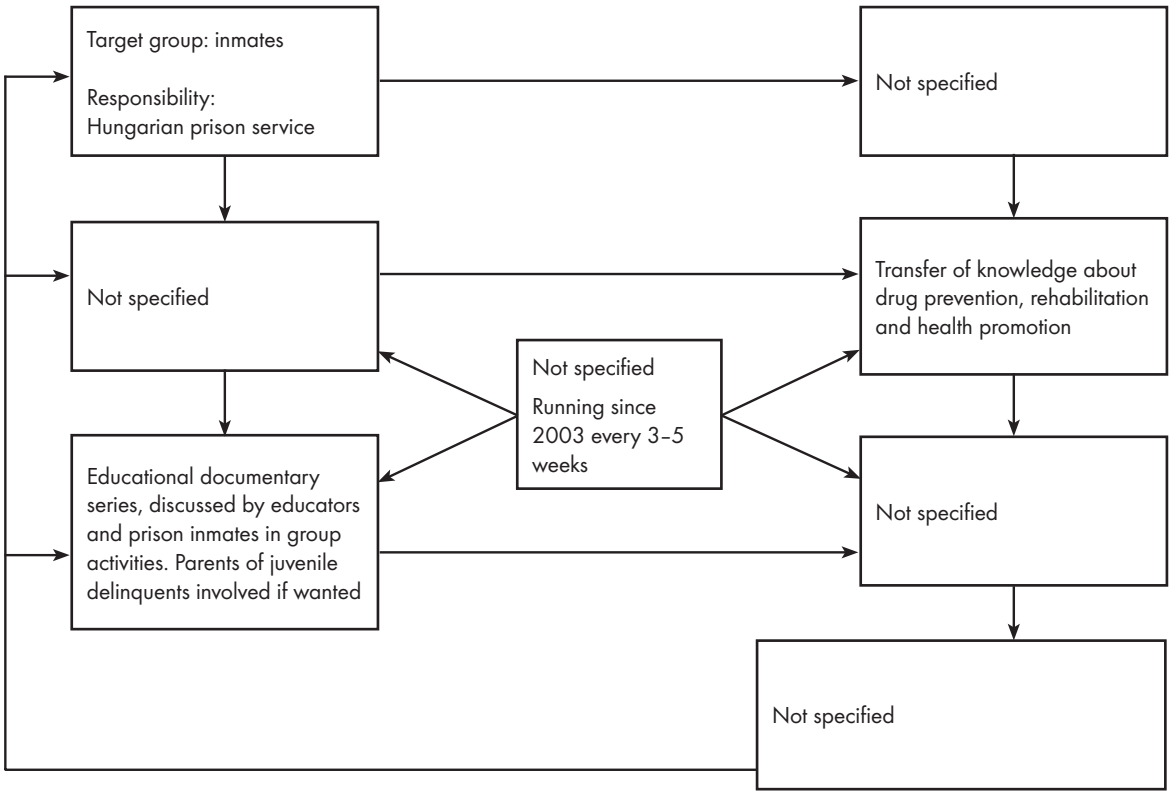
Czech Republic, Children's day care

Level: no level of evidence-based evaluation



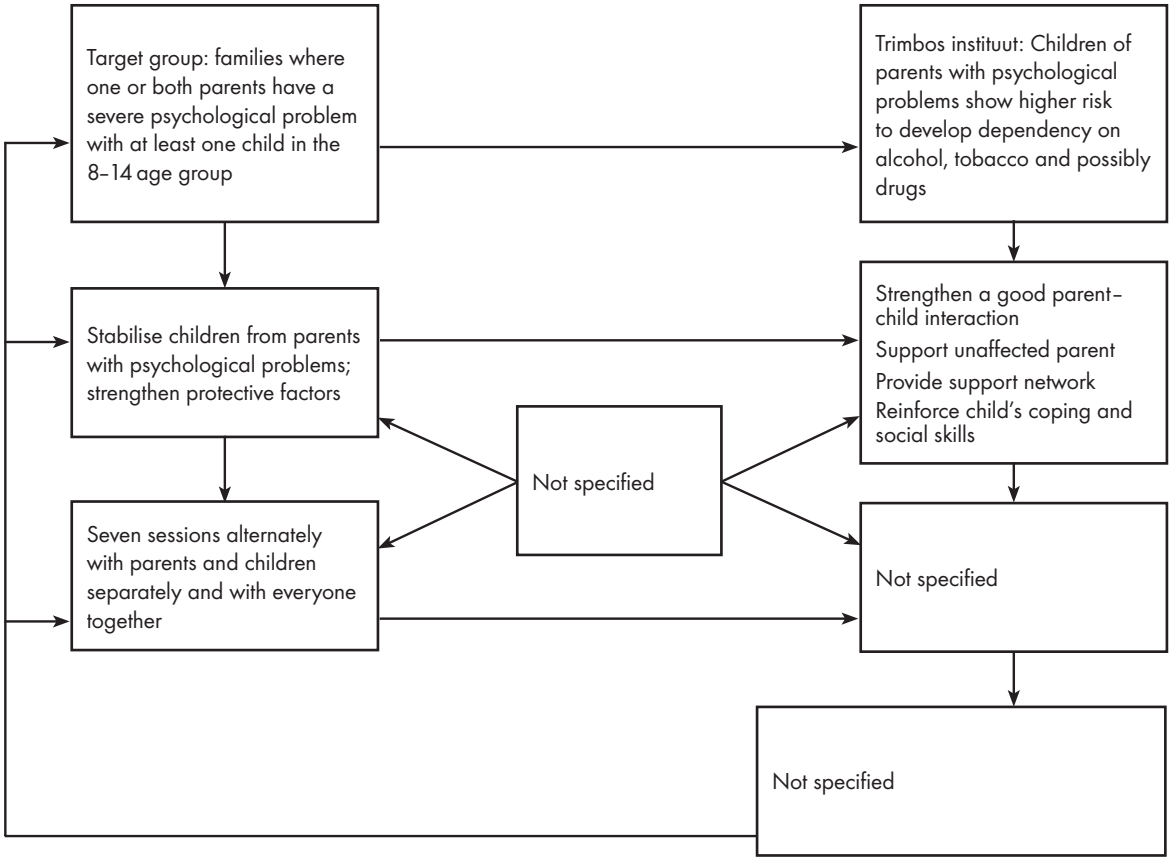
Hungary, Tracing prevention for at-risk groups and families

Level: no level of evidence-based evaluation



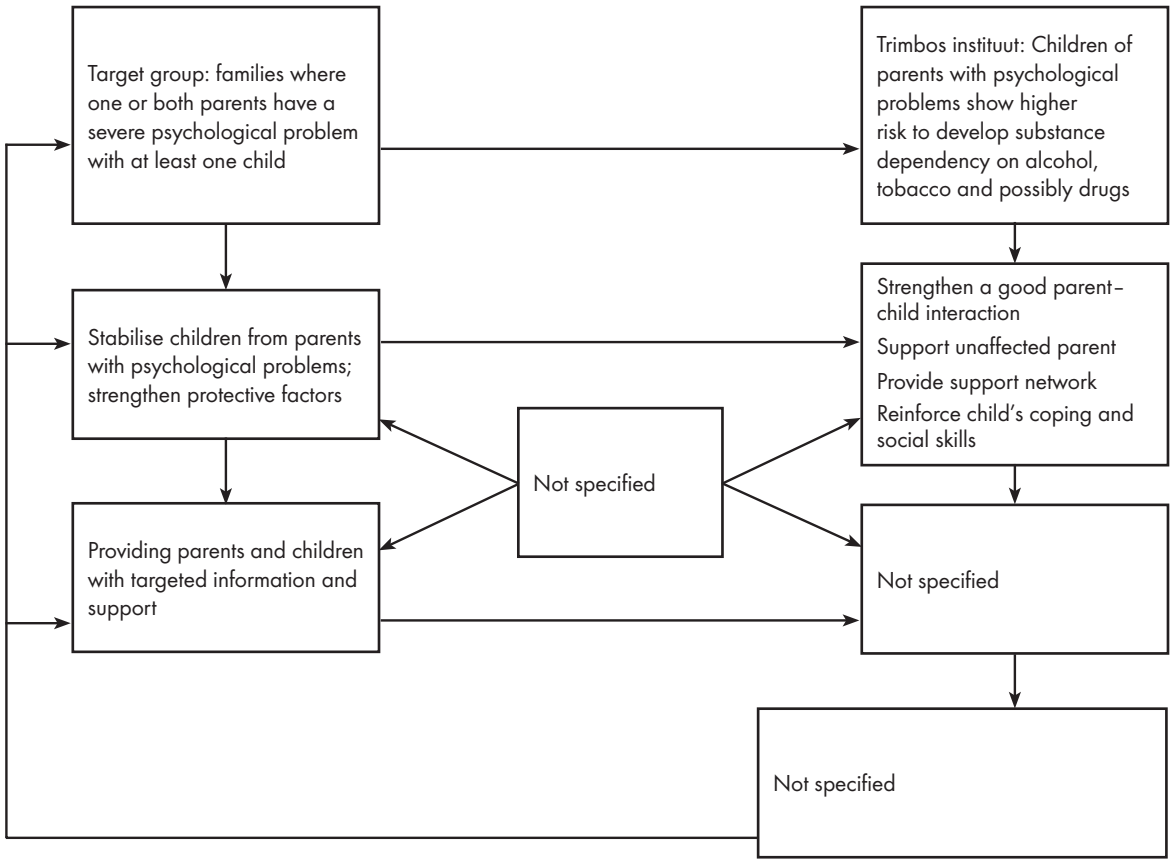
Hungary, Prevention in prisons

Level: no level of evidence-based evaluation



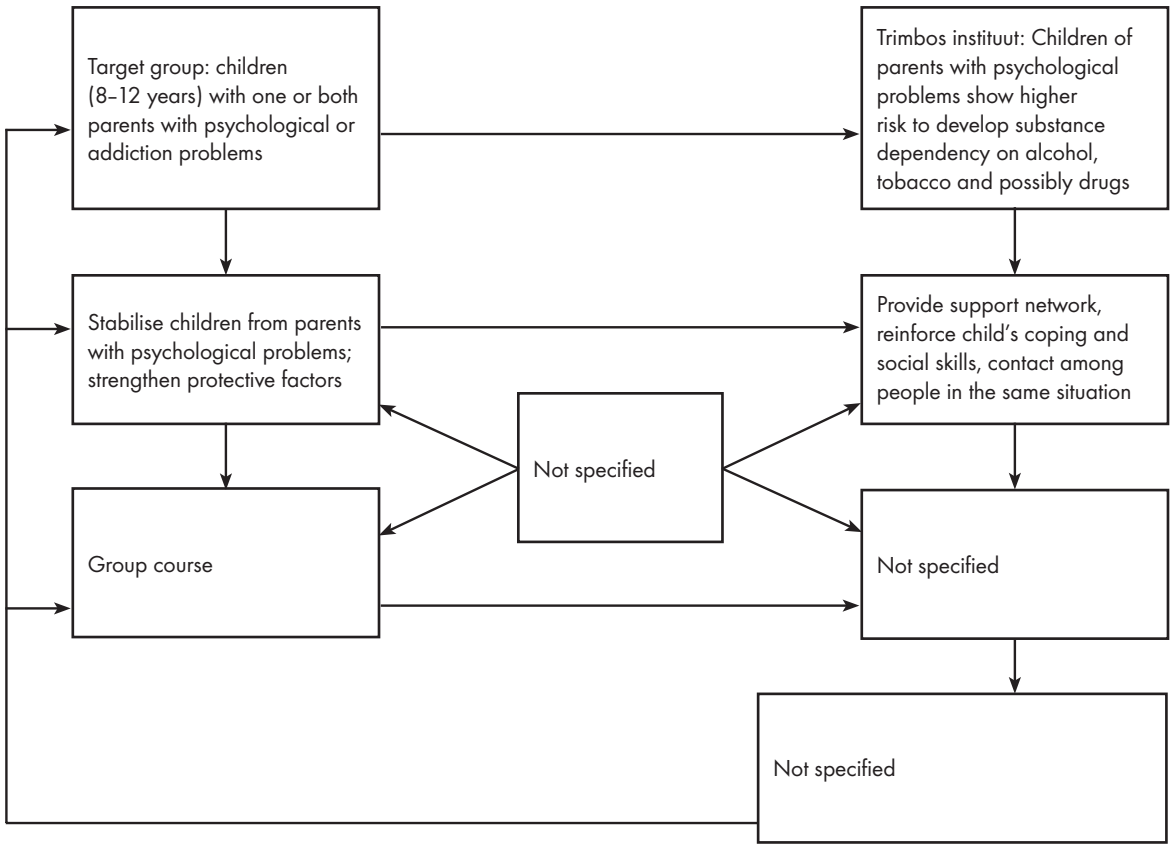
Netherlands, Psycho-educational family intervention

Level: no level of evidence-based evaluation



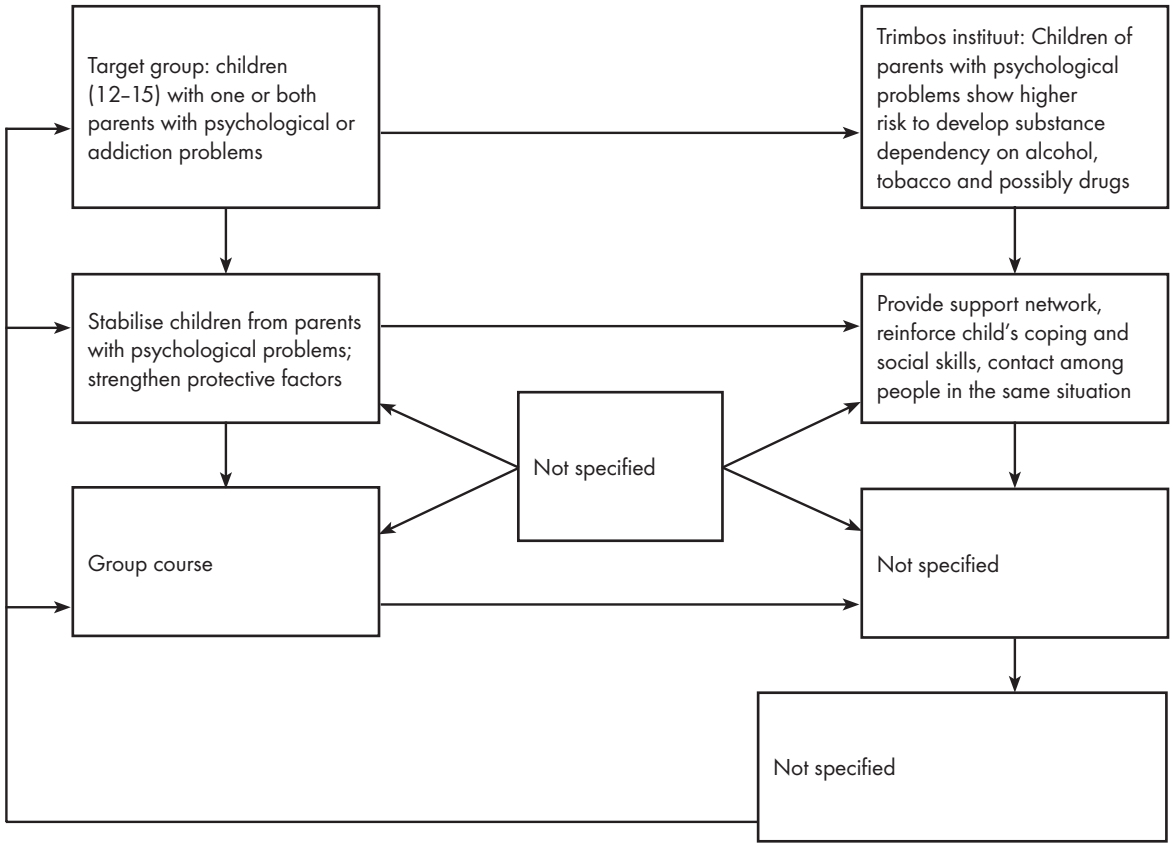
Netherlands, Tailor-made prevention

Level: no level of evidence-based evaluation



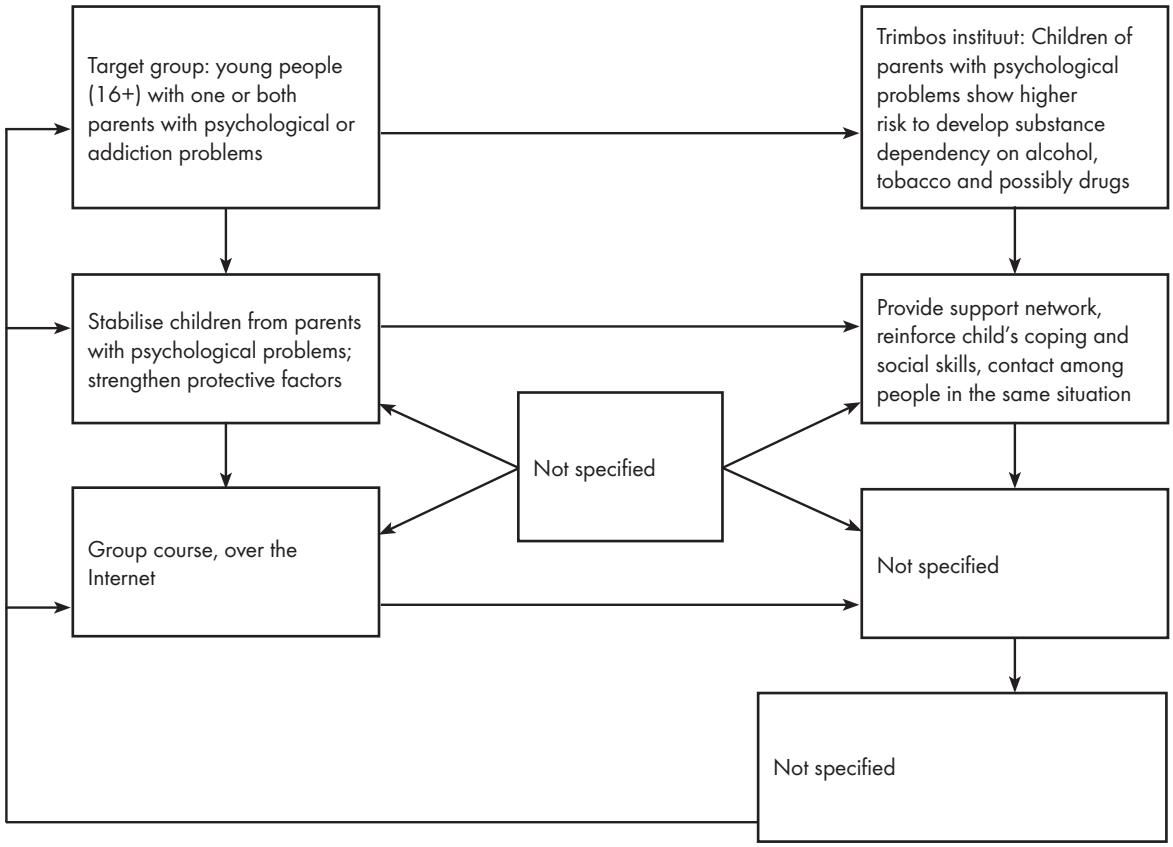
Netherlands, Doing and talking group CPPP 8–12

Level: no level of evidence-based evaluation



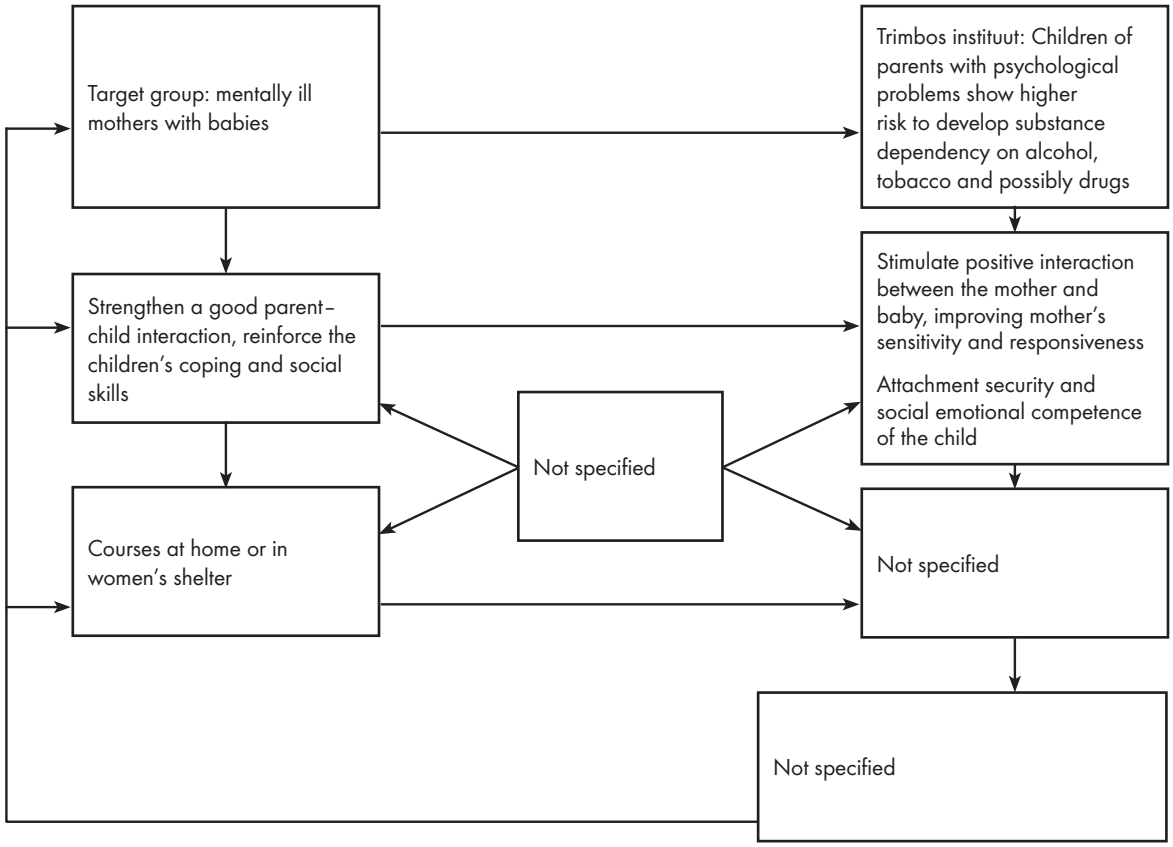
Netherlands, Doing and talking group CPPP 12–15

Level: no level of evidence-based evaluation



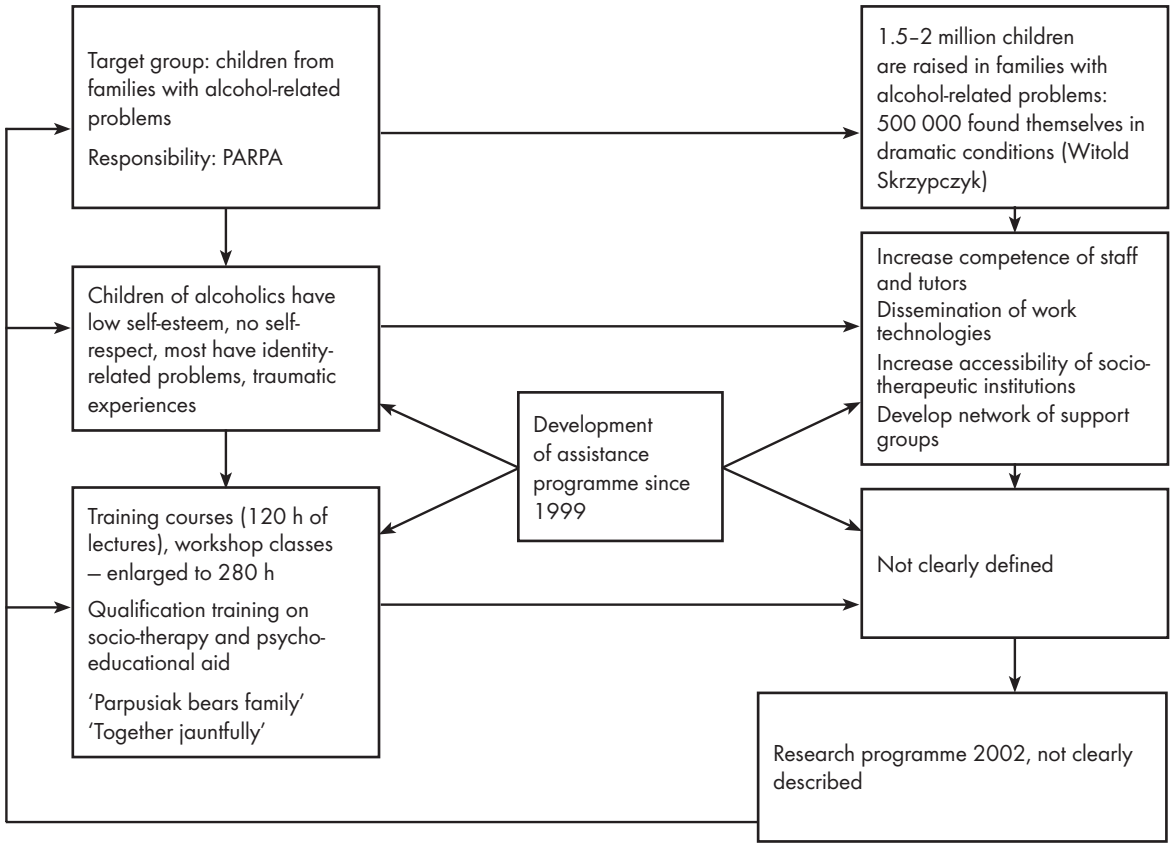
Netherlands, Group course 16+

Level: no level of evidence-based evaluation



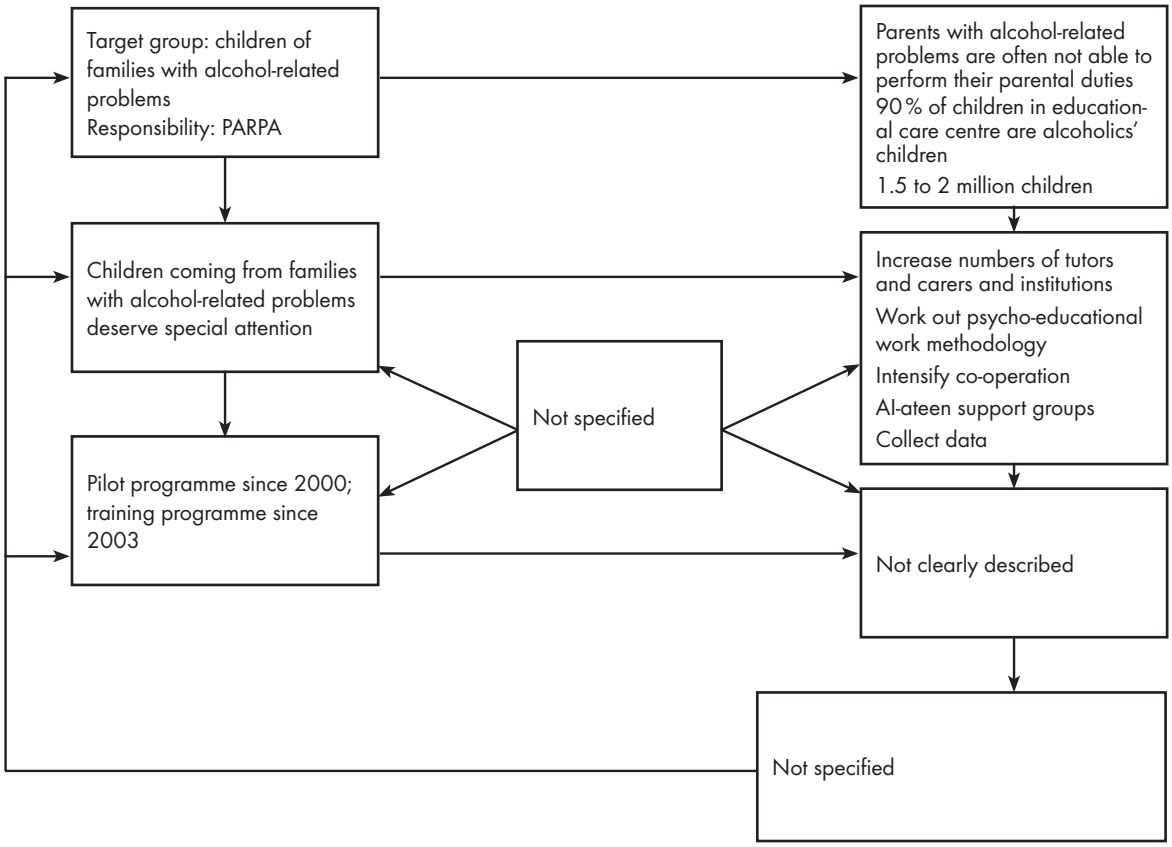
Netherlands, Mother–baby intervention

Level: no level of evidence-based evaluation



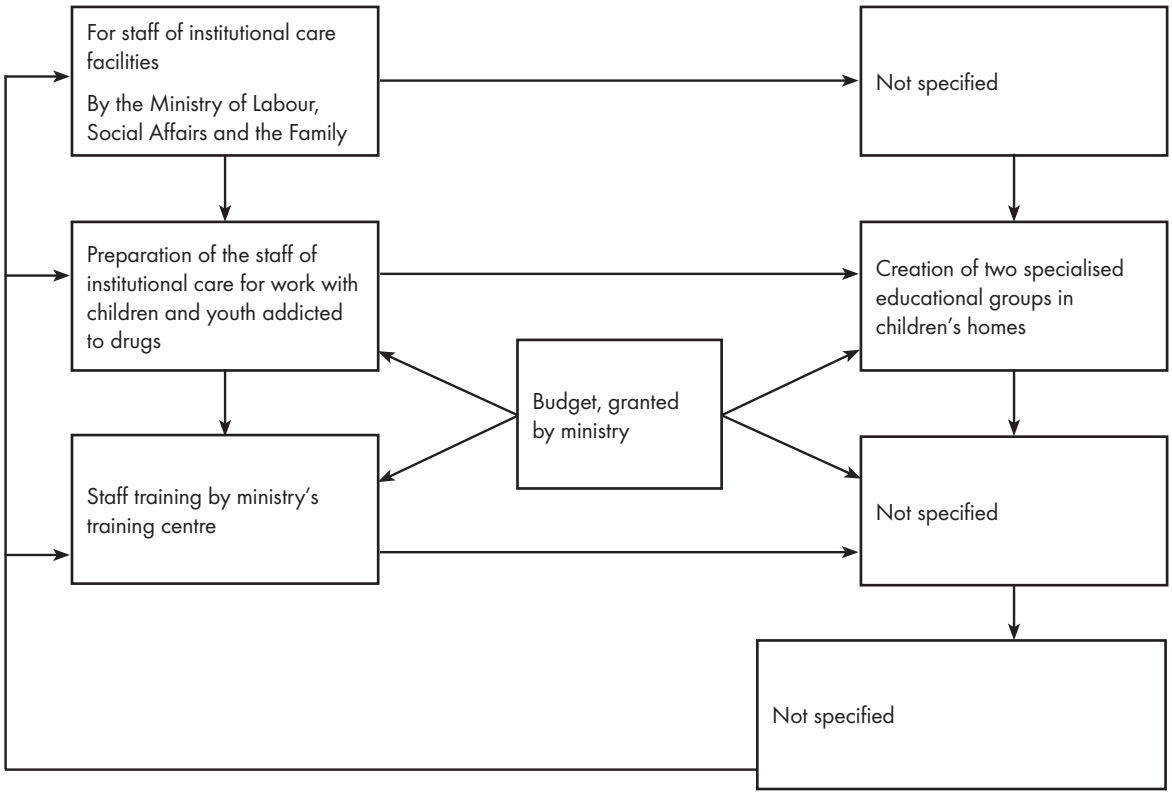
Poland, Development of socio-therapeutic club rooms

Level: no level of evidence-based evaluation



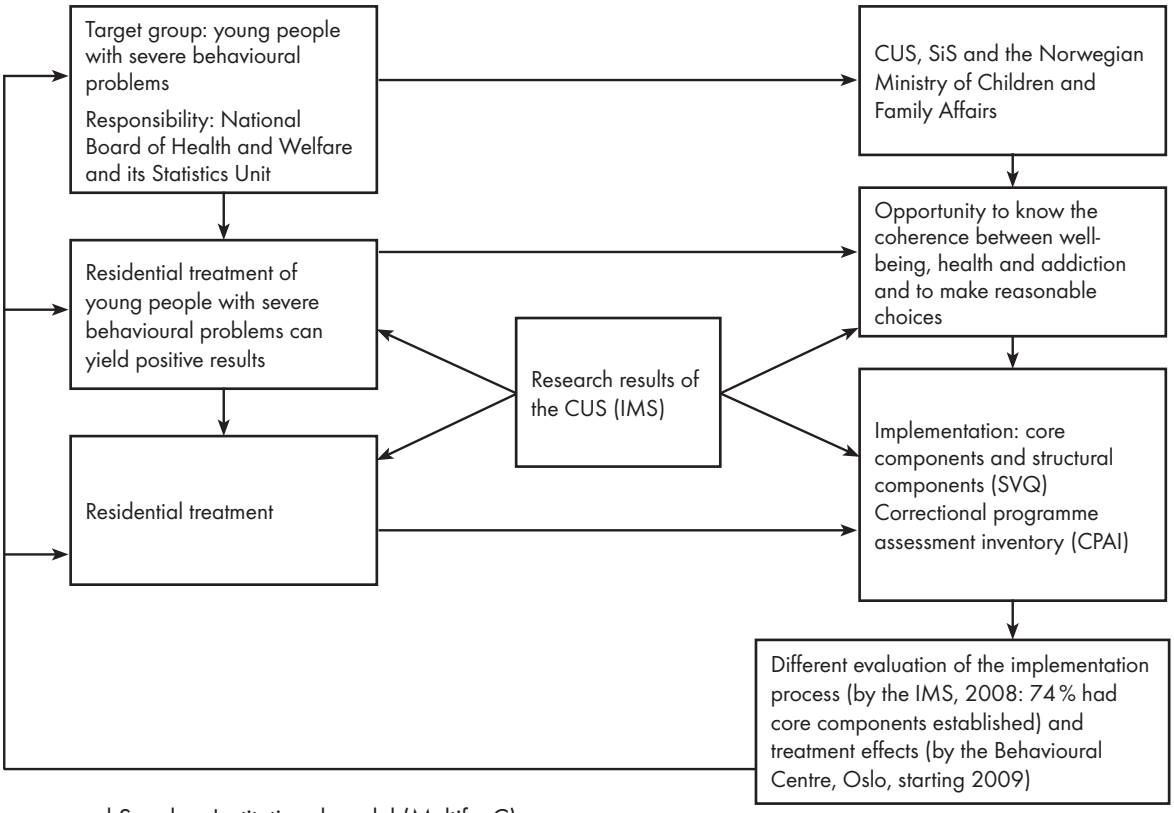
Poland, Children coming from families who have alcohol-related problems, staying in care and educational centres

Level: no level of evidence-based evaluation



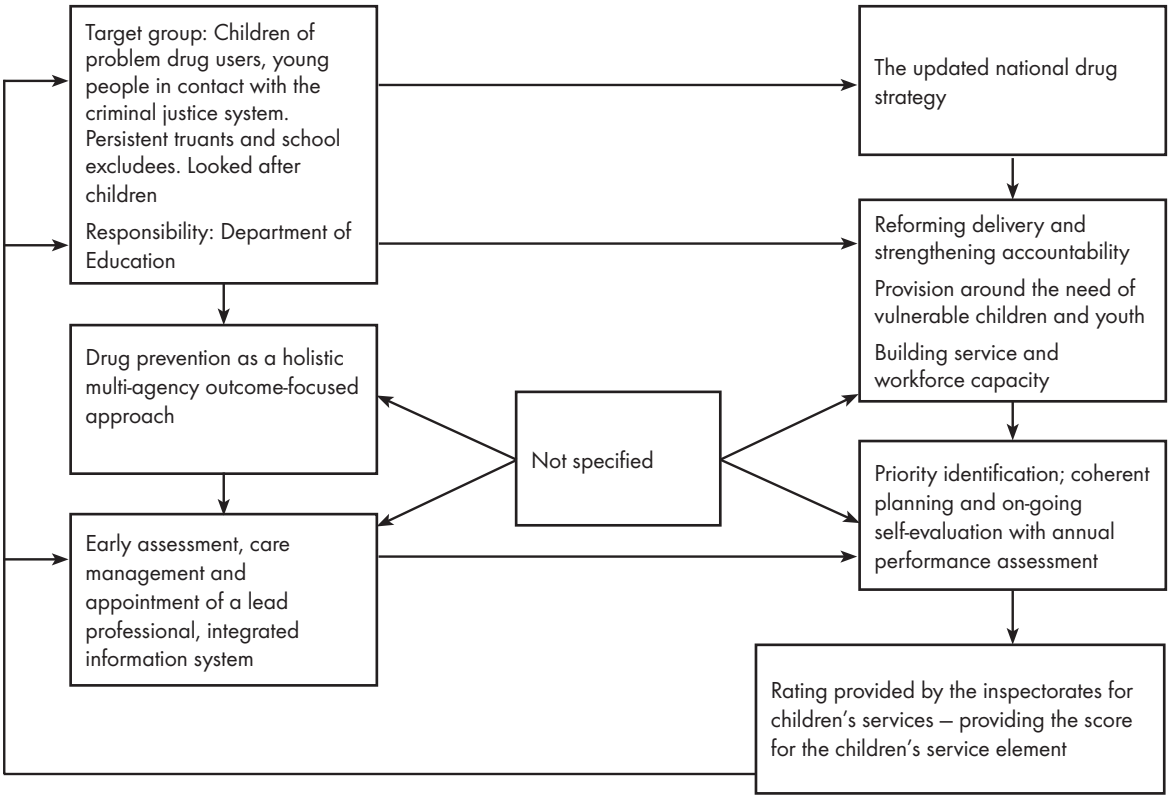
Slovakia, Development of secondary and tertiary prevention of drug addiction among children in court-imposed institutional care.

Level: no level of evidence-based evaluation



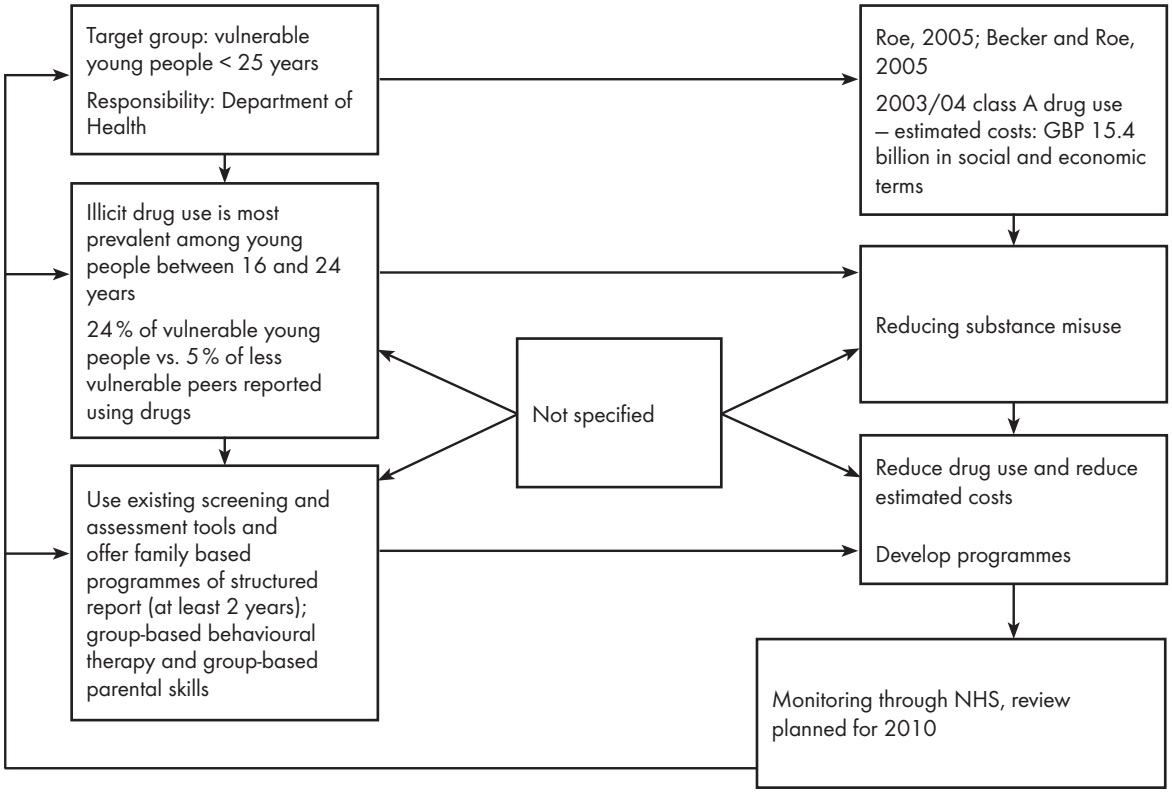
Norway and Sweden, Institutional model (MultifunC)

Level: 1



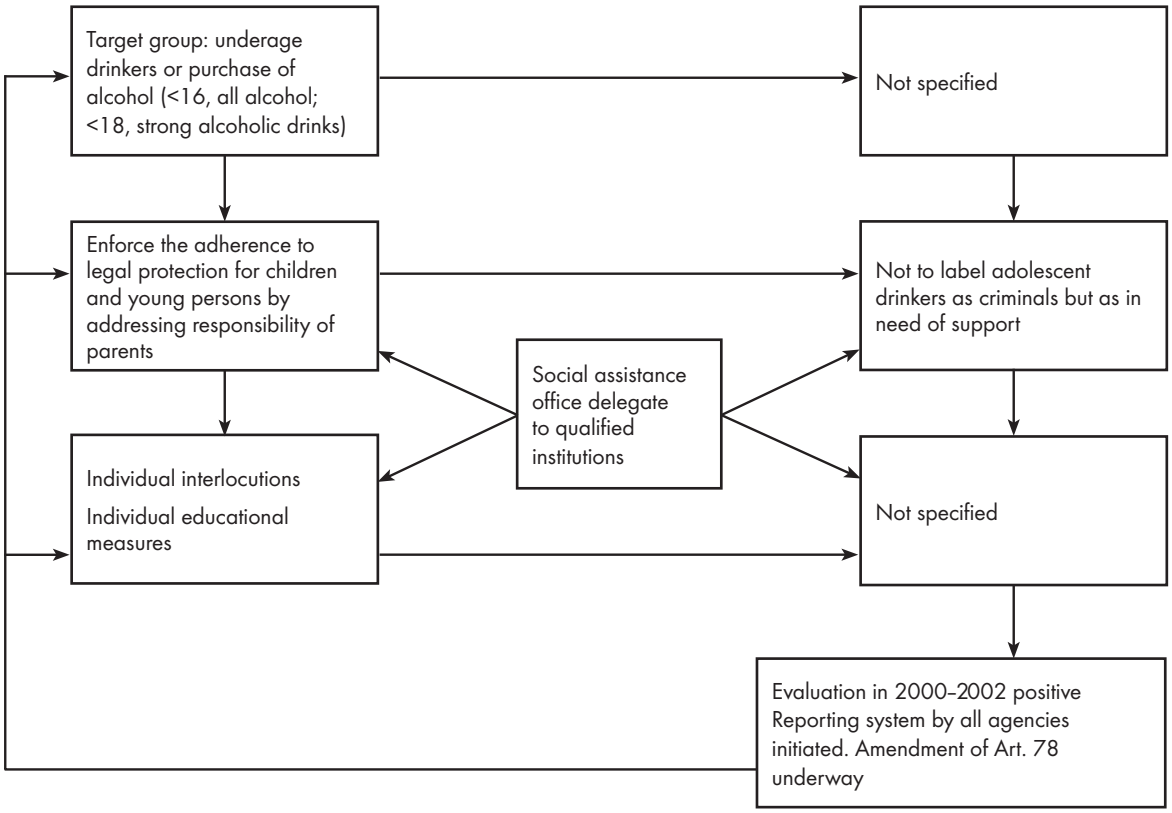
United Kingdom, Every child matters

Level: 1



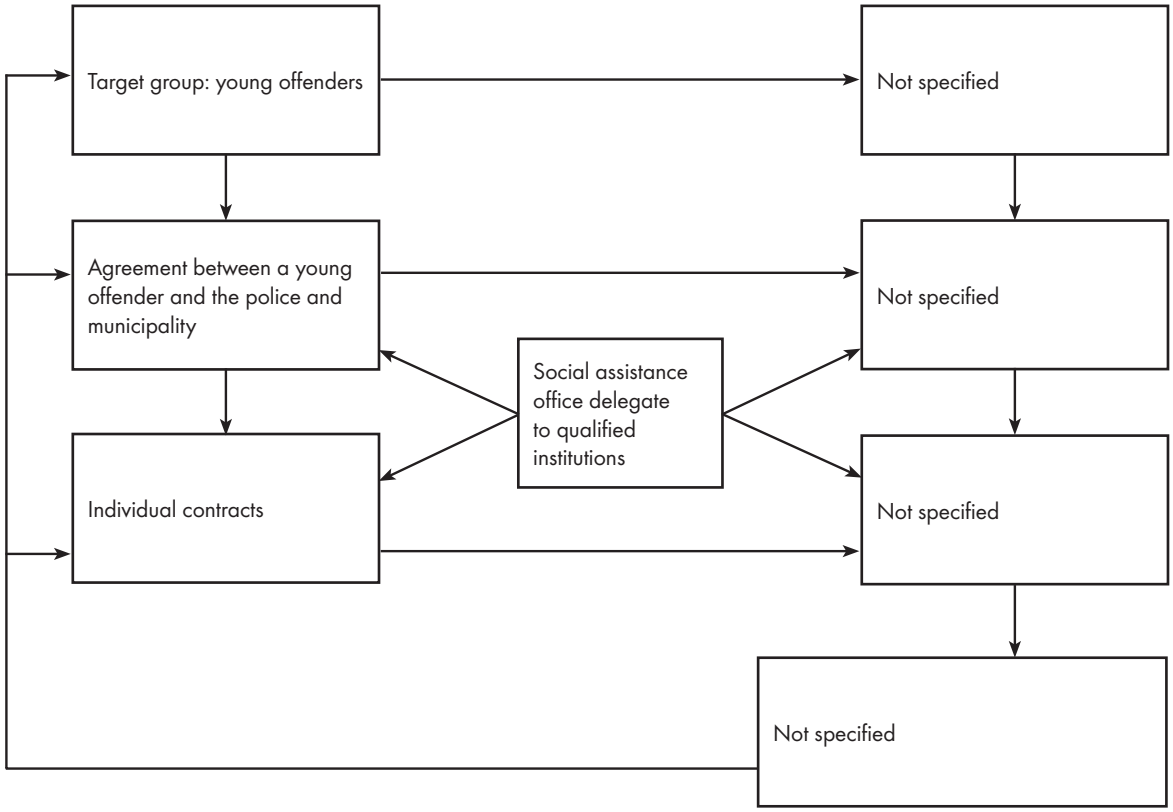
United Kingdom, Community-based interventions to reduce substance misuse among vulnerable and disadvantages children and young people

Level: 1



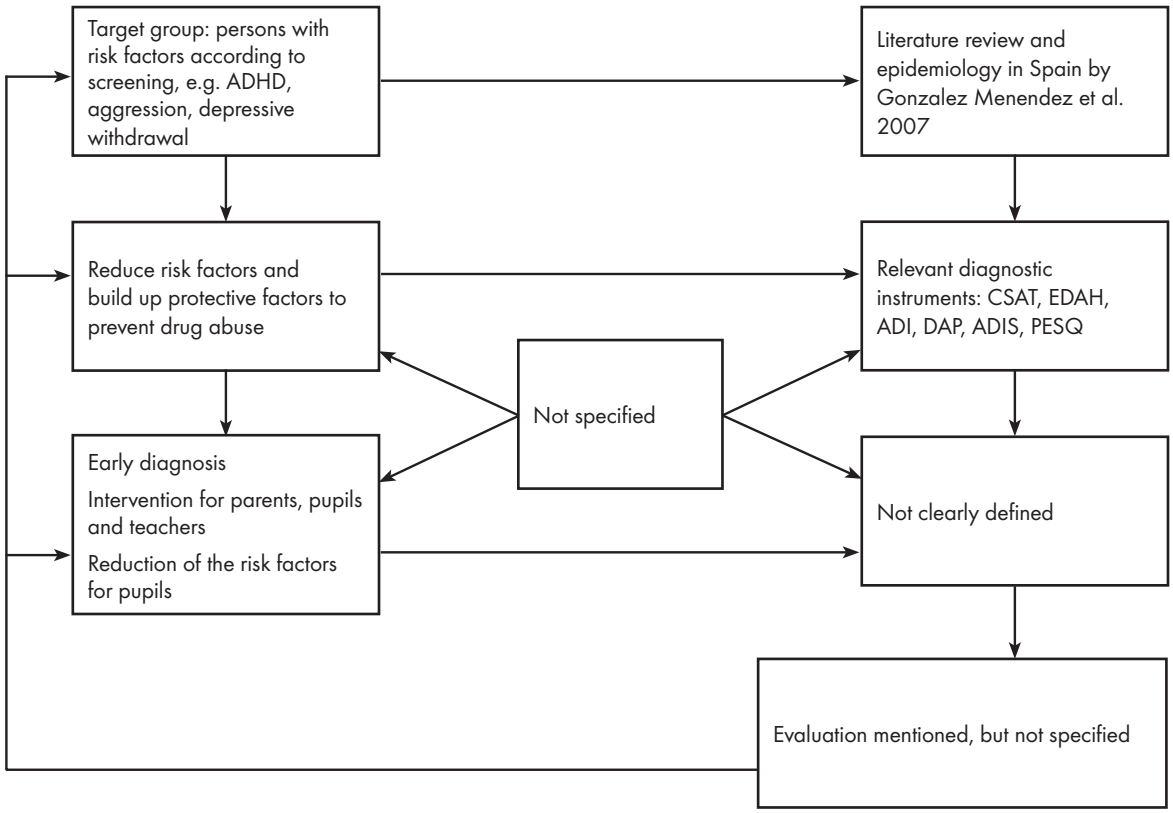
Liechtenstein, Educational intervention after violation of protection of minors rules

Level: 1



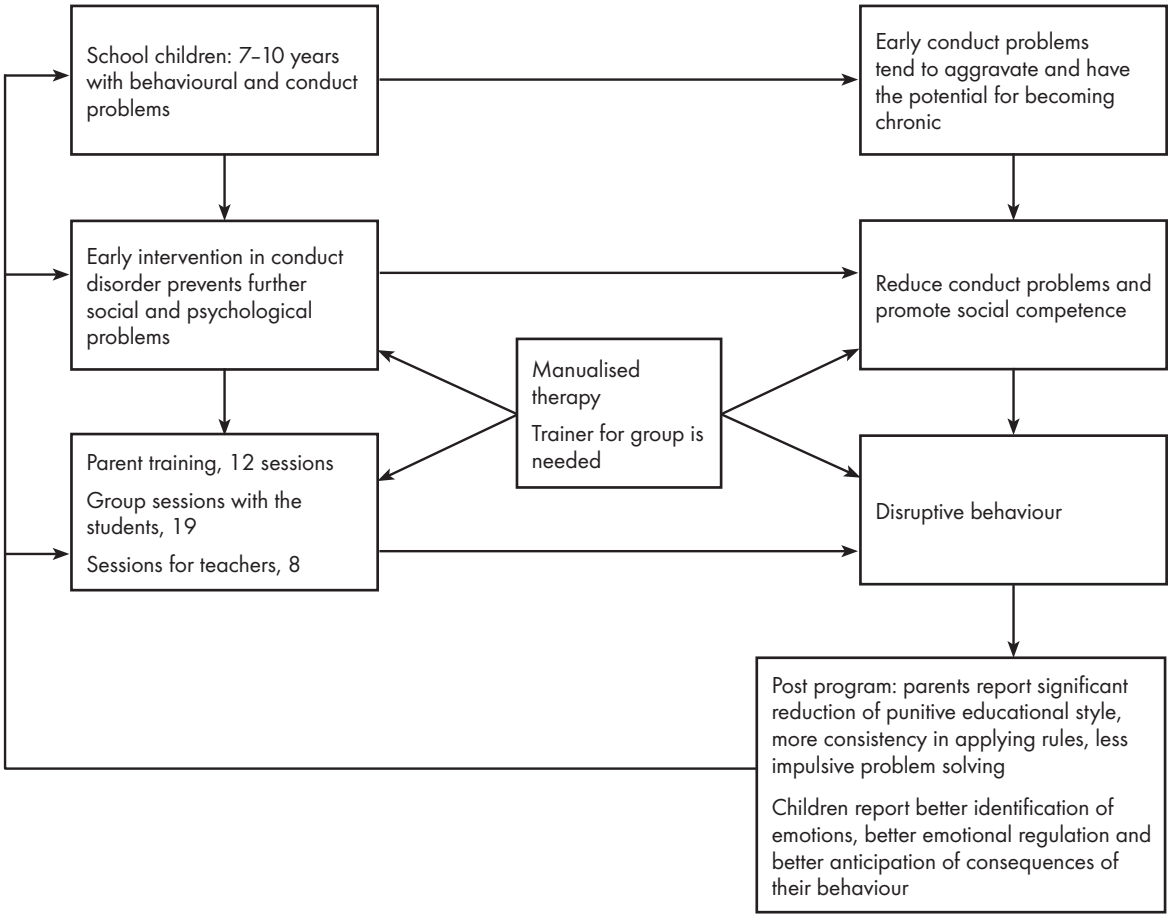
Norway, Juvenile contract

Level: no level of evidence-based evaluation



Spain, Early detection and treatment of adolescents at risk for addiction

Level: 1



Spain, Empecemos (multi-component intervention for behavioural problems in primary education)

Level: 3

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About the EMCDDA

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) is one of the European Union's decentralised agencies. Established in 1993 and based in Lisbon, it is the central source of comprehensive information on drugs and drug addiction in Europe.

The EMCDDA collects, analyses and disseminates factual, objective, reliable and comparable information on drugs and drug addiction. In doing so, it provides its audiences with an evidence-based picture of the drug phenomenon at European level.

The Centre's publications are a prime source of information for a wide range of audiences including policymakers and their advisors; professionals and researchers working in the drugs field; and, more broadly, the media and general public.

The EMCDDA Thematic papers are scientific reports on selected, theme-based aspects of the drugs phenomenon. The series makes available the results of research carried out by the agency to a target audience of specialists and practitioners in the drugs field, including scientists, academics and policymakers.

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