Co-operation Group to Combat Drug Abuse
and illicit trafficking in Drugs

Calculating the social cost of illicit drugs

Methods and tools for estimating the social cost of the use of psychotropic substances

Pierre Kopp

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INTRODUCTION

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1. Introduction

Illegal drugs impose many costs on society. Consequently, the preparation of guidelines for analyses of the social cost of drugs based on the cost-of-illness (COI) will facilitate the harmonisation of drug statistics in Europe and promote the development of a new and permanent social indicator to evaluate the burden placed by drugs on society. This composite indicator is particularly useful since it is calculated in monetary units and expressed as a percentage of GNP.

Devising an indicator means raising a whole series of questions about the nature of the causal relationships between drugs and their negative effects on individuals and society. This kind of research is part of the process of improving our understanding of drugs.

Using this proposed statistical indicator of the social cost of drugs, it will be possible to set up other studies to evaluate the effectiveness of different treatments and law enforcement strategies. It will also be possible to compare the effectiveness of all the major methods for combating drug abuse.

Devising an indicator of the social cost of drugs should promote a better understanding of the nature and scale of the consequences of drug use and trafficking, which itself may then improve policy decisions and help identify those strategies best suited to reducing the negative effects of drugs.

With this in mind, this introduction first stresses the importance of having a quantifiable indicator of the social cost of drugs and then goes on to discuss the remaining methodological difficulties. The first part of the report expounds general aspects of methodology, while the second part explains the methods used to estimate the various types of cost to be taken into account when calculating the social cost of drug abuse. Finally, an example of how the social cost of licit drugs and illicit drugs (alcohol and tobacco) is calculated in France is provided to show the type of findings which may be furnished by such studies.

1.1 Why devise an indicator for calculating the social cost of drugs?

The principle of devising an indicator of the social cost of drug abuse[1] is based on quantifying drug effects by representing them as a common monetary unit[2]. It is however impossible to be all-inclusive: some of the effects of drugs on society still remain relatively unstudied and will not be fully accounted for by our indicator.

[1] The English-speaking world uses the term “drug abuse” to designate drug consumption as well as the accompanying effects.

[2] Technically a calculation such as this raises the standard dilemma of how to give a monetary value to items which, in themselves, have no market value. Putting a monetary value on the loss to society when one of its members dies and then adding on the wage costs involved in running a country’s customs service may well seem absurd. Such studies, however, have gained significant credibility, their main advantage being the information they supply on the scale of each factor contributing to the social cost. The final social cost calculation should be regarded merely as an approximation.

1.1.1 Underlying questions

The process of devising an indicator of the social cost of drugs calls for answers to the following questions:

- What kind and scale of health-care services are necessary to deal with drug problems, and how much do these services cost?
- How many people die as a result of drug use and what is the economic impact of these premature deaths?
- What effects do drugs have on individual productivity?
- How many crimes can be attributed to drugs, whether crimes related to trafficking, to financial need caused by use, or to their physiological effects?
- How much does society have to spend to protect itself from these crimes, enforce the law, and punish offenders?
- What is the impact of drugs on the social welfare system (pensions, social security, etc.) and how much does it cost?
- Which are the other dimensions of drug abuse, such as driving a vehicle under the influence of alcohol or drugs?
- What is the respective share of each of these factors in the total social cost? It may be important to know which particular type of illegal drug causes the highest cost.
- Which form of addiction gives rise to the highest social cost in a given society (alcohol, tobacco or illegal drugs)

1.1.2 Social cost and effectiveness

Calculation of social cost is however only the first stage in devising a complete set of tools for supporting public policy decisions.

Resources available for tackling any given social problem are scarce. Releasing funds to tackle the different problems faced by our society forces our objectives into direct competition with one another. Should more resources be committed to fighting cancer or to combating drugs?

In order to resolve this question, elementary rules for the proper management of public funds should be respected. These rules demand that every public programme meet the following two criteria:

- Cost-benefit. A public programme can only be justified when it brings about a reduction in social cost at least equal to the cost it entails.
- Cost-effectiveness: Given the choice of two public programmes, preference should be given to one which reduces social cost most per unit spent.

1.1.3 A sound methodology

Using the cost-of-illness methodology as a basis for devising an indicator for calculating the social cost of drugs is not an innovation. Studies using this methodology in fields other than drug abuse, such as alcoholism and mental illness, were first carried out more than 25 years ago[3].

There has been a significant advance in the literature. Methodologically speaking, the degree of consistency between studies has increased considerably, and studies are more readily comparable to one another. They are now relatively standardised and based on fairly widely accepted principles of economic evaluation.

The first studies to calculate the social cost of an illness during the 1970s had the explicit objective of showing that a significant amount of mortality, morbidity and health expenditure was directly or indirectly due to alcohol or drug abuse.

These first studies clearly showed that an illness gives rise to costs and consumes resources which, in its absence, would have been used in another way. This observation is based on the concept of opportunity cost, a measurement of the cost to society when resources are diverted from the use to which they would otherwise have been put. Technically, this entails quantifying the amount of the total reduction in the production of goods and services which can be attributed to the development of an illness.

The concept of opportunity cost has been discussed many times since the 1950s. It is expressed most clearly in the American studies associated with Rice. The approach was codified by a task force of the U.S. Public Health Service chaired by Rice. Financed by the U.S. PHS, this task force was convened for the purpose of preparing guidelines for future studies on the social cost of illnesses. The U.S. PHS Guidelines themselves were intended to reduce methodological differences between the various studies under way.

These U.S. PHS Guidelines gave credence to a few methodological biases that are still in current use. Standard economic concepts such as consumer's surplus, the social welfare function and marginal utility are translated into practical terms by the authors. They lean on some perhaps surprising hypotheses. For example, they assume that benefits derived by drug or alcohol users from their habit should not be taken into account. Similarly, jobs that may arise from use of drugs or alcohol are disregarded in their estimations. Such hypotheses are part of an analytical logic based on opportunity cost and give rise to a line of reasoning called the counterfactual scenario.

The concept of a counterfactual scenario is based on the hypothesis of full employment of the factors of production and posits that all the resources absorbed in treating illness

[3] As long as ago as 1956, Reynolds suggested studying the social cost of car accidents in Great Britain. Fein (1958) and Rice (1966) examined the social cost of mental illnesses. Pritchards conducted the first study of the social cost of alcohol (1971). In the United States, the first studies were those by Berry and Boland (1973). A.D. Little Inc. was the first to study drug abuse (1973). In other countries, only a very limited number of similar studies have been published. The two most comprehensive recent studies are those by Collins and Laspley (1991, 1996) on alcohol and drug abuse in Australia, by Rice et al. (1990) in the United States, and by Single et al. (1996) in Canada.

(medical jobs, police staff, etc.) would have been spent for other purposes had the illness not existed.

The social cost of the illness is thereby obtained by comparing the actual situation and the counterfactual. The social cost of illness is equivalent to the cumulative costs generated by the illness without taking account of the fact that some activities to which the illness gives rise may actually create wealth.

The U.S. PHS Guidelines have, however, not been able to lay down a definitive standard for studies. Nor have they made it possible to decide between the different theoretical options still under discussion. The authors confined themselves to describing all the practices used at the time without giving an opinion on the more controversial issues.

Following the study in Canada (1996a), Single's team drafted International Guidelines (1996b), which are helpful to researchers examining the social cost of drugs. This document clearly identifies the steps for this kind of study and singles out technical points that are still unresolved.

NIDA (1998) has also contributed to the work in this area by comparing the methods and results of various American studies.

1.2 Remaining difficulties

There are still a number of problems in setting up studies to examine the social cost of drugs. However, these problems seem neither insurmountable nor likely to hinder putting such a study into practice.

The general principle of social cost studies is fairly simple, although actually setting them up is rather complex and follows three successive steps:

- ☞ Identifying the various negative consequences attributable to drugs.
- ☞ Documenting and quantifying the degree of causality between drugs and their negative consequences.
- ☞ Assigning economic values to the negative consequences.

1.2.1 Identifying the various negative consequences of drugs

In order to identify the cost of drugs, the study period and type of costs involved have to be defined.

a. Incidence or prevalence?

Two approaches are feasible for estimating the social cost of drugs: using the prevalence or incidence rate. The key distinction is the period during which consequences of drug abuse are considered. A large consensus prefers prevalence-based studies.

- ☞ Prevalence-based studies record all drug-related costs occurring during the reference year and first emerging during that year or in previous years.

- ☞ incidence based studies record all costs occurring during the reference year and in the following years. The initial step involves identifying tangible negative effects that may reasonably be assumed to arise from drug abuse.

b. Classification of costs

Previous studies based on the U.S. PHS guidelines made a distinction between direct and indirect costs, core costs and non-core costs. Direct costs describe the value of tangible goods and services used to tackle the negative effects of drugs. Indirect costs represent the value of services not produced by individuals because of drug abuse. Core costs refer to the costs of health care, while non-core costs designate costs occurring outside health care.

The current trend is to discard this terminology and settle for a distinction between health and non-health costs, and out-of-pocket costs from foregone earnings.

Table 1 - Drug-related effects accounted for in social cost studies

	Values of goods and services	**Value of lost productivity**	**Generally non quantifiable costs**
Health	Specialty drug/alcohol treatment and prevention. Support for specialty treatment, including training, research, and insurance administration. Health consequences of alcohol and drug abuse, including hospital care, physician services, nursing home care, and pharmaceuticals, or the continuum of services for certain disease categories as HIV/AIDS, drug-exposed infants and boarder babies, hepatitis and tuberculosis.	Reduced or lost earnings while impaired or unemployed. Lost earnings due to premature death or to institutionalisation	Pain and suffering. Bereavement. Psychosocial development impairment among alcohol and drug abusers and their children. Family health. Out-of-pocket costs other than deductibles and co pays such as transportation, child care, and other factors associated with health care use.
Other (non-health)	Criminal justice system expenses, including protection, adjudication, and corrections. Victim expenses. Crime-related property destruction. Administration of income transfer programs. Motor vehicle crashes. Fire destruction.	Lost earnings while crime victims cannot work. Lost earnings while criminals are incarcerated. Lost legitimate earnings, including lost tax dollars due to “careers of crime”.	Reduced product quality. Secondary market effects. Productivity consequences for family members. Productivity consequences for co-workers and firms that are not reflected in the earnings of alcohol and drug abusers.

Source: NIDA 1998

“Health costs” describe the cost of treating drug use and illness or injuries resulting from this activity.

"Productivity losses" represent the earnings foregone by drug users as a result of imprisonment, morbidity, etc.. They also cover earnings foregone by people who are victims of drug-related crimes. Productivity losses also include income not received as a result of a shorter working life in the case of persons dying prematurely.

"Other impact on society" includes drug-related costs outside the health field, chiefly costs of crime, justice, the social system, car accidents, etc..

It should be noted that the intangible costs incurred by drug users or their victims are not included in these studies since they are too difficult to quantify.

1.2.2 Documenting and quantifying the degree of causality between drugs and their negative consequences

There has been much controversy about attempts to establish causality between drugs and illnesses, notably with regard to how a correlation becomes a causality and how to apply the statistical method.

a. Correlation and causes

The most basic point involves the distinction between correlation and causality. NIDA (1998) has drawn attention to the three requirements established in the literature (Berry, 1984; Austin and Werner, 1974) for interpreting an association as a causal relationship:

- ☞ Strong and consistent correlation or covariance between phenomena.
- ☞ A coherent logic to the causal link, including correct temporal ordering
- ☞ Elimination of alternative possible causes.

Although the first two requirements are relatively straightforward, the third presents a challenge. It is impossible to eliminate all potential other causes; a cause may have precursors that undermine the causal connection. For example, research into the aetiology of drug abuse has identified several factors that contribute to the likelihood that a person will have problems with drugs. Some analysts argue that these are the "real" causes of a person's drug problem.

In order to eliminate alternative possible causes, the analyst must also be concerned with the counterfactual scenario, which is used to determine the likelihood that a given person would have faced the same problems had he not taken drugs. If a criminal did not have a problem with alcohol or drugs, would he still have difficulties with the law? Is it logical to assume that a person's wage rates are driven lower because of alcohol or drug abuse, or, conversely, would the same person still receive lower rates even without the alcohol or drug problems? Similarly, can a car accident be ascribed to the fact that a person has abused drugs or alcohol beforehand? Many accidents occur late at night when drivers are tired and often less attentive. Many of these drivers will also

have been drinking or taking drugs. If only cases involving known drug or alcohol use are counted will this not mask the night-driving factor?

Moreover, analysts recognise that while drug and alcohol abuse result in some consequences by definition, even reasonable alcohol or drug use may directly or indirectly contribute to other negative effects. Although alcohol and drugs do not cause HIV/AIDS, they may play a direct or indirect role. Needle sharing among drug users may directly result in the transmission of HIV; alcohol and drugs may also promote HIV transmission by making people forget “safe sex” rules.

b. Applying the statistical method

A complex issue arises when alcohol or drugs are one of the causes of consequences such as cirrhosis of the liver, certain cancers, car accidents, crimes or employment problems. The aim is to develop a way of estimating which proportion of these consequences can be attributed to drug use.

Quantifying the relationship between a risk factor (e.g. drug) and a disease allows calculation of the attributable risk (AR) for the given risk factor in relation to the disease analysed. In other words, this coefficient (AR) defines the proportion of mortality (and/or morbidity) attributable to a risk factor for any given illness.

In order to quantify the effects of a risk factor on the onset and development of morbidity and/or the mortality rate, the proportion of diseases and deaths imputable to this factor needs to be calculated.

The procedure for evaluating the number of diseases and/or deaths attributable to a risk factor is therefore limited to an extrapolation of results obtained by direct observation, generally the number of deaths among drug users and non-users. This procedure has two stages:

- ☞ The first involves direct observation of the morbidity and/or mortality rate in drug users compared with the same rate in non-users to determine the relative risk (RR).

- ☞ The second involves measuring the excess mortality of drug users imputable to the risk factor in the total population. This attributable risk (AR) is calculated as the difference between the relative risk (RR) and the risk to which the same population is exposed for causes other than the given risk factor.

The difficulties inherent in this part of the process of calculating the social cost indicator are generally underestimated by the various guidelines available. The lack of a standard classification system in many European countries for recording drug abuse as the cause of death will require research teams studying social cost to get involved with this issue, which calls for a sound knowledge of epidemiology. In English-speaking countries this type of classification generally seems to exist.

Some problems are still being argued over. Some believe that mortality statistics should not be used to calculate how living people use a health system. There is no

guarantee that the share allocated to drug users in a hospital's budget for a given illness is proportional to the mortality rate for drug-related deaths from the same illness.

Regarding this issue, traditional studies on alcohol and tobacco use deem this hypothesis to be satisfactory. With drugs, it may well be that such a calculation method does not properly account for the fact that most drug-users who die are recorded under the heading “fatal drug overdose”. They are therefore likely to be considerably underrepresented in deaths from other illnesses. With such a hypothesis, the hospital expenditure allocated to drug users is therefore likely to be underestimated. This issue warrants more detailed discussion.

1.3 Assigning economic values to the negative consequences of drug abuse

The final stage in devising the social cost indicator involves assigning a monetary value to each recorded consequence of drug abuse. This means looking more closely at the general problems raised by the calculation of drug-related productivity losses and defining the specific problems raised by the calculation of productivity losses and the drug budget in a European context.

1.3.1 General problems raised by calculation of productivity losses

It must be acknowledged that discussion on how to give a value to productivity losses has not progressed much and that most published studies therefore dismiss the *human capital* and *willingness-to-pay* techniques as unsuitable.

The *human capital* approach involves evaluating productivity losses caused by morbidity for a given person (during the year under consideration) and by the person's death (in the following years). In simple terms, the two approaches differ in that the latter (*willingness to pay*) measures the monetary sum that the drug user, plus his family and relatives, are prepared to pay not to undergo alcohol or drug effects in terms of mortality and morbidity.

In the *human capital* approach, a monetary value is assigned to production lost because of illness, work-related problems, or even premature death. This monetary value has to be based on descriptive statistics of current incomes for drug users compared to populations not using drugs.

Researchers - apart from Muller et al. (1977a; 1977b) - generally prefer the *human capital* technique (Hodgson, Meiners, 1982). Two reasons account for this choice. Firstly, the method is far simpler in technical terms; secondly, there is scepticism about the usefulness of measuring intangible costs, which are not obviously wasted resources and therefore not relevant to the criterion of opportunity cost.

1.3.2 Specific problems involved in measuring productivity losses in the European context

In Europe, patchy information on prevalence rates and drug user profiles will inevitably lead to some highly specific methodological choices. The research teams which will have the task of calculating the social cost indicator in European countries cannot avail

themselves of such advanced data as are available in the United States and will have to rely on statisticians specialising in drug issues to remedy these lacunae.

Some examples will serve to illustrate these issues. It is known that figures for lost productivity have to be adjusted on a pro rata basis for age and gender to the average drug user profile. Similarly, the reference salary has to be adjusted for the probable unemployment rate for the drug user and non-cash benefits not appearing on the salary sheet. However, information on these factors is fairly piecemeal. Data required for such a study therefore have to be put together with particular care.

The expected future course of productivity is also a thorny issue that requires novel solutions to offset the paucity of our statistical data.

The expected future course of productivity describes the productivity of a former drug user throughout his life. It is generally assumed that this amount is less than it would otherwise be had the individual never used drugs: this discounting reflects the fact that any delay in starting a professional career, especially by young people, is often never recouped. The rate assigned to this discount coefficient depends on the subsequent pattern of a drug user's life. Once again, in many countries we run up against a lack of complete data.

Selection of the discount rate for human capital estimates should also be discussed in depth. The general concept is straightforward. Technically it involves calculating the value assigned by the individual to his future earnings. A high discount rate indicates that future gains for an individual are hypothesised as being low, and a low discount rate indicates that future gains are assigned a high present value.

The more uncertain the future, the higher the value individuals give to the present. If only those drug users who die or face productivity loss due to illness, imprisonment, etc., are to be considered, then it is logical to select a high rate (8-10%). The degree of uncertainty overshadowing the life of a drug user depends not only on how often he uses drugs but also on his social circumstances. Selection of a rate therefore partly reflects the researcher's opinion about how difficult a society will make it to live as a drug user. Intuitively, countries with a harm reduction strategy might be thought to have a lower discount rate than countries without such a strategy. The lower the selected rate the higher the estimated social cost. Paradoxically, improving the ability of users to plan into the future, ceteris paribus, does not produce a rise in the level of the social cost indicator! No doubt this paradoxical effect is partially offset by the fact that harm reduction decreases present and future productivity losses.

The marked divergence between drug policies in Europe gives a highly specific slant to discussion of the hypothetical level for the discount rate. There has hitherto been no mention of this issue in comparable studies, in which the rate selected is generally 6%.

1.3.3 Specific problems involved in calculating the drug budget in the European context

Calculation of public expenditure on drugs raises new problems. Unlike the United States, and to a lesser degree Canada, European countries are not used to calculating their drug budget, i.e. the amount of public funds spent on drug abuse.

Public funds are spent on drug abuse in two ways. A budget is directly assigned to the campaign against drugs or to treatment. Expenditure is recorded under budgetary headings as earmarked for anti-drug campaigns. It is a simple matter of identifying these items and calculating the total.

Some government departments have, however, acquired the habit of claiming funds for combating drugs and then using them for other purposes. Some amounts therefore appear in the public accounts as being allocated to combating drugs that have in fact been put to other uses. These figures need to be adjusted.

The second part of the drug budget is the proportion of working time which non-specialist public bodies (police, legal system, etc.) spend on drug issues. To obtain the budget allocated by a non-specialist public body to drug abuse, the proportion of the mean annual working time of a civil servant in a given category (police officer, customs officer, judge, etc.) taken up with drug issues should be multiplied by its cost (Kopp; Palle, 1996).

Current research indicates that France is the only country that has carried out a complete study of this type. More restricted studies are available for the Netherlands (Kraan, 1994), United Kingdom (HMSO, 1995) and Switzerland (Estermann, 1991).

As a rough guide, public spending by non-specialist public bodies generally accounts for more than 90% of drug budgets in Europe. Before attempting to calculate the indicator of the social cost of drugs, it is essential that the problems connected with the calculation and standardisation of statistics should first be solved. This particular issue cannot be settled simply by transferring Canadian or American know-how.

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GENERAL PHILOSOPHY FOR CALCULATING THE SOCIAL COST OF DRUGS

Co-operation Group to Combat Drug Abuse and illicit trafficking in Drugs

2. General philosophy

The trafficking and use of drugs (whether alcohol, tobacco or illicit drugs) has a wide range of social consequences for both the individual and society. In economic terms these consequences may be measured by estimating the social cost generated by the use and trafficking of these substances.

The concept of "social cost" refers to the overall cost to society, i.e. to both private and public agents, and caused by use and trafficking of psychotropic substances, as shown in Table 2 below.

Table 2 - Social cost of psychotropic substances

Private cost	+ Public expenditure	+ External costs	= Social cost
Expenditure of users of psychotropic substances on these substances, and other expenses not reimbursed (lawyers' fees, certain medical expenses, etc.).	Total expenditure incurred by central and local government in combating use (and trafficking) of psychotropic substances. This expenditure can be grouped under three main headings: enforcement, treatment and prevention.	Total expenses incurred indirectly by society as a result of substance use (and trafficking). External costs include, for example, lost productivity, absenteeism, premature death, reimbursement of medical expenses, and treatment of illnesses sometimes linked to substance abuse, etc.	Total cost to society

In Kopp and Palle (1998), "Le coût de la politique publique de la drogue: essai de mesure des dépenses des administrations d'Etat" ("The cost of public drugs policy: An attempt to measure government spending"), MILDT report.

In reality, external costs can be divided into private costs and public costs in order to differentiate between what is actually borne by private agents on the one hand and the public sphere on the other.

Thus private costs include, in addition to costs borne directly by drug users (personal expenditure on drugs, lawyers' fees not covered by the State, some non-reimbursable medical expenses, etc.) the private external costs borne by private agents who are not substance users (individuals and organisations). The latter category encompasses not only costs inflicted by substance users on other private agents who are not users (individuals and firms) but also the expenditure incurred by private agents (chiefly associations).

Public costs, on the other hand, cover three types of expenditure relating to drug use (and trafficking) by private agents. The first category of expenditure includes public expenditure as defined in the national accounts, i.e. that shown in the central government budget. We here find the expenditure incurred by the various ministries (such as the Ministry of Employment, Solidarity and Public Health, the Ministry of Justice, the Ministry of the Interior, the Ministry of Defence, etc.). The second category of expenditure represents all resources committed by local government (regional, local

and district councils). Lastly, all social transfers count as public costs, occurring mainly in the health sector. In actual fact, this expenditure is not generally regarded as a public cost (as defined in national accounts) in studies carried out in France and most other European countries, since these costs are paid for by society as a whole, i.e. also by households and firms, which are private agents. Nevertheless, when comparing various studies internationally we should note that the British and American approaches include all health-service costs in public expenditure.

To adopt a presentation more in keeping with the one usually used in France, Table 2 corresponds to Table 3 below, in which a clear distinction is made between the nature of the costs (direct costs, direct and indirect costs resulting from drug addiction, and intangible costs) on the one hand, and the nature of the agents bearing these costs (drug users, central and local government, social security, and civil society) on the other.

Table 3 - Social cost of drugs in cost-of-illness (COI) studies

Players	Drug users	+ Non-users	+ Central and local government	+ Social security	= Society
Direct costs	(1) Purchase of drugs	(2)	(3) Public cost of prevention and maintenance programmes	(4) Cost of medical treatment	Total cost to society
Cost of direct conse-quences	(5) Cost of individual treatment (non-reimbursable part); court fees not claimable	(6) Cost of treatment for diseases transmitted by users (non-reimbursable part); cost of material damage and personal injury	(7) Treatment cost out of public-sector budget; legal costs; legal advice and assistance	(8) Cost of individual treatment (reimbursed part); cost of treatment for drug users' victims (reimbursed part)	
Cost of indirect conse-quences	(9) Lost earnings	(10) Lost productivity; lost earnings	(11) Lost tax; sundry social assistance	(12) Lost social insurance contributions	
Cost of intangible consequen-ces	(13) Drug-related loss of well-being due to disease, premature death or incarceration	(14) Loss of well-being due to drugs (family), offences committed by drug users, deaths due to transmitted diseases, etc.			

Notes: Externalities in the strict sense = 3 + 4 + 6 + 7 + 8 + 10 + 11 + 12
Externalities in the broad sense = externalities in the strict sense + 5 + 9
"Social cost" as defined by economic theory = 1 + (5 + 9) + externalities in the strict sense = 1 + externalities in the broad sense
"Social cost" as defined by COI studies = externalities in the broad sense

For studies including intangible costs: "Social cost" = "Social cost" as defined by COI studies + intangible costs.

In short, the "social cost" approach adopted here takes only those costs borne by private and public agents as a whole (apart from intangible costs) and specifically excludes the "revenue" or "benefit" aspect connected with use of these substances. In other words, an approach based on the concept of "social cost" proves very different from the "cost-benefit" method traditionally used in public-sector economics, which consists in considering all the costs generated by a given activity and all the benefits gained from this activity. Thus the cost-benefit approach arrives at a balance representing the difference between benefits and costs, this balance being either positive (net benefits) or negative (net costs).

Intuitively the cost-benefit method would seem to provide a better grasp of economic reality than the social-cost method in that it produces a net benefit or a net cost. In other words, both economic dimensions (positive and negative) are addressed by this method, which gives a clear overall picture of the benefit gained or cost paid by calculating a net balance, whereas "social cost" would seem to offer a truncated view of reality by considering only the negative dimension (i.e. the total cost to society) and disregarding the benefit aspect.

The problem, at this stage of the argument, is therefore to identify factors vindicating and supporting a purely cost-based approach rather than subscribing to a methodology which would balance the relative costs and benefits. In other words, what general philosophy underlies the social-cost approach?

This approach, which in English-language literature on psychotropic substances is termed the cost-of-illness (COI) method[4], presupposes full factor employment (i.e. all existing resources are employed to produce goods and services).

However, the latter assumption has to be combined with an assumption of cost minimisation for a constant yield. Standard economic theory has traditionally assumed that all available resources are used (or combined) efficiently, in other words, that optimum allocation of resources has occurred. But as far as the concept of social cost is concerned, optimum resource allocation is not the object. Nevertheless, the social-cost approach involves a better allocation of resources than is currently the case.

Thus, in the context of this study, these two assumptions support the following argument: Firstly, the assumption of full factor employment posits a situation in which all resources mobilised for a particular economic activity would be allocated to other activities if the activity in question did not exist. By way of example, this would mean that if there were no business in tobacco, alcohol or illicit drugs, all the resources used in these "industries" would have to be found alternative employment in other types of activity; secondly, taking this to be the case, resource reallocation would, ceteris paribus, create the same amount of benefit without the costs previously generated. This consequently involves the second assumption, since the new resource allocation enables the total benefit created by the economy as a whole to be kept constant whilst the total cost generated by this economy is reduced.

[4] Cf. Single, Collins, Easton, Harwood, Lapsley and Maynard (1996).

This argument is akin in spirit to the concept of opportunity cost used in economic theory: the possibility of using the resources allocated to an activity in an alternative and more beneficial way. For example, in this study and COI studies generally, if we suppose that a disease linked to the use of tobacco, alcohol or illicit drugs did not exist, the resources mobilised by society for treatment of this disease could be used differently. In this connection, Single et al. (1996) speak of a counterfactual scenario, which reflects an alternative state of affairs.

An important point to bear in mind is that a counterfactual scenario for a situation involving use of a psychotropic substance implies that users of this substance will shift their consumption to non-harmful goods and services, i.e. to activities not imposing costs comparable (in value) to those generated by the use and trafficking of psychotropic substances.

The question then arises as to what is actually covered by the costs considered in this type of study, since disagreement between economists usually relates to what should or should not be counted as a cost under "social cost" and how to calculate the various components of the "social cost".

With regard to the first point[5], although Table 2 provides a rough outline of social cost it will nevertheless be necessary to define more precisely the various costs to be included and analysed.

Generally speaking, according to Single et al. (1996), an economic study of the social cost engendered by use of psychotropic substances should cover the following six elements:

- Itemisation of all expenditure incurred by substance users.
- A cost study of diseases connected with the substances used.
- Calculation of the impact of substance use on society's material well-being.
- Study of resources used for treatment, prevention, research and legal issues.
- Lost production due to increased morbidity and mortality.
- Some measurement of lost quality of life for a counterfactual scenario in which there is no substance use, this measurement being an attempt to estimate those costs usually termed intangible.

In broad outline, Table 4 below indicates the various components of the social cost in France which should be included in this type of analysis, drawing a distinction between private costs and public costs on the one hand and the category of agent actually incurring these costs on the other[6]. However, this report will not be studying all of these costs, either because of the lack of data available for this type of work or because of a deliberate choice on the author's part. The ticks in the "alcohol", "tobacco" and "illicit drugs" columns show which components are used to calculate the social cost of each type of drug studied.

[5] The second point will be discussed in § 2.1 below.

[6] The table includes in the "public costs" section the medical expenses covered by social security. We have thus followed the North American approach in order to simplify the table.

A number of comments may be made about Table 4 In the first place, some components of the social cost are open to debate. Let us take the case, for example, of someone who has consumed alcohol or illicit drugs and then committed a crime. Even if this person was intoxicated it is not clear that the crime can be attributed to consumption of alcohol or illicit drugs. Although such consumption could have made the person aggressive and been an incentive to murder, on the other hand it is perfectly conceivable that he had decided to use one of these substances before committing his crime. In this case we cannot automatically attribute to consumption of alcohol or illicit drugs the costs linked to the death (loss of future earnings for the victim, lost tax revenue as a result of premature death, etc.) and the crime (costs incurred for arrest, trial and imprisonment of the criminal). The same is true of treatment. We know, of course, that a large proportion of HIV infections stem from drug addiction. But should we therefore include in the "social cost of drugs" the cost of treating AIDS patients infected as a result of their drug addiction? Although the AIDS contracted by users of illicit drugs is undoubtedly the direct consequence of their drug addiction, the facilities and expenditure are not intended for drug addicts as such but for AIDS sufferers. These various cases thus provide material for discussion.

Similarly, the premature deaths arising from these drugs (whether the individuals concerned are users or not) involve putting a value on human life (by itemising, for example, the earnings not received by these individuals as a result of their premature death) as well as making allowance for the fact that these deaths reduce the population and consequently diminish consumption, lower production, etc. This sort of reasoning may seem disturbing, and the reader may legitimately wonder what right economists have to decide the value of human life. Nonetheless, it is not always possible to avoid assigning it a monetary value.

Let us consider the simple question of whether or not traffic lights are required at a junction, bearing in mind that they would reduce accidents there and prevent a certain number of deaths. If the economic assessment of the project's expediency disregards the human lives thus saved, this would amount to giving human life a zero monetary value. Consequently, the traffic lights would never be installed. On the other hand, if human life was assigned an unlimited monetary value, traffic lights would be installed at every junction in order to reduce to the maximum the risk of accident and therefore death. In such circumstances, the traffic flow would be seriously affected. Accordingly, the reader will readily understand that a monetary value for human life must be assigned in this type of study, although this may give rise to discussion of how this should be done.

Similarly, some might raise the question of whether every life should be treated in the same way. In other words, if we deliberately strain the comparison a little, does the life of a driver who is a chronic alcoholic have the same value as that of the "good citizen" whom this alcoholic driver has just killed in a road accident. Here again, this question may seem shocking. In reality, the answer to the problem may turn out to be of little concern if the reader bears in mind our "counterfactual" methodology. In the counterfactual scenario, use of drugs (alcohol in this case) is assumed not to occur; the driver who is a chronic alcoholic is now regarded as a "good citizen" and his life consequently has the same monetary value as that of such a citizen.

Table 4 – The different components of social cost

Private costs	ALCOHOL	TOBACCO	ILLICIT DRUGS
Costs to substance users	✓	✓	✓
Purchase of substances	✓	✓	✓
Lawyers' fees	✓		✓
Non-reimbursed medical expenses	✓	✓	✓
Including: - Pharmaceuticals not reimbursed by social security	✓	✓	✓
Proportion of pharmaceutical costs not reimbursed by social security	✓	✓	✓
Proportion of hospital expenses not reimbursed by social security	✓	✓	✓
Years of life lost by substance users	✓	✓	✓
Private bodies' expenditure on prevention and research	✓	✓	✓
Staff costs	✓	✓	✓
Running costs	✓	✓	✓
Prevention campaigns (radio, TV, poster, etc.)	✓	✓	✓
Medical research by private bodies	✓	✓	✓
Support for patients and patients' and victims' families (expenditure by private bodies)	✓	✓	✓
Staff costs	✓	✓	✓
Running costs	✓	✓	✓
Direct payments	✓	✓	✓
Workplace costs	✓	✓	✓
Absenteeism	✓	✓	✓
Lost productivity	✓	✓	✓
Including - Due to a wage earner's illness-related days of absence	✓	✓	✓
- Due to lost skills as a result of a wage earner's death	✓	✓	✓
Recruitment costs due to a wage earner's death	✓	✓	✓
Training costs due to a wage earner's death	✓	✓	✓
Costs relating to destruction of equipment	✓		✓
Industrial accident costs	✓		✓
Other costs borne by private individuals	✓	✓	✓
Illness due to passive use		✓	
Destruction of private property (vehicles, forests, etc.)	✓	✓	✓
Theft	✓		✓
Lost years of life (crime victims, passive smokers, etc.)	✓	✓	✓
Extra cost of insurance premiums	✓		✓
Intangible private costs	✓	✓	✓
Illness-related suffering of users	✓	✓	✓
Suffering of a user's close relations due to his death	✓	✓	✓
Suffering of a crime victim's close relations	✓	✓	✓
Public costs			
Public spending on health	✓	✓	✓
Medical expenses covered by social security	✓	✓	✓
Including: - Medical consultations	✓	✓	✓
Pharmaceuticals	✓	✓	✓
Hospital expenses	✓	✓	✓
Ambulance service (accident attendance – first aid)	✓		✓
Fire brigade (accident attendance – first aid)	✓		✓
Local-government health spending	✓	✓	✓
Medical research	✓	✓	✓
Spending by Ministry of Employment and Solidarity	✓	✓	✓
Public spending on prevention	✓	✓	✓
Prevention expenditure by Ministry of Education	✓	✓	✓
Prevention expenditure by Ministry of Youth and Sports	✓	✓	✓
Prevention expenditure by police	✓		✓
Prevention expenditure by gendarmerie	✓		✓
Grants to private associations (central government budget)	✓	✓	✓
Grants to private associations (local government budget)	✓	✓	✓
Public-body campaigns funded from central government budget	✓	✓	✓
Public-body campaigns funded from local government budget	✓	✓	✓
Public spending on enforcement	✓		✓
Spending by Ministry of Justice	✓		✓
Spending by General Directorate of Customs and Excise	✓		✓
Spending by gendarmerie	✓		✓
Spending by police	✓		✓

Police spending by local government	✓		✓
Other public costs			✓
Public spending on international measures			✓
Including: Spending by Ministry of Foreign Affairs			✓
French contribution to European Union budget			✓
Contribution of Ministry of Co-operation			✓

The second comment on Table 4 relates to the section dealing with "intangible private costs". In this study, these costs will not be quantified since they are by definition intangible (i.e. non-quantifiable). Nevertheless, this would be possible, and a genuinely exhaustive analysis of social cost ought to include such elements, since the suffering of the deceased's close relations, for example, has a clear impact on their productivity.

The last general comment to be made on Table 4 concerns the fact that two categories of cost can be distinguished. Firstly, there are the costs which are immediately identifiable in a chart of accounts. In this category we find users' expenditure on purchasing substances, lawyers' fees incurred by these users, private bodies' expenditure on prevention and research, spending by private bodies on support for patients and patients' and victims' families, public grants to private associations, prevention campaigns organised by public bodies, public spending on international measures, etc. The second type of cost, on the other hand, either requires allocation bases if the budgets earmarked for problems arising from the use and trafficking of psychotropic substances are not directly identifiable in a chart of accounts (e.g. for general government budgets) or entails the calculation of ratios reflecting the risks attributable to a risk factor such as tobacco, alcohol or illicit drugs. The latter point is important when assessing a set of costs such as health costs, workplace costs and lost years of life, which, once converted into money terms, provide us in this study with a monetary value for the lost earnings of prematurely deceased persons.

However, these ratios are calculated by means of a special method, an explanation of which would go well beyond the scope of this section. The following section on methodological tools will therefore address this question, explaining the stages and calculations required to determine these ratios.

2.1 Discounting

Discounting is a method of measuring future losses (or gains) in relation to the present, taking account of an individual's (more or less negative) expectations of the future. For example, by using a discount rate for expected future earnings of individuals who die prematurely, it is possible to put a present value on the amount of future earnings which will be lost.

In other words, if:

- every medical cause of death is identified by a number i (with i = 1, ..., n)
- individuals are identified by the exponent j
- n_i^j represents the number of individuals dying of medical cause i
- t_i is the difference between the individuals' life expectancy and their average age at death due to medical cause i
- r represents the discount rate
- R^t is the income lost over time period t (or t_i)

- and FRA_i represents the discounted income flow lost by all individuals dying prematurely of disease *i*

then FRA_i can be rendered by:

$$FRA_i = n_i^j \times \left\lfloor \frac{R^{t_i}}{(1+r)^{t_i}} \right\rfloor$$

The fundamental questions raised by this type of analysis hinge, on the one hand, on the level of income to be taken into account and, on the other, on the discount rate used. As regards the latter we should note that the higher the discount rate, the greater will be future depreciation, since this increases the denominator and reduces FRA, whilst the opposite occurs with a lower rate.

Co-operation Group to Combat Drug Abuse and illicit trafficking in Drugs

TYPOLOGY OF COSTS USED TO CALCULATE THE SOCIAL COST OF ILLICIT DRUGS

Co-operation Group to Combat Drug Abuse and illicit trafficking in Drugs

3. Typology of costs used to calculate the social cost

This section is intended to provide a brief outline of all the costs requiring close attention when calculating the social cost of illicit drugs. More precisely, it addresses the nature of the costs to be considered but does not propose to describe in detail the methods of estimating these various costs. [7]

3.1 Health-care costs attributable to drug use

On the one hand, assessment of health-care costs means that it is necessary to know the diseases for which drugs may be considered a risk factor as well as the associated attributable risks (3.1.1). On the other, such an assessment entails a distinction between hospital expenses (3.1.2), outpatient costs (3.1.3), and other health-care costs attributable to drugs (3.1.4).

3.1.1 Data for drug-related risks

To obtain data for drug-attributable risks means first identifying all the diseases for which drugs may be considered a risk factor (AR). As a rule, this type of study is based on ICD9 (International Classification of Diseases, 9th revision) compiled by the WHO. However, it appears that some diseases for which drugs must be considered a risk factor are not listed in ICD9. Hepatitis is a case in point.

Nonetheless, it is essential, when calculating an indicator such as social cost, to identify the entire range of drug-related diseases and to conduct epidemiological surveys in order to determine the drug-attributable risk for each disease.

It is also important to point out that AR values must be calculated separately for each sex (men and women), since the two populations are not affected in the same way by all the diseases concerned.

Finally, although this goes beyond the scope of health-care costs, the drug-attributable risks must be calculated for aspects such as road accidents and accidental falls resulting in death or temporary or permanent working disability, as well as for suicides, indictable offences, etc., in order to estimate specific lost earnings, production, income tax and social insurance contributions.

In fact, of all the costs to be taken into account in the social-cost approach, only those which are not immediately identifiable in a chart of accounts require the use of special tools, since for those costs appearing directly as an accounting line dedicated to one of the drugs studied, it is sufficient to take the amount shown without applying any particular treatment. However, when costs incurred for tobacco, alcohol or illicit drugs are lumped together with other expenditure not specifically earmarked for these substances, special allocation rules must be adopted. The method called of “Attribuable Risks” is one of those allocation rules.

[7] The various methods will form the subject of a detailed analysis in the final report. Thus in this interim report we shall confine ourselves to a list of the costs to be covered by this analysis, together with the accounting principles used to estimate them.

a. Starting point for attributable risk (AR) method [8]

The association between risk factor and health is the starting point for an analysis intended to assess some of the costs attributable to a risk factor (e.g. tobacco, alcohol or illicit drugs). Quantifying this association enables us to calculate the mortality risk for a given risk factor. Once the proportion of deaths due to a risk factor has been defined, it is then possible to assign money values to some components of the "social cost" for this risk factor.

Thus in order to quantify the effects of a risk factor on the onset and development of a disease or on the mortality rate, the proportion of diseases or deaths attributable to this risk factor must be calculated. However, the number of deaths due to a risk factor cannot be arrived at directly. Thus the procedure for evaluating the number of diseases and/or deaths attributable to a risk factor consists simply in extrapolating results obtained by direct observation, generally the number of deaths among those exposed to the risk factor and among those not exposed to it. The procedure has two stages:

1. The first involves direct observation of the morbidity and/or mortality rate among persons exposed to the risk factor compared with the same rate in those not exposed, in order to determine the relative risk (RR).

2. The second involves measuring the excess mortality of persons exposed to the risk factor in the total population. This attributable risk (AR) is calculated as the difference between the relative risk (RR) and the risk to which the same population is exposed for causes other than the given risk factor.

b. Calculating Relative Risk (RR)

Relative Risk (RR) [9] is a "measurement of the association between a disease and a dual-mode (present/absent) risk factor. The factor defines two population groups: the exposed and the unexposed. The Relative Risk is the ratio:

$$RR = \frac{\text{risk in exposed group}}{\text{risk in unexposed group}}$$

Various measurements of risk may be used: incidence rate, instantaneous incidence, cumulative incidence or even prevalence."

However, the analysis method for Relative Risk differs according to the nature of the epidemiological research, the two types of epidemiological study generally used to estimate the effects of a risk factor on health being prospective studies and retrospective studies.

Prospective analyses provide a measurement of Relative Risk proper (RR). These studies (also know as longitudinal studies) consist in monitoring over several years a group exposed to the relevant risk factor and a group not exposed to it. On the basis of

[8] Most of the developments outlined here have been taken from J.J. Rosa (1994).
[9] A. Leclerc, L. Papoz, G. Breart, and J. Lellouch, *Dictionnaire d'épidémiologie*, Éditions Frison-Roche, 1990.

these observations, researchers analyse the incidence of disease in each of these groups, i.e. the number of new cases of disease or death in a group over a given period. Relative Risk is then defined as the ratio of the morbidity or mortality (n1) in the group exposed to the risk factor (N1) to the morbidity or mortality (n2) in the unexposed group (N2). If the two groups are the same size (i.e. N1 = N2), RR is calculated as follows:

$$RR = (n1/N1) / (n2/N2) = n1/n2$$

In retrospective analyses it is only the estimated Relative Risk (RR') which can be calculated. These studies (also known as case-control studies) are based on one sample of subjects who are either deceased or suffering from disease and a second sample of people without disease. For each of these groups, researchers look at risk-factor frequency, i.e. the number of persons exposed to the risk factor. Thus let us assume that for two samples, one consisting of diseased or deceased individuals (M1) and the other of undiseased individuals (M2), the number of persons exposed to the risk factor is "a" in M1 and "c" in M2, and the number of unexposed persons is "b" in M1 and "d" in M2. Consequently, the RR' ratio is given by the following formula:

$$RR' = (a \times d) / (b \times c)$$

It follows that individuals exposed to the risk factor are RR' times more likely to develop disease or die than unexposed persons. If RR' = 1, the morbidity or mortality rate is the same for exposed as for unexposed people. If RR' is greater than 1, the risk factor is a source of morbidity or mortality. Thus, unlike RR, which determines the likelihood of disease or death for an individual exposed to a risk factor, RR' is used to estimate risk prevalence. However, retrospective analyses raise a particular difficulty concerning interpretation of the causal relationship between risk factor and heath, since the subjects of these studies are questioned when they are already ill. The chronological connection between causal factor and disease is not always clear or objectively established, since it is based on the subjects' statements.

For this reason, most epidemiologists base their working hypotheses on the findings of prospective studies, even if the latter are not recent, since these studies are always more rigorous and reliable, despite the problem of distinguishing the direct and indirect consequences of the risk factor from other endogenous factors.

c. Calculating Attributable Risk (AR)

Relative Risk cannot be directly used to attribute a proportion of the costs relating to the substances studied. For example, knowing that there are twice as many deaths from lung cancer among smokers than among non-smokers does not tell us how many deaths can be attributed to tobacco. It is therefore necessary to estimate the proportion of disease relating to the risk factor studied, i.e. to calculate the Attributable Risk (AR).

In relation to RR, Attributable Risk is that part of the risk of which the risk factor is the direct cause. It allows us to estimate the proportion of morbidity or mortality linked to the relevant risk factor.

The mortality risk attributable to a risk factor, i.e. AR, depends on both RR and the proportion of the total population exposed to the risk factor. This is the ratio of the

number of deaths attributable to the risk factor (i.e. the number of deaths observed among those exposed to the risk factor minus the number of deaths in this population which would have occurred anyway even if these individuals had not been subject to the risk) to the total number of persons with disease. To make things clearer, let us suppose that P is the percentage of persons exposed to the risk factor in total population N, n1 the number of deaths among persons exposed to the risk factor, and n2 deaths among unexposed individuals. Therefore, the number of deaths due to the risk factor in the exposed population equals N x P x n1. But if the number of individuals N x P had not been exposed to the risk factor, only N x P x n2 would have died. Consequently, of the total number of deaths in the population (n x N), only (N x P x n1) – (N x P x n2) are attributable to the risk factor considered. This amounts to saying that the proportion of deaths due to the risk factor in relation to the total number of deaths in the population can be rendered by the following formula:

$$AR = ((N \times P \times n1) - (N \times P \times n2)) / (N \times n) = P \times (n1 - n2) / n$$

where {P x (n1 – n2) / n} is the excess mortality as a percentage of the overall morbidity attributable to the risk factor in the total population.

It should be noted that AR is not an index number but always a percentage, expressing the number of deaths attributable to the relevant risk factor in relation to the total number of deaths. Lastly, this method of estimating AR is widely approved by scientific authorities, since it limits bias due to possible interaction between various endogenous factors (gender, age, etc.) and exogenous factors (tobacco, alcohol, illicit drugs, etc.).

d. Example of related risks: alcohol and tobacco consumption in France

The two tables below 5. and 6.) show the pathologies related to drinking and smoking respectively which were used in the study of the social cost of licit drugs (alcohol, tobacco) and illicit drugs in France. They confirm that the related risk lies between 0 and 1, a coefficient of one indicating a pathology fully attributable to a particular risk factor (such as psychosis and alcohol dependence syndrome), while pathologies not attributable to the risk factor concerned have zero related risk.

Table 5 - Risks attributable to the "alcohol" risk factor by pathology and by sex

Pathologies	***Hill's Coefficients (men)***	***Hill's Coefficients (women)***
Mental disorders		
Psychosis and alcohol dependence syndrome	1.00	1.00
Digestive system disorders		
Acute alcoholic hepatitis	1.00	1.00
Liver cirrhosis	0.91	0.69
Acute pancreatitis	0.40	0.40
Chronic pancreatitis	0.70	0.55
Cancers		
Mouth	0.84	0.24
Pharynx	0.89	0.30
Œsophagus	0.86	0.55
Rectum	0.12	0.05
Liver	0.71	0.54
Larynx	0.76	0.15
Pancreas	0.20	0.20
Breast	-	0.16
Cardiovascular diseases		
Ischemic cardiopathy	0.39	0.07
Alcoholic cardiomyopathy	1.00	1.00
Cerebral vascular disease	0.26	0.08
Diseases of the respiratory tract		
Pneumonia, influenza	0.36	0.07
Other pathologies		
Foetal alcoholism syndrome	1.00	1.00
Other medical causes of death		
Road accidents	1.00	1.00
Accidental falls	1.00	1.00
Suicides	1.00	1.00
Homicides	1.00	1.00
Foetal alcoholism syndrome	1.00	1.00

It should also be noted, with a view to international comparison of the social cost, that the first stage consists in identifying all the pathologies which are related to the risk factor studied. Before international comparisons can be made, in order, for example, to compare the efficacy of public policies in different countries, a set of homogeneous data must be obtained. It is therefore essential, prior to any evaluation of the social cost, to arrive at a broad consensus and a full agreement at the international level as to which pathologies related to the risk factor studied must be monitored in order to calculate the attributable risks. The lack of such a common approach will result in major discrepancies in the various component costs and in their aggregate, i.e. the social cost itself, depriving international comparisons of much of their meaning and usefulness.

Table 6 - Risks attributable to the "tobacco" risk factorby pathology and by sex

Pathologies	***Hill's Coefficients (men)***	***Hill's Coefficients (women)***
Infectious Pathologies		
Respiratory tuberculosis	0.50	0.00
Cancers		
Mouth and pharynx	0.74	0.13
Œsophagus	0.53	0.13
Pancreas	0.38	0.04
Larynx	0.87	0.29
Trachea, bronchia, lung	0.85	0.19
Cervix	-	0.06
Bladder	0.50	0.13
Kidney and urinary tract	0.39	0.06
Cardiovascular diseases		
Hypertension	0.19	0.01
Ischemic cardiopathy	0.43	0.11
Cardiac arrest	0.42	0.02
Cerebro-vascular disease	0.11	0.01
Arteriosclerosis	0.24	0.03
Aortic aneurysm	0.63	0.11
Arteritis	0.68	0.04
Respiratory diseases		
Pneumonia, influenza	0.36	0.00
Chronic bronchitis, emphysema	0.88	0.14
Obstructive pulmonary disease	0.88	0.14
Digestive disorders		
Gastroduodenal ulcer	0.49	0.02

3.1.2 Drug-related hospital costs

In some countries hospital costs may be broken down into costs with surgery and costs without surgery. Hospitalisations with surgery include all hospitalisations where surgical operations are performed, while hospitalisations without surgery include both hospital treatment not involving any surgery (for example, general check-ups, X-rays, etc.) and visits by the patient to the hospital to pick up medicines. So "hospitalisations without surgery" are in fact the same as ambulatory medicine, or out-patient treatment.

The reason for this distinction between hospitalisations with and without surgery is that the cost of hospitalisations with surgery is much higher than that of hospitalisations without.

In order to calculate the cost of hospitalisations with surgery for a given risk factor, the following data are required:

- ☞ the pathologies which involve the 'drug' risk factor,

- the risks attributable to the 'drug' risk factor for each pathology involving the risk factor considered, each attributable risk being calculated both for men and for women,
- the number of hospitalisations with surgery per pathology and per sex,
- the mean cost per pathology of a hospitalisation with surgery.

The cost of hospitalisation with surgery (C_h) for n pathologies is thus:

$$C_h = \sum_{i=1}^{n} \left(RA_i^1 \times NS_i^1 \right) \times c_i + \sum_{i=1}^{n} \left(RA_i^2 \times NS_i^2 \right) \times c_i$$

where:

- index i is the pathology studied (i =1, ..., n),
- exponent 1 concerns men and exponent 2, women,
- RA corresponds to the risk attributable to the risk factor considered,
- NS is the number of hospitalisations with surgery,
- c_i is the mean cost of a hospitalisation with surgery for the pathology i.

Thus:

$$\left(RA_i^1 \times NS_i^1 \right)$$

and :

$$\left(RA_i^2 \times NS_i^2 \right)$$

represent the number of hospitalisations with surgery for men (exponent 1) and women (exponent 2) for pathology i, which are attributable to the risk factor studied. Multiplying each of these expressions by c_i gives the cost of hospitalisations with surgery for men and women respectively for pathology i and attributable to the risk factor studied. Then, by adding together, for all pathologies, the costs of hospitalisations with surgery for men and women respectively which are attributable to the risk factor studied, we arrive at the total cost of hospitalisations with surgery attributable to a particular risk factor.

Tables 7 and 8 give an estimation, for men and women respectively, of the cost of hospitalisations with surgery for the risk factor "alcohol" as calculated in the context of the study on the social cost of licit drugs (alcohol, tobacco) and illicit drugs in France.

Table 7 – Cost, for men and per pathology, of hospitalisations with surgery attributable to the "alcohol" risk factor in France

Pathologies	*Risk attributable to alcohol*	*Number of hospitalisations*	*Number of hospitalisations attributable to alcohol*	*Mean cost of a hospitalisation (francs)*	*Total hospital cost attributable to alcohol (millions of francs)*
Mental disorders					
Psych. and alc. dep. syndr.	1.00	68,077	68,077	**24,490.84**	1,667.26
Digestive disorders					
Acute alcoholic hepatitis	1.00	4,250	4,250	**24,490.84**	104.09
Liver cirrhosis	0.91	35,250	32,078	**24,490.84**	785.60
Acute pancreatitis	0.40	13,800	5,520	**24,490.84**	135.19
Chronic pancreatitis	0.70	3,681	2,577	**24,490.84**	63.11
Cancers					
Mouth	0.84	15,300	12,852	**24,490.84**	314.76
Pharynx	0.89	16,900	15,041	**24,490.84**	368.37
Œsophagus	0.86	17,644	15,174	19,280.50	292.56
Rectum	0.12	16,100	1,932	**24,490.84**	47.32
Liver	0.71	12,500	8,875	**24,490.84**	217.36
Larynx	0.76	15,543	11,813	18,573.00	219.40
Pancreas	0.20	12,375	2,475	20,338.00	50.34
Cardiovascular diseases					
Ischemic cardiopathy	0.39	193,500	75,465	21,352.00	1,611.33
Alcoholic cardiomyopathy	1.00	*na*	*na*	*na*	*na*
Cerebral vascular disease	0.26	79,300	20,618	24,434.00	503.78
Respiratory diseases					
Pneumonia, influenza	0.36	57,000	20,520	21,165.00	434.31
Other pathologies					
Foetal alcoholism syndrome	1.00	*na*	*na*	*na*	*na*
				TOTAL	**6,814.75**

The first column in each of these two tables shows the pathologies for which alcohol was identified as a risk factor. The second column shows the risk to men (table 7) and to women (table 8) attributable to the "alcohol" risk factor associated with each pathology *i*. The third column shows the total number of hospitalisations with surgery for men (table 7) and women (table 8) for each pathology. The fourth column indicates the total number of hospitalisations with surgery for men (table 7) and women (table 8) attributable to the "alcohol" risk factor (these figures are obtained by multiplying the figures in column 2 by those in column 3). The fifth column shows the mean cost of a hospitalisation for each pathology. It should be noted that the figures in bold correspond to missing figures and were generated by taking the mean hospital costs

available weighted by the number of hospitalisations with surgery. The last column gives the total cost of hospitalisations with surgery attributable to the "alcohol" risk factor for each pathology (the product of columns 4 and 5).

Table 8 - Cost, for women and per pathology, of hospitalisations with surgery attributable to the "alcohol" risk factor in France

Pathologies	*Risk attributable to alcohol*	*Number of hospitalisations*	*Number of hospitalisations attributable to alcohol*	*Mean cost of an hospitalisation (francs)*	*Total hospital cost attributable to alcohol (millions of francs)*
Mental disorders					
Psych. and alc. dep. syndr.	1.00	21,841	21,841	**24,288.15**	530.48
Digestive disorders					
Acute alcoholic hepatitis	1.00	2,152	2,152	**24,288.15**	52.27
Liver cirrhosis	0.69	17,848	12,315	**24,288.15**	299.11
Acute pancreatitis	0.40	7,800	3,120	**24,288.15**	75.78
Chronic pancreatitis	0.55	4,287	2,358	**24,288.15**	57.27
Cancers					
Mouth	0.24	2,900	696	**24,288.15**	16.90
Pharynx	0.30	2,500	750	**24,288.15**	18.22
Œsophagus	0.55	18,000	9,900	19,280.50	190.88
Rectum	0.05	14,500	725	**24,288.15**	17.61
Liver	0.54	2,900	1,566	**24,288.15**	38.04
Larynx	0.15	15,857	2,379	18,573.00	44.18
Pancreas	0.20	12,625	2,525	20,338.00	51.35
Breast	0.16	60,300	9,648	**24,288.15**	234.33
Cardiovascular diseases					
Ischemic cardiopathy	0.07	95,810	6,707	21,352.00	143.20
Alcoholic cardiomyopathy	1.00	*na*	*na*	*na*	*na*
Cerebral vascular disease	0.08	81,700	6,536	24,434.00	159.70
Respiratory diseases					
Pneumonia, influenza	0.07	41,400	2,898	21,165.00	61.34
Other pathologies					
Foetal alcoholism syndrome	1.00	*na*	*na*	*na*	*na*
				TOTAL	**1,990.65**

The same method may be used to calculate the cost of hospitalisations without surgery. The data required are the following:

- ☞ the pathologies involving the “drug” risk factor,

- the risks attributable to the “drug” factor for each pathology involving the risk factor considered, each attributable risk being calculated both for men and for women,
- the number of hospitalisations without surgery per pathology and per sex,
- the mean cost per pathology of a hospitalisation without surgery.

The cost of hospitalisation without surgery ($C_{h'}$) for *n* pathologies is thus:

$$C_{h'} = \sum_{i=1}^{n} \left(RA_i^1 \times NS'^1_i \right) \times c'_i + \sum_{i=1}^{n} \left(RA_i^2 \times NS'^2_i \right) \times c'_i$$

where:

- index *i* is the pathology studied (*i* =1, ..., *n*),
- exponent 1 concerns men and exponent 2 women,
- *RA* corresponds to the risk attributable to the risk factor considered,
- *NS'* is the number of hospitalisations without surgery,
- c'_i is the mean cost of a hospitalisation without surgery for the pathology *i*.

Thus:

$$\left(RA_i^1 \times NS_i^1 \right)$$

and :

$$\left(RA_i^2 \times NS_i^2 \right)$$

represent the number of hospitalisations without surgery for men (exponent 1) and women (exponent 2) for pathology *i,* which are attributable to the risk factor studied. Multiplying each of these expressions by c'_i gives the cost of hospitalisations without surgery for men and women respectively for pathology *i* and attributable to the risk factor studied. Then, by adding together, for all pathologies, the costs of hospitalisations without surgery for men and women respectively which are attributable to the risk factor studied, we arrive at the total cost of hospitalisations without surgery attributable to a particular risk factor.

Tables similar to tables 7 and 8 may thus be drawn up for the cost of hospitalisations without surgery attributable to a particular risk factor.

The total cost of hospitalisations attributable to a particular risk factor is obtained by adding the cost of hospitalisations with surgery attributable to the risk factor concerned and the cost of hospitalisations without surgery attributable to the same risk factor, as shown in table 2.5, which shows the total cost for the risk factor "alcohol" as calculated in the study on the social cost of licit drugs (alcohol, tobacco) and illicit drugs in France.

Table 9 - Cost of hospitalisations attributable to the "alcohol" risk factor in France

Cost	Sex	Hill’s Coefficients
Cost of hospitalisations with surgery	Men	6,814.75
	Women	1,990.65
	Total 1	8,805.40
Cost of hospitalisations without surgery	Men	1,074.80
	Women	309.00
	Total 2	1,383.80
	Overall total (1 + 2)	*10,189.20*

It should be noted that the distinction in table 9 between the cost generated by the male population and that generated by the female population is interesting as it clearly identifies the population group which generates the largest proportion of the overall hospital cost, information that can be very useful to the public decision maker, for example in targeting a certain population group with prevention campaigns.

3.1.3 Drug-related non-hospital medical costs

In addition to the hospital costs attributable to a given risk factor described above, health expenditure includes another type of cost, viz. the non-hospital medical costs linked to drug consumption.

This type of cost is more difficult to calculate than the costs mentioned above, as numerous data are required. Not only does estimating the additional non-hospital medical cost of a particular risk factor mean knowing the overall amount spent annually on non-hospital health care, but it also means calculating the overall risk attributable to the risk factor concerned in order to determine the share of non-hospital health care costs attributable to that risk factor.

The method for calculating the overall risk attributable to the risk factor concerned, in order to determine the share of non-hospital health care costs attributable to that risk factor, consists in taking the total annual number of visits or consultations (NV_i, i = 1, ... n) for each pathology.[10] In other words, for any given pathology i, each non-hospital health care professional (or a representative panel) has to count the annual number of visits received in connection with the pathology concerned. If this is done for all the pathologies listed in the International Classification of Diseases 9th or 10th revision (ICD9 or ICD10), we obtain the total annual number of visits (NV), thus:

$$NV = \sum_{i=1}^{n} NV_i$$

Now, assuming that:

$$NV_i = NV_i^{'} + NV_i^{''}$$

where:

$$NV_i^{'} = RA_i \times NV_i$$

and:

$$NV_i^{''} = (1 - RA_i) \times NV_i$$

RA_i being the risk attributable to the risk factor concerned for pathology i. And if:

$$RA_i = 1 \Rightarrow NV_i^{'} = NV_i$$

$$RA_i = 0 \Rightarrow NV_i^{''} = NV_i$$

[10] The number of patients is smaller than or equal to the number of visits, as the same patient may make one or more visits in the course of a year.

the overall or global risk (RA_g) attributable to the risk factor under consideration when calculating the non-hospital health care costs of that risk factor is determined as follows:

$$RA_g = \frac{\sum_{i=1}^{n} NV_i^{'}}{NV}$$

Therefore, as we know the total annual cost of non-hospital health care (which we shall call *D*), one simply has to multiply *D* by the global risk (RA_g) attributable to the risk factor concerned, thus:

$$D^{'} = RA_g \times D$$

where *D'* is the cost of non-hospital health care attributable to the risk factor concerned.

This method nevertheless calls for two remarks: first, as with the cost of hospital treatment, it can be interesting to distinguish the cost of non-hospital medical treatment generated by men from that generated by women; and secondly, it should be noted that the coefficient RA_g is calculated on the basis of visits to the doctor. However, in addition to these consultations non-hospital medical costs also include the consumption of medicines and apparatuses. So, for greater accuracy, one should also calculate the proportion of the cost of the pathologies in which the risk factor is involved which is spent on medicines and the proportion spent on apparatuses.

Take spending on apparatuses, for example. Like visits to the doctor, the cost of each apparatus consumed (i.e. the cost of the treatment involving the apparatus) should be recorded each time a patient suffering from a pathology *i* has a consultation involving an apparatus. This would reveal the total annual cost of apparatuses for pathology *i* (which we shall call CA_i, $i = 1, \ldots n$). If we do this for all the pathologies in which the risk factor studied is involved, we obtain the total annual cost of apparatuses (CA) for all the pathologies involving the risk factor concerned, thus:

$$CA = \sum_{i=1}^{n} CA_i$$

Now, assuming that:

$$CA_i = CA_i^{'} + CA_i^{''}$$

where:

$$CA_i^{'} = RA_i \times CA_i$$

and:

$$CA_i^{''} = \left(1 - RA_i\right) \times CA_i$$

RA_i being the risk attributable to a given risk factor for pathology *i*. And if:

$$RA_i = 1 \Rightarrow CA_i^{'} = CA_i$$

$$RA_i = 0 \Rightarrow CA_i^{''} = CA_i$$

then the total annual expenditure on apparatuses attributable to the risk factor concerned (*D''*) is obtained as follows:

$$D'' = \sum_{i=1}^{n} CA_i'$$

The same method is used to calculate the cost of medicine consumption. The problem here is whether the cost of medicine consumption should be monitored by the chemists who dispense the drugs or the doctors who prescribe them. Be that as it may, the total annual expenditure on medicinal drugs attributable to the risk factor studied (which we shall call *D'''*) is calculated as follows:

$$D''' = \sum_{i=1}^{n} CP_i'$$

where CP'_i is the cost of medicine for pathology *i* attributable to a particular risk factor.

Total annual spending on non-hospital health care (*D*) for a given risk factor is thus:

$$D = \left(\frac{\sum_{i=1}^{n} NV_i'}{NV} \times CV \right) + \sum_{i=1}^{n} CA_i' + \sum_{i=1}^{n} CP_i'$$

where CV is the total annual cost of visits to doctors.

Taking these three items of expenditure into account, of course, means breaking down the total annual cost of non-hospital health care into three categories:

- ☞ total annual cost of visits to doctors,
- ☞ total annual cost of medicinal drugs consumed,
- ☞ total annual cost of apparatuses consumed.

The sum of these three categories should be equal to the total annual cost of non-hospital health care. However, the data necessary for calculating the cost of non-hospital health care attributable to a given risk factor based on the above breakdown of the total annual cost of non-hospital health care are not always available. For simplicity's sake, therefore, spending on non-hospital health care may be calculated in terms of a global attributable risk estimated on the basis of visits to doctors. There again, however, the statistics on visits to doctors may not be available. This difficulty may be overcome by taking the figures for hospital visits and using the same method to calculate the global attributable risk as that used for visits to doctors.

3.1.4 Other drug-related health-care costs

The last type of cost to be taken into consideration in drug-related health-care costs is that of substitution programmes, using Subutex® or methadone, for example. [11]

In actual fact, the simple rule when determining the types of expenditure that should be taken into account here is whether the cost is covered by the collective health system (i.e. the social security system), by government departments or by private agencies. If the cost is covered by the collective health system it should be classified under the heading "Illicit drug-related health costs" (i.e. under heading 2.1 presented here). Otherwise the cost should be classified under the expenditure of the government departments or private agencies concerned. The items included in these health-care costs will therefore vary from country to country.

In the case of France, only the cost of Subutex® treatment falls into the category "other drug-related health-care expenditure". This is why the only example presented here is that of Subutex® treatment, although the same approach can be applied to other types of treatment.

To determine the cost of treatment with Subutex® (or another substitute drug), the first step is to identify the type of product, its form (tablet, liquid, etc.), the different doses and the method of administration. In the case of France, Subutex®, which has been on the market there since 1996, is a high-dose form of buprenorphine, which is a partial agonist of the morphine receptors. Theoretically, therefore, it is less likely than other opiate substitutes to cause respiratory depression because of its ceiling effect. The Authorisation to Market the product defines it as the "*substitute treatment for severe opiate dependence in the context of medical, social and psychological treatment".* The means of prescription and administration were fixed by the French Medicinal Drug Agency and published in the Authorisation to Market. It comes in the form of sublingual tablets containing 0.4 mg, 2 mg and 8 mg doses of buprenorphine. The tablets are sold in boxes of 7 at the following prices, including VAT: FF 28.20 per box of 0.4 mg tablets, FF 65.10 for the 2 mg dose and FF 176.70 for the 8 mg dose.

Any hospital or non-hospital physician may prescribe Subutex®. The prescription, for a maximum period of 28 days, must be made out on a special stub book. The doctor may state on the prescription whether the treatment should be dispensed all at once or in stages, and in this case at what rate. It is also recommended that the doctor contact the dispensing chemist and that the name of the chemist or the outlet be indicated on the prescription counterfoil, especially in the induction phase. Once the patient is stabilised, however, the full 28-day prescription may be delivered at once.

These prescription and dispensing arrangements are more flexible than those applied to methadone: methadone treatment must be initiated in specialised centres where the drug is dispensed daily and urine samples are tested. Urine tests are not necessary in substitution treatment with Subutex®. Later into the treatment process, methadone may be prescribed by a general practitioner, using a stub book, for a maximum period of 7 days at a time.

[11] In practice, these costs, like the cost of methadone in France, for example, can be included in government spending when they are entirely covered by the government institutions concerned.

Another type of information needed to evaluate this cost is the number of patients per month. In France, the SIAMOIS indicators[12] show that 14-18,000 patient-months were taken in charge as of June 1996, and almost 40,000 patient-months in June 1997. These figures are based on the unlikely assumption that a 30-day treatment (at an 8 mg dose) is purchased and consumed in full by the same person. The real picture would seem to be less rigid: an estimate of 50,000 to 80,000 people consuming Subutex® seems reasonable. The Auditor General's report set the number of drug addicts treated with Subutex® at about 42,000 on 31 December 1997, compared with 24,000 a year earlier.

With the help of this information, it is possible to calculate the total annual cost of Subutex® treatment (*CTS*), as follows:

$$CTS = 12\left(\sum_{i=1}^{n} \left(Np_i \times NBS_i \times c_i \right) + NP \times \left[\left(c_v \times NV \right) + \left(c_m \times c_e \right) \right] \right)$$

where:

- Np_i is the number of patient-months of type *i* Subutex® consumption,
- NBS_i is the number of boxes of type *i* Subutex® consumed per month by each type of patient *i*,
- c_i is the cost of a box of type *i* Subutex®,
- *NP* is the total number of patients treated with Subutex®,
- *NV* is the number of visits to a doctor per patient per month and c_v is the cost of a visit,
- c_m is the mean monthly cost per patient of the other medicinal drugs associated with treatment by Subutex®, and
- c_e is the mean monthly cost per patient of biological and radiological examinations linked to Subutex® treatment.

In France, a study conducted by the Centre of Economic, Sociological and Management Research [13] (CRESGE), at the request of the Schering-Plough Laboratory, the findings of which were included in the recent report of the Auditor General's Department, evaluates the cost of medical treatment using Subutex® at FF 15,284.04 per patient per year. In other words, for the whole of the study sample, the mean cost of the administration by a general practitioner of substitution treatment with Subutex® is FF 1,273.67 per month, more than three quarters of that being the cost of the Subutex® itself.

[12] The SIAMOIS system *(Système d'Information sur l'Accessibilite au Materiel d'Injection Sterile)*, run by the National Public Health Network, gathers information about the products chemists sell to drug users. It was set up in January 1996 as part of risk prevention policy in France.

[13] Paree, Allenet, Lebrun, *"Subutex® dans l'arsenal thérapeutique de prise en charge des héroïnomanes : environnement et estimation du coût de prise en charge médicale",* Centre de Recherches Economiques, Sociologiques et de Gestion (CRESGE), October 1997. The authors used the database of the network of general practitioners of the Thalès Epidemiological Observatory, with input from 383 computerised GPs. All the prescriptions of Subutex® issued by these doctors were studied from October 1996 to March 1997 inclusive. In all, 1,548 prescriptions including Subutex® were analysed for such details as prescription arrangements, co-prescriptions, related diagnoses and complementary examinations. 378 patients were concerned, mainly men (77 % of the sample); their average age was 30 years.

Table 10 - Evaluation of the mean cost per patient of treatment with Subutex®

Mean monthly cost of treatment	Patients "followed"	
	Cost in FF	% of total cost
Subutex®	1,001.50	78.6
Other medicines	109.55	8.6
Consultations with doctor	154.13	12.1
Biological or X-ray examinations	8.49	0.7
Total	**1,273.67**	**100.0**

It is also worth noting that the burden of this cost is spread as follows:

- FF 10,800 is paid by the sickness insurance scheme,
- the remainder is paid by the social security funds, out of their welfare budget.

33.3 % of the sample population were entitled to free treatment as long-term illness sufferers.

The cost concerned is that of ambulatory treatment of an individual starting or continuing a substitution treatment by Subutex®, not counting specialist treatment, hospital treatment or the possibility of patients going to several doctors at once for treatment.

So, based on the assumption that 40,000 people are given substitution treatment with Subutex®, we can extrapolate the overall cost from the above-mentioned monthly cost. **The overall direct medical cost would be approximately FF 611.36 million**.

In fact, the method used here by the CRESGE differs somewhat from the method presented above insofar as the mean monthly cost of treatment per patient is calculated first, then multiplied by the total number of patients. In other words, the total annual cost of treatment with Subutex® (*CTS*) is calculated as follows:

$$CTS = 12 \times NP \times (c_s + c_v + c_m + c_e)$$

where:

- *NP* is the total number of patients treated with Subutex®,
- c_s is the mean monthly cost of Subutex® per patient,
- c_v is the mean monthly cost per patient of visits to the doctor,
- c_m is the mean monthly cost per patient of other medicines associated with Subutex® treatment,
- c_e is the mean monthly cost per patient of biological and X-ray examinations associated with Subutex® treatment.

3.2 Government department expenditure

Spending by government departments to combat drug abuse is the second major component of the social cost of drug abuse. This spending includes all the resources in the State budget allocated to the different ministries under budget headings specifically aimed at drug abuse, as well as spending by the different ministries which is only partly related to the drug problem. An example of the latter is the Ministry of Justice, where judges spend some, but not all of their time working on drug-related cases.

A simple way of presenting this type of public spending is to distinguish action geared to repression (justice, police, *gendarmerie*, customs) from that geared to health and social care or prevention. The actual breakdown of government spending adopted here is based on a presentation per government department, a simpler solution in view of the budgetary context, the lack of uniformity between the different ministries, and the fact the distinction between repressive and other action is not really clear-cut, as the justice system, the police and the *gendarmerie* sometimes spend an often considerable proportion of their time on prevention work.

It should also be remembered that government organisation differs from country to country. However, although the methodology presented here is based on the situation in France, most of the expenditure concerned is also found in other countries. While following the general lines, therefore, each country must adjust this method to its specific needs.

Finally, for certain items of expenditure the number of drug offences is used to determine how expenditure is apportioned. (Drug offences are often referred to in the following paragraphs, particularly in equations, as “ILS”, the initials of the French expression *infractions à la législation sur les stupéfiants*, or violations of the narcotics legislation). The ILS taken into account are only those where the drug offence is the main offence. In other words, a prison sentence or fine may be the result of several offences committed simultaneously. In such cases, if the primary or main offence is not the drug offence, the latter taking only second or third, etc. place, the offence will not be counted as an ILS. Say a driver is arrested for speeding and is found to be in possession of cocaine, for example. He may be sentenced concurrently for speeding and possession of illegal substances. In this case, if speeding was considered the main offence, this will not be counted as an ILS. If two sentences are pronounced, however, one for speeding and the other for possession of illegal substances, the latter alone will be taken into account in the social cost. In the event of multiple offences giving rise to a concurrent sentence, if the ILS is considered to be the main offence, the entire multiple offence will be considered as an ILS and all its consequences will be included in the social cost calculation.

3.2.1 Ministry of Justice

A first series of costs relates to the activities of the justice system at the different stages of the criminal law process and the functioning of the criminal courts. These costs are primarily (a) payroll costs (judges, clerks and justice officers), court operating costs (building maintenance, information processing, etc.), court fees and legal aid; (b) the

cost of incarcerating suspects and convicts, i.e. prison administration costs; and (c) spending by the services responsible for the judicial protection of juvenile offenders.

These are typical cases of expenditure not devoted exclusively to drug-related problems. For each of these three categories of spending, therefore, the method proposed seeks to determine what share of the budgets concerned is spent on dealing with people prosecuted for drug offences (ILS).

a. Judicial services

As we saw earlier, each country organises its judicial services in its own way, so it is rather unrealistic to hope for a "turn-key" solution here. However, even in a case as complex as that of France, it is possible to develop a reasonably general methodology, which then has to be adapted, of course, to the organisational specificities of each country's judicial services.

En France, judicial services include the activities of the criminal and the non-criminal courts. One must therefore pinpoint the total cost of criminal proceedings, then determine the share of that cost which can be attributed to drug-related offences (ILS). This means determining what proportion of their time judges spend on criminal cases and what percent of that is spent on ILS.

Seven categories of judges and justice officials may be distinguished when calculating the proportion of judicial work devoted to criminal cases (table 2.7):

1 Judges of the court of cassation
2 Appeal court Judges
3 Judges of the Bench
4 Prosecutors
5 Investigating Judges
6 Judges responsible for the execution of sentences
7 Children's Judges

Table 11 – Number of judges and % of time spent on drug offences (ILS)

Category of judges	**Number in the category** (1)	**% of time spent by the category on criminal cases** (2)	**% of time spent on criminal cases that concern ILS** (3)	**% of time of all judges in the category spent on ILS** (4) (4) = (2) x (3)	**Equivalent in terms of no. of judges working full-time on ILS** (6) (6) = (1) x (4)
2	1,232	40%	6.4%	2.560%	31.5
3	2,409	22%	4.7%	1.034%	24.9
4	1,162	72%	7.3%	5.256%	61.0
5	555	100%	11.0%	11.000%	61.0
6	199	100%	15.0%	15.000%	30.0
7	290	25%	2.2%	0.500%	1.6
Total	5,847	-	-	3.59%	210.0

Note : we have excluded the judges of the court of cassation (category 1), considering that their activity, like that of central government, is too indirectly linked to ILS to be taken into account.

Table 11 shows that the different categories of judges spend varying amounts of their time dealing with criminal offences, i.e. cases likely to involve a significant proportion of ILS.

In fact, for each category of judges, Table 11 gives some of the information needed in order to calculate the cost of judicial services generated by illicit drug use. In other words, each category of judges (which we shall call M_i, i = 1, ..., n) comprises a number of judges (N_i), and each category of judges devotes part of its time (p_i) to criminal proceedings. This time devoted to criminal proceedings (p_i) by each category of judges (M_i) includes time spent on ILS (which we have called ILS_{pi}), which can be used to calculate the share of the total activity of each category of judges which is spent on ILS, which we shall call ILS_i and which is calculated as follows:

$$ILS_i = \left(p_i \times ILS_{pi}\right)$$

i.e. the proportion of their total activity which judges in category i devote to criminal proceedings, multiplied by the percentage of that time devoted to criminal proceedings which they effectively spend dealing with ILS cases. For example, on average, judges in the court of appeal category (category M_2) spend 40% of their time on criminal cases and 6,4% of that 40% dealing with ILS. Consequently this category of judges devotes 2.56% of its total activity to ILS (40% x 6,4%).

In general, therefore, each country should identify the categories of judges who deal with ILS (i.e. drug-related offences) and calculate how much of their total activity they devote to ILS. The figures should be calculated on an annual basis.

If we know how many judges there are in each category (N_i), it is then possible to estimate the Full-Time Equivalent (ETP_i), i.e. number of judges in each category M_i who would be occupied full-time if all the ILS work was done by the same judges, thus:

$$ETP_i = N_i \times ILS_i$$

For example, still in the category of appeal court judges (category M_2), the Full-Time Equivalent number of judges working on ILS cases is estimated at 31.5, i.e. (1,232 x 0.064).

Finally, the ILS-related cost of each category of judges (which we shall call $CILS_i$) is obtained by multiplying the mean cost of a judge in category i (i.e. the total cost (C_i) of the category of judges i divided by the number of judges in category i (N_i)) by the number of Full-Time Equivalent judges in category i (ETP_i) working exclusively on ILS, thus:

$$CILS_i = \frac{C_i}{N_i} \times ETP_i$$

The total annual cost of all work on ILS done by judges in all categories, which we shall call CM_{iLS}, is then obtained as follows:

$$CM_{ILS} = \sum_{i=1}^{n} CILS_i$$

Table 12 below shows the result when this approach is applied to the situation in France.

Table 12 - Cost of work done by judges on ILS (thousands of francs)

Category of judges	Total cost	Number judges	Mean cost*	ETP	ILS cost
2 - Appeal court judges	688,216	1,232	558.617	31.5	17,596
3 – Other judges	1,057,218	2,409	438.861	24.9	10,928
4 - Prosecutors	509,957	1,162	438.861	61.0	26,770
5 – Examining judges	243,568	555	438.861	61.0	26,770
6 – Enforcement judges	87,333	199	438.859	30.0	13,165
7 – Children's judges	127,269	290	438.859	1.6	702
Total	2,713,474	5,847	464.079	210.0	95,931

(in francs)*

The other two categories of judiciary staff who must be taken into account are court registrars and other justice officials. As with the different categories of judges, we must first determine what share of their total activity is devoted to ILS, then multiply this percentage by the number of registrars and other justice officials in order to determine the Full-Time Equivalent or ETP, i.e. the equivalent in full-time staff working exclusively on ILS, and finally multiply this ETP number of registrars and other justice officials by the mean cost of employing these categories of staff. As the method used is the same as for the different categories of judges, we refer the reader to the method described above.

In France, for example, a total of 18,552 registrars and other officials were on the payroll of the Ministry of Justice in 1995. The mean cost of employment per official (including salary, bonuses, allowances and social charges) was FF 190,224, i.e. a total annual payroll cost of FF 3,529,035,648.

According to Ministry of Justice statistics, 8,500 officials in these categories worked for the different regional courts. In order to determine how many of these 8,500 registrars and justice officials effectively work full-time on ILS (i.e. drug-related offences), we may consider the activity of these categories of staff to be proportional, on average, to that of the judges. Registrars and other justice officials can therefore be considered to spend 50% of their time on criminal offences, so 4,250 registrars and justice officials may be said to work full-time on criminal offences. These 4,250 officials devote 7.7% of their time to ILS (i.e. the same proportion as judges), making a Full-Time Equivalent, or ETP, of 327.25 registrars and justice officials. In budgetary terms, by multiplying the mean cost of employing these officials (190,224 francs/year) by the Full-Time Equivalent of 327.25 officials working exclusively on ILS, we obtain a total cost for drug offences of FF 62.25 million.

In the case of France, however, one must add the cost of officials working for the appeal courts. They numbered 1,000 (working on criminal cases), so there are an additional 64 Full-Time Equivalent registrars and other justice officials working on ILS (1,000 x 0.064, 0.064 being the percentage of ILS in the criminal law work of appeal court judges). In budgetary terms these additional 64 officials working on ILS cost FF 12.17 million.

FOR REVISION – In addition to the cost of the different categories of staff listed above, judicial services entail other expenditure, such as legal aid and court costs. Table 13 details all the costs that must be taken into account when analysing the cost of judicial services, together with the allocation bases adopted by the authors. (cf. pages 21 and 22)

Table 13 – Miscellaneous judicial service expenditure (millions of francs)

Item	Total cost (1)	Base (%)	ILS cost (1)
Ch 34-05 IT and telecommunications	86.750	3.6	3.123
Ch 34-90 Travel	51.422	3.6	1.851
Ch 37-11 Criminal and police court costs	829.919	3.7	31.204
Ch 37-12 Legal aid	1,085.280	3.6	39.070
Ch 37-92 Functioning of the courts			
- art. 40 Appeal Court	94.003	6.0	5.640
- art. 51 Regional Courts (mainland and overseas Departments)	503.311	3.6	18.119
Ch 46-01 Miscellaneous subsidies and interventions			
- art. 21 Private or public bodies contributing to judicial supervision	26.000	3.6	0.936
		Total	**99.943**

Other judicial service spending on ILS therefore amounts to FF 99.94 million (cf. pages 22 et 23 report Kopp and Pale the allocation bases adopted by the authors).

Total Ministry of Justice spending on judicial services related to ILS (drug-offences) must therefore include the following items:

- ☞ the cost of judges attributable to ILS,
- ☞ the cost of registrars and other justice officials attributable to ILS,
- ☞ the other costs of judicial services (IT and telecommunications, travel, etc.) attributable to ILS.

b. Prison administration

One simple method is to use the number of detainees for ILS (drug offences) at a given time *t*, to determine what percentage of the total prison population that population represents at time *t*, and to multiply the resulting percentage by the total annual cost of prison administration, in order to obtain the total cost of detaining persons for ILS for the year concerned. So, if PC_{ILS} is the prison population incarcerated for ILS and *PC* is the total prison population, the percentage of detainees in prison for ILS (which we shall call PPC_{ILS}) is:

$$PPC_{ILS} = \frac{PC_{ILS}}{PC}$$

From this percentage it is then possible to calculate the percentage of prison expenditure attributable to illicit drugs, thus:

$$DI_{ILS} = PPC_{ILS} \times DI$$

where DI_{ILS} is annual prison expenditure related to ILS and *DI* is total annual spending on prisons (i.e. the total prison administration budget).

For example, at 1 May 1995 in France there were 51,325 detainees in all and 11,816 in prison for drug offences. ILS detainees therefore made up 23.02% of the total prison population ((11,816 / 51,325) x 100). As the total prison administration budget was FF 5,727.95 million, the cost of imprisonment for drug offences was FF 1,318.68 million (5,727.95 x 0.2302).

However, this simple method is open to criticism as it does not allow for the effective duration of imprisonment of the different prison populations, including those detained for drug-related offences (ILS). It is preferable to think in terms of time served, in which case several scenarios are possible.

The most suitable method is, first, to determine the time served in the course of a year by the total prison population, and the time served in the same year by ILS detainees. These figures can then be used to calculate time served by ILS detainees as a percentage of total time served in prisons. Finally, by multiplying this percentage by total prison administration expenditure, the total cost of detaining ILS offenders is obtained.

So if *TI* is the total time served in the course of a year by the prison population as a whole, and TI_{ILS} is the time served by ILS detainees, the percentage of total prison time served by ILS detainees (which we shall call PTI_{ILS}) is:

$$PT_{ILS} = \frac{TI_{ILS}}{TI}$$

Multiplying this percentage by total prison administration expenditure for the year (*DI*) gives the total annual cost of detaining ILS offenders, or DI_{ILS}, thus:

$$DI_{ILS} = PT_{ILS} \times DI$$

This second method for calculating prison costs attributable to illicit drugs is preferable to the first method described: duration of sentence varies with the type of offence, so detainees do not all serve the same time in prison. it is preferable, therefore, to count the time served by the different prison populations, rather than the number of people in detention.

This method raises two problems, however: first, the requisite statistical data on time served in prisons must be available; and secondly, there is a difference between the sentence pronounced and the time actually served.

The former of these two problems is illustrated by the following example from France. Table 14 shows the percentages of detainees convicted to sentences of different lengths at 01/07/1998.

Table 14 – Breakdown of prison sentences being served at 01/07/1998 (%)

Duration of the sentence	% of all sentences
Detainees sentenced to less than one year	29.8%
Detainees sentenced to 1 to 3 years	21.7%
Detainees sentenced to 3 to 5 years	12.0%
Detainees sentenced to 5 years and more	36.5%

Source :"Les chiffres-clés de la Justice : octobre 1998", Ministry of Justice

The table reveals that 70.2% of the prison population on 1 July 1998 had been sentenced to 12 months' imprisonment or more, and therefore that the remaining 29.8% were serving sentences shorter than one year. The prison population on 1 July 1998 numbered 57,458. If 70.2% of the 57,458 were serving sentences of 12 months or more:

$$57{,}458 \times 0.702 \times 12 = 484{,}026$$

484,026 months of detention were served in 1998 by 40,336 detainees (70,2% of the prison population). At the same time, 17,122 detainees (57,458 x 0.298) were serving sentences shorter than 12 months. The total time served by these 17,122 detainees remains to be calculated. If we do not know the average time served by these detainees, various scenarios are proposed:

- *Scenario 1 : each detainee serves 1 month, making a total of an additional 17,122 months' imprisonment*
- *Scenario 2 : each detainee serves 6 months, making a total of an additional 102,732 months' imprisonment*
- *Scenario 3 : each detainee serves 11 months, making a total of an additional 188,342 months' imprisonment*

Table 15 shows the total time served by all detainees in 1998 for each of these three scenarios.

Table 15 – Total time served by all detainees in 1998 (in months)

Detention duration	Number of detainees	Mean duration in months	Total duration in months	Total per scenario
Detention ≥ 12 months (1)	40,336	12.0	484,026	
Detention < 12 months (2)	17,122	1.0	17,122	(1) + (2) = 501,148
Detention < 12 months (2')	17,122	6.0	102,732	(1) + (2') = 586,758
Detention < 12 months (2")	17,122	11.0	188,342	(1) + (2") = 672,368
Total	**57,458**			

In the case of detainees serving time for drug offences (ILS), we know that there are 11,816 ILS detainees and that they are sentenced on average to 18.1 months' imprisonment, i.e. more than 12 months. We may therefore calculate the total time served in a year by ILS detainees as follows:

11,816 x 12 = 141,792 months

If we apply this figure to the different scenarios in Table 15, we obtain the following results for the percentage of time served by ILS (drug offence) detainees out of the total time served by all detainees:

- *Scenario 1 : time served by ILS detainees is 28,29% of total time served by the prison population as a whole*
- *Scenario 2 : time served by ILS detainees is 24,17% of total time served by the prison population as a whole*
- *Scenario 3 : time served by ILS detainees is 21,09% of total time served by the prison population as a whole*

This shows the importance of the statistical data at one's disposal, as knowing the average time served by detainees sentenced to less than one year would help to calculate a more accurate estimate of the percentage occupied by ILS detainees in the overall prison population. Here the fact that this data is not available leads us to estimate the time served by ILS detainees at between about 20 and 30% of the total time served by the whole prison population.

The second problem encountered is that the sentences pronounced do not in fact correspond to the time actually served. Table 15 is based on the sentences pronounced against persons convicted as at 01/07/98, but the sentences actually served by the detainees concerned by the time they leave prison are in fact much shorter than those used in Table 15, as shown in table 16.

Table 16 – Time actually served by detainees

Duration of detention	Time actually served as a % of all time served
Less than 1 month	19.2%
1 to 3 months	25.8%
3 to 6 months	23.4%
6 to 12 months	15.6%
1 to 3 years	12.4%
3 to 5 years	1.9%
5 to 10 years	1.4%
10 years and more	0.2%

Source :"Les chiffres-clés de la Justice : octobre 1998", Ministry of Justice

This reveals a reversal of the proportions between the sentences pronounced and the time actually served: in the first case sentences of less than 1 year made up 29.8% of all sentences pronounced, whereas in the second table less than 1 year was actually served in 84% of the cases. The cost of detaining ILS offenders is thus very different if

we use these new figures. However, information on the time actually served by each category of detainees (particularly ILS detainees) is not always available. Two solutions are therefore possible:

- ☞ Estimate the cost of ILS detainees based on time actually served in prison where this information is available,
- ☞ Estimate the cost of ILS detainees based on length of sentence pronounced where no other information is available

One last criticism may be levelled against the calculation method proposed. We are reasoning here in terms of a "stock" of detainees at a given moment *t*, when the prison population is in fact made up of a "flow" of detainees, with detainees entering prison in the course of the year while others are released. A truly correct method should therefore take these incoming and outgoing detainees into account In practice, however, as the average sentence served by drug offenders is more than one year (18.1 months according to the Ministry of Justice), it is reasonable to assume that there is a cumulative effect, i.e. that people sentenced in 1997 will still be in prison in 1998. Although it would be preferable to calculate the cost of imprisonment of ILS detainees using a method based on the actual flow of detainees entering and leaving prison, this information is unlikely to be available, as it would require a count of the whole prison population broken down by type of detainee at least twice in the course of a year (at the beginning of the year and at the end), whereas this type of count is usually made only once a year.

c. Cost of Judicial Youth Protection services (Protection judiciaire de la jeunesse or PJJ in France)

In certain countries the Ministry of Justice can play a part in protecting minors. [14] Here again the cost of this type of action should distinguish between the different types of target group concerned, and the different protagonists involved. In France, for example, two types of target group are concerned: young people in danger (law of 4 June 1970) and juvenile delinquents. And efforts to protect these two categories of minors rely on both the public sector and voluntary associations.

The target groups for this type of action must therefore be broken down in order to isolate the ILS (drug offender) population from the other populations. So if PM_{ILS} is the population of ILS minors and *PM* the total population of minors followed by the Judicial Protection service, the proportion of ILS minors in this total, which we shall call PPM_{ILS}, is:

$$PPM_{ILS} = \frac{PM_{ILS}}{PM}$$

If D_{PJJ} is the total cost of Judicial Youth Protection (PJJ) services, the share of that cost spent on ILS minors (DM_{ILS}) is:

$$DM_{ILS} = PPM_{ILS} \times D_{PJJ}$$

[14] Where this is the responsibility of another ministry, this type of expenditure should be attributed to the ministry concerned.

The same problems arise here as we encountered when calculating the cost of ILS detainees. The first problem is knowing how many minors protected by the PJJ are guilty of drug offences (ILS). If we consider convictions in the course of the year we exclude minors convicted the previous year who are still followed by the PJJ. This means that the percentage of ILS minors among all the minors followed by the PJJ may be a considerably higher than the percentage of convictions of ILS minors among total convictions of minors in the course of a year. This also raises the problem that counting only the number of ILS minors convicted can conceal the fact that ILS minors may be kept under supervision for a longer period of time than other convicted minors. And there is always the possibility that the duration of the sentence pronounced may differ from that of the sentence actually served. Here again, calculations based on the real duration of the probationary period would be more accurate.

3.2.2 General Directorate of Customs and Excise (Ministry of Finance)

The cost to the customs authorities comprises two different situations: first of all, there is expenditure directly linked to the fight against illicit drugs. In this case the budget headings or items are clearly identifiable and no special calculation method is called for. Secondly, there is spending not specifically earmarked for combating illicit drugs but part of which is in fact used for that purpose.

As stated above, expenditure directly allocated to the fight against illicit drugs corresponds to well-identified budget headings or items. In France, for example, although there is no specialised “drugs” unit, the General Directorate of Customs and Excise considers that the equivalent of 500 customs officers spend all their time combating the drug problem. As the mean annual cost of a customs officer is FF 158,000 and the operating costs per officer attributable to the fight against drugs (excluding payroll costs) amount to FF 35,500, total spending on staff involved in combating illicit drugs amounts to:

$$500 \times (158{,}000 + 35{,}500) = \text{FF } 96.75 \text{ million}$$

In some countries the customs authorities have specialised anti-drug units. In principle these countries should have specific budget headings within the general customs budget that show the cost of operating these anti-drug units. These budget headings should include both the payroll costs of these units and their other operating costs. However, where there are no such headings in the general budget, the simplest method is to divide total payroll cost by the number of customs officers in order to determine the average cost of employing one officer, and to divide total operating costs by the number of customs officers in order to determine the average operating cost per officer (excluding salary). The cost to the customs authorities of combating drugs may then be calculated by the simple equation shown above.

It is worth noting, however, that specialised units generally have larger than average budgets. In the absence of any other information concerning these specialised units, therefore, the proposed method will tend to underestimate the real cost of running such units.

The second type of expenditure by customs authorities on combating illicit drugs is based on the fact that all uniformed customs officers are involved in combating illicit

drugs. It is difficult, however, to determine exactly how much of his or her time each officer devotes to this aspect of the activity. Various criteria can be useful here: the ratio “value of drugs seized / total value of goods seized”, for example. The ratio “number of persons apprehended for ILS (drug-related offences) / total number of persons apprehended” is another indicator that can be used to determine the place occupied by ILS-related work in each custom officer’s total activity. It would appear, however, that in the absence of any other statistics, the ratio “number of ILS (drug-related offences) reported / total number of offences reported” provides a simple indicator, this type of information generally being available in most countries. As with the other types of ratio, the proportion will probably be somewhat inaccurate as the great variety of types of offence reported tends to introduce a bias. It does, however, provide an approximate idea of the proportion of this aspect of customs expenditure that can be attributed to the fight against illicit drugs. So, if the number of ILS reported by the customs authorities is NI_{ILS} and the total number of offences reported by the customs authorities is *NI,* the proportion of ILS (drug-related offences), which we shall call PNI_{ILS}, is calculated as follows:

$$PNI_{ILS} = \frac{NI_{ILS}}{NI}$$

Assuming, then, that this is the proportion of his/her total activity that each uniformed customs officer devotes to ILS offences, the Full-Time Equivalent (ETP, i.e. the number of officers who would have to work full time on drug-related offences to do the equivalent amount of work) can then be calculated thus:

$$D_{ETP} = PNI_{ILS} \times ND$$

where D_{ETP} is the Full-Time Equivalent number of customs officers working exclusively on illicit drug problems and *ND* is the total number of customs officers. The cost of these Full-Time Equivalent customs officers working exclusively on illicit drug problems is therefore:

$$CD_{ILS} = D_{ETP} \times (FP + FF)$$

where CD_{ILS} is the cost of customs officers working exclusively on illicit drug problems, *FP* is the mean payroll cost of employing one customs officer and *FF* is the mean operating cost per officer (excluding salary).

3.2.3 The National Gendarmerie (Ministry of Defence)

The National *Gendarmerie* in France plays a role similar to that of the National Police. Although their roles differ in certain respects, the main difference is that the National *Gendarmerie* operates under the authority of the Ministry of Defence, while the National Police reports to the Ministry of the Interior. Another difference lies in the geographical territory covered by the two forces. In many countries different police and security functions are performed by different bodies. Italy, for example, has its police force, its *carabinieri*, its financial police, etc.

This presentation is based on the situation in France, although much of it will also apply to other countries. Each country should simply adapt the following notes to its own situation.

a. Police work done by the gendarmerie

The *gendarmerie* does ordinary police work (crime investigation), dealing each year with about a third of the crimes and lesser offences committed in France. Unlike the National Police, however, it has no specialised anti-drug units. As with the customs authorities, therefore, it is necessary to identify the percentage of their total activity which the *gendarmes* devote to ILS (drug-related offences).

The first step, however, is to determine what percentage of their total activity *gendarmes* devote to ordinary criminal investigation work. If *A* is the total annual activity of the *gendarmerie*, and *APJ* is the total ordinary police work done annually by *gendarmes*, the proportion of their overall activity taken up by ordinary police work, which we shall call PA_{PJ}, is calculated as follows:

$$PA_{pj} = \frac{APJ}{A}$$

Evidently this calculation can only be done if one knows how much of their time *gendarmes* devote annually to ordinary criminal investigation work in relation to their total annual activity. In France, 27.345 million *gendarme*-hours were spent on "police" work, representing 30% of their total activity.

The second step is to determine what proportion of the *gendarmes'* activity is devoted to dealing with drug offences (ILS). Here again, if there is no statistical monitoring of the *gendarmerie's* ILS activity, an indicator is needed in order to determine the share of ILS activity in the *gendarmes*' total police work. Several indicators may be used: the number of people prosecuted by the *gendarmerie* for drug offences in the course of the year as a percentage of all prosecutions initiated by the *gendarmerie*, the number of people imprisoned annually for drug offences as a percentage of all those imprisoned by the *gendarmerie*, the number of ILS cases handled annually as a percentage of all cases dealt with by the *gendarmerie* in the course of a year, etc.

The first of these indicators was used in the French study, i.e. the number of people prosecuted by the *gendarmerie* for drug offences in the course of the year (which we shall call PMC_{ILS}) as a percentage of total prosecutions initiated by the *gendarmerie* that year (*PMC*). So the proportion of their ordinary "police" activity spent by the *gendarmerie* on ILS work, which we shall call PA_{ILS}, is:

$$PA_{ILS} = \frac{PMC_{ILS}}{PMC}$$

Given that 27.345 million *gendarme*-hours were spent on "police" work (i.e. 30% of their total activity), and that PA_{ILS} amounted to 7.4% of police work, 2.024 million *gendarme*-hours (27.345 x 0,074) were devoted to fighting drug abuse.

The annual cost of the *gendarmerie's* ILS activity can now be calculated using one of two methods. If the cost of one *gendarme*-hour is known, the annual cost of the *gendarmerie's* ILS activity (CA_{ILS}) may be calculated thus:

$$CA_{ILS} = CH_g \times H_{ILS}$$

where CH_g is the cost of one *gendarme*-hour and H_{ILS} is the total number of hours spent by the *gendarmes* on ILS work.

The second solution is to calculate the proportion of ILS work (A_{ILS}) in the *gendarmes'* total annual activity, as follows:

$$A_{ILS} = PA_{PJ} \times PA_{ILS}$$

In some countries it is probably possible to determine the percentage of total activity taken up by ILS work directly, without going through the intermediate stages. Or the indicator used to calculate the percentage of ILS work in total *gendarmerie* activity may be different from the one used here if the relevant statistics are not available.

It is then possible to estimate the number of Full-Time Equivalent (or ETP) number of *gendarmes* working full-time to combat illicit drugs, which we shall call G_{ETP}:

$$G_{ETP} = A_{ILS} \times NG$$

where NG is the total number of *gendarmes*. The cost of these *gendarmes* working full-time to combat illicit drugs may then be calculated as follows:

$$CG_{ILS} = G_{ETP} \times (FP + FF)$$

where CG_{ILS} is the cost of *gendarmes* working full-time on drug-related offences, *FP* is the mean budgetary cost of employing one *gendarme* and *FF* is the mean operating cost of one *gendarme* (excluding salary).

b. General public security work

The general public security work of the *gendarmerie* is a surveillance task that includes road safety and the supervision of "raves". The method used to evaluate the cost of work done by the *gendarmes* in the context of their general public security mission is the same as for their ordinary police work, as there are no *gendarmerie* units specialised in drug problems as part of their general security activity.

This means that one must determine the proportion of the *gendarmerie's* total activity which is devoted to public security work and the proportion of its public security activity which is devoted to ILS. The product of these two percentages equals the percentage of total activity taken up by ILS-related public security work. This can then be multiplied by the total number of *gendarmes* to determine the Full-Time Equivalent, or ETP, of *gendarmes* working full-time on drug offences. This figure, multiplied by the mean payroll cost of one *gendarme* plus the mean operating cost per *gendarme* (excluding salary), gives the annual cost of ILS work done by the *gendarmes* in the execution of their general public security duties.

Calculating these different percentages will naturally mean using certain variables, such as the number of arrests on ILS charges as a proportion of total arrests in the course of public security work, and so on.

Where road safety is concerned, the cost of equipment used to detect drivers under the influence of narcotics must be taken into account. [15] This is obtained by taking the number of testing devices used in the year concerned, then the price paid by the *gendarmerie* for these devices. Where the devices are disposable (for use once only), the cost is charged in full to the year in which they are used. The annual cost of this type of device is thus obtained by multiplying the number of devices used in the year by the unit purchase price. [16] Where the devices are used more than once and over several years, their cost must be set off over a number of years (defined in the accounting plan), at a constant or a digressive rate.

c. Other expenditure: units specialised in combating drug abuse

In addition to the expenditure generated by the two types of activity described above, one must take into account any *gendarmerie* staff specialised in anti-drug activities. In France, for example, this means:

- ☞ Anti-drug training instructors, who cost FF 6.2 million.
- ☞ 120 additional staff in various sectors who work solely on drug-related offences (dog handlers, etc.), who cost FF 32 million.

No methodological explanation is needed here as the budgets of these specialised units are clearly identifiable and may be added directly to the social cost.

3.2.4 The National Police (Ministry of the Interior)

In order to evaluate the cost of the work done by the National Police to combat drug abuse, we first need to know the total number of staff employed by the National Police. Some members of the National Police devote only part of their total activity to dealing with drug offences, the exact proportion being determined with the aid of an allocation base, while other members work in specialised anti-drug units and devote all their time to the drug problem.

a. General police work

As with customs officers and the *gendarmerie*, an allocation base must be used to determine what percentage of their activity the National Police devote to ILS (drug offences). The first step is to determine what proportion of their total activity they spend dealing with crime in general, which we shall call *PAP*. This is done by dividing their criminal investigation work by their total activity, thus:

$$PAP = \frac{AP}{AT}$$

[15] Drivers are tested for alcohol in France but not for drugs at present.

[16] We did not feel the need to complicate matters by going into details of stocks that may be left over from one year to the next, which may have been purchased at a different price from that of the year under examination, as devices are generally used during the year in which they are purchased and stocks have a relatively short shelf-life.

where *AP* is criminal investigation work and *AT* total activity. In France the National Police devote 70% of their activity to crime investigation. This *PAP* can now be used to calculate the Full-Time Equivalent (or ETP) for police staff working full-time on the prevention and investigation of crime, thus:

$$NP_P = PAP \times NP$$

where NP_P is the number of police staff dealing exclusively with crime and *NP* the total number of police staff. In France, for example, NP_P is 57 820 policemen. To determine the proportion of their criminal investigation activity the National Police devote to ILS, several indicators may be used. For example: "the number of people prosecuted by the National Police for ILS / the total number of people prosecuted by the National Police". If this information is not available, of course, other indicators may be used. If we use the above indicator, however, the percentage of ILS work in the total criminal investigation activity of the police, which we shall call PA_{ILS}, is:

$$PA_{ILS} = \frac{MC_{ILS}}{MC}$$

where MC_{ILS} is the annual number of prosecutions by the National Police for ILS and *MC* is the total number of prosecutions by the national police. On this basis, it is now possible to calculate the number of police staff working exclusively on drug offences, as follows:

$$NP_{ILS} = PA_{ILS} \times NP_P$$

where NP_{ILS} is the number of National Police officers working full-time on drug offences. The cost of this aspect of National Police activity (CP_{ILS}) is the mean budgetary cost of employing a member of the National Police (*FP*) plus the mean operating cost of same (*FF*), multiplied by the number concerned, as follows:

$$CP_{ILS} = NP_{ILS} \times (FP + FF)$$

b. Other expenditure: specialised anti-drug units

As with the *gendarmerie*, in addition to the National Police who devote part of their work to the fight against illicit drugs, there are units specialised in this type of work, or staff for whom we know the percentage of their work which is devoted to this task. In France, for example, the specialised units whose sole job is to combat illicit drug abuse comprise:

- ☞ 2000 members of the OCRTIS *(Office Central pour la Répression du trafic illicite des stupéfiants)*, the criminal police and the urban security units.

The other members of the National Police who spend a known percentage of their time working on the drug problem include:

- ☞ 260 members of the BRI *(Brigades de recherches et d'intervention)* 17.5% of whose activity is drug-related (i.e. the equivalent of 45 people working full-time

- About 7.5% of administrative staff, the equivalent of 150 people working full-time.

In all, therefore, 2,195 additional members of the National Police work full-time to combat drug abuse, at a total cost of FF 503.53 million.

Here again, no special method is called for as the budgets of these specialised units are clearly identifiable. One simply has to refer to the corresponding budget headings.

3.2.5 The Ministry of Social Affairs, Health and Towns

This ministry is active in the prevention and treatment of drug abuse. Much of its expenditure is directly and exclusively related to the problem of illicit drugs and is listed as such in the ministry's budget. No particular calculation method is required here, therefore, as the amounts concerned may be found under the corresponding budget headings. Other expenditure may require special treatment, however.

The presentation that follows is based on the situation in France and must be adapted to the way in which each country organises the finances of this type of ministry. In other words, each country must list the headings in the ministry budget which are devoted exclusively to the drug problem. Other expenditure, for example on staff who devote only part of their time to drug questions, may be determined with the aid of allocation bases that must be defined. Examples relating to the situation in France are given below.

a. Health Department (DGS – Direction générale de la santé)

Drug-related Health Department expenditure is detailed directly under heading 47-15 of the budget of the Ministry of Social Affairs, Health and Towns, labelled "Drug abuse programmes and measures". In practice, all the sub-heads under this heading concern the DGS, with the exception of sub-heads 50 and 60, which concern the Social Affairs Department (DAS).

Further drug-related expenditure is found under heading 47-18 "Programmes and measures to combat AIDS", particularly sub-heads 10 and 20, respectively entitled "Fighting AIDS: national measures" and "Fighting AIDS: decentralised measures". Expenditure under sub-head 10 includes the funding of certain associations active in the field of drug abuse, the financing of information campaigns specifically aimed at substance abusers, and subsidies to assist drug abusers with housing and in their everyday life. Sub-head 20 concerns syringe exchange programmes, opening "boutiques" for drug users, providing urban litter bins, etc.

This expenditure concerns all AIDS sufferers, not only drug abusers. An allocation base must therefore be proposed in order to determine what proportion of this expenditure is attributable to illicit drugs. Two possibilities spring to mind, although other possibilities certainly exist:

- the percentage of drug abusers in the HIV-positive population,
- the percentage of drug abusers among new AIDS cases.

The former option is more complex to use as it means knowing the total number of people who are HIV-positive and the number of drug abusers among them. As these statistics were not recorded in the early stages of the epidemic, and in view of the fluctuation in the HIV-positive population due to new cases and deaths, it is clearly simpler to calculate the percentage of new cases of AIDS in a given year and the proportion of drug abusers among them. Now, if we call all new cases of AIDS *NCS* and drug-related new cases of AIDS NCS_{ILS}, the expenditure under heading 47-18 attributable to illicit drugs (D(47-18)$_{ILS}$) is calculated as follows:

$$D(47-18)_{ILS} = \frac{NCS_{ILS}}{NCS} \times D(47-18)$$

where D(47-18) is total expenditure under heading 47-18 (sub-heads 10 and 20).

b. Social Affairs Department (DAS)

The money spent by the DAS to combat illicit drugs is clearly identifiable in the budget of the Ministry of Social Affairs, Health and Towns. It falls under sub-heads 50 and 60 of budget head 47-15 and concerns preventive action at the national and local level. The DAS also receives funds from the MILDT (Inter-ministerial Task Force on Drugs and Drug Abuse) which help to finance “contact points”, some training, the “sleep-in” (an overnight accommodation centre for drug users), etc.

These items of expenditure being directly identifiable in the ministry budget, no special calculation method is needed.

c. Inter-ministerial Delegation to the Town (DIV)

Of the FF 142 million in aid distributed to prevent crime, FF 42 million come from budget heading 46-60, “Crime Prevention”, and FF 100 million from contracts concluded between towns and the government. In all FF 22 million of these FF 142 million were devoted to the prevention of drug abuse. This spending on the prevention of drug abuse is therefore clearly identifiable and calls for no further calculation.

Another level of expenditure that has to be taken into account here is that disbursed at the local (municipal, “departmental” and regional) level. In theory the State should cover at least 50% of this expenditure. If the DIV spends FF 22 million, for example, the local, “departmental” or regional authorities should spend no more than FF 22 million. In certain underprivileged areas, however, the local share of such financing is often well in excess of 50%. On average it is estimated that local authorities disburse 2 or 3 times more than the State, i.e. FF 22 million spent by the State can be expected to induce expenditure of between FF 44 million and FF 66 million at the local level.

The French study was unable to account for all financing at the local level, excluding urban policy. Yet combating drug abuse is a major concern of municipalities and one of their highest priorities in practice. However, if there are rules governing the ratio between State funding and local (i.e. municipal, “departmental” and/or regional) funding, as there are in France, this may prove very helpful in determining the level of local funding, which is not counted, of course, as government department expenditure.

d. Staff and overheads of the DDASS and the DRASS

The DDASS and the DRASS are the Departmental and Regional Directorates of Sanitary and Social Action. Some of their staff spend time dealing with drug-related problems. In France, when one adds together all the time spent by DDASS and DRASS staff on drug problems, the equivalent of 1 person per *department*, i.e. a hundred-odd people in all, are estimated to work full-time on drug-related questions. So in order to calculate the annual cost of work on drug-related issues by these employees, one has merely to multiply the number of full-time equivalent staff working on drug problems by the mean budgetary cost of one staff member.

3.2.6 Ministry of National Education, Higher Education and Research

The Ministry of National Education, Higher Education and Research is also concerned by the problems connected with illicit drugs. There are two aspects to be considered in this context:

- ☞ the national education system which acts in the area of prevention among young people
- ☞ research into drugs.

a. National education system

The task of the Ministry of National Education here mainly concerns primary prevention among young people. It is particularly difficult to identify the resources deployed other than the funding from the Inter-ministerial mission for combating drugs and drug addiction. This is linked to the actual definition of a prevention initiative since it is often impossible to say when these start or end. In fact, defining what specifically prevents a population of young people from falling victim to drug addiction is quite simply impossible. In other words, it is unrealistic to attempt to determine how much time a teacher might spend on drug addiction prevention during his classes, for example, and therefore impossible to associate a cost with this kind of initiative.

Ultimately, only the prevention initiatives billed as such, i.e. essentially funded by inter-ministerial funds for national education, can be measured. In the case of France, "Social Environment Committees" (SECs) were set up in 1990 by the Ministry of National Education to develop initiatives aimed at preventing risk behaviour at the level of school establishments.

To determine the funding granted by the Ministry to these SECs, it is first necessary to establish the funding granted by the Ministry and then the proportion (indicated as PA_{PT}) of these centres' activity devoted to preventing drug addiction (activity indicated as A_{PT}) as the share of the total activity (indicated as AT). In other words, PA_{PT} is equal to:

$$PA_{PT} = \frac{A_{PT}}{AT}$$

Finally, this ratio must be applied to the total funding allocated by the Ministry of National Education to the SECs to determine the cost of these centres which may be imputed to the problem of illicit drugs, i.e.:

$$C_{PT} = PA_{PT} \times CT_{CES}$$

where C_{PT} corresponds to the cost of the SECs that may be imputed to drug addition prevention and CT_{CES} to the total funding granted by Ministry to these SECs.

On the other hand, there are staff at the Ministry (or paid by the Ministry) excluding teachers, who devote part of their time to prevention of drug addiction. By way of example, there is, in France, a steering group in each local education authority comprising five individuals (1 doctor, 1 nurse, 1 social worker, 1 school environment supervisor and 1 inspector). In addition, a further three individuals are concerned at the level of each *department*. Finally, we must also count, in each SEC, a head of establishment as well as a team of varying composition. Unfortunately, it has not been possible to compute the cost of all these people in the French study, since it is not possible to determine how much time each one devotes to their various activities.

In fact, contrary to the case of staff at the Ministry of Justice, customs, the national and municipal police forces etc, where there are indicators that may be used to determine the share of their activities devoted to the problem of illicit drugs, it is difficult to find an available indicator to calculate that share for the aforementioned individuals.

The only course of action is therefore to monitor these different categories of staff to determine what proportion of their time they devote to the prevention of drug addiction. In conclusion, if such monitoring is not performed, it is recommended that only prevention initiatives billed as such, i.e. essentially funded by inter-ministerial funds for national education, are taken into account.

b. Research

As regards the activity of the research ministry, here again it is difficult to determine the costs arising from the question of drugs. In fact, for categories of researchers who devote only part of their research to the problem of illegal drugs, we experience similar difficulties in finding an indicator to calculate that share of their time. Other than monitoring these categories of researchers in their work, possible methods might be to count the number of publications or patents etc linked to drugs as a share of the total publications, patents etc produced by these researchers. Nevertheless, we know full well that the time devoted to this matter will depend on the type of research carried out.

In fact the data provided in the French study concerns only researchers devoting 100% of their time to subjects concerning illicit drugs. This amounts to 50 researchers employed full-time, 40 engineer/technician/administrative staff (in French, ITA) and 21 researchers in social and human sciences. By multiplying the main budgetary cost of one researcher post and one ITA post respectively by the number of researchers and the number of ITAs solely concerned with drugs, we arrive at the cost of these staff categories, to which overheads must be added. The researchers covered include, for example:

- ☞ Researchers in the field of neurobiology and surge
- ☞ Researchers undertaking "clinical" research in the areas of psychiatry and psychology
- ☞ Researchers in social and human sciences

3.2.7 Ministry of Youth and Sport

Estimating the cost borne by the Ministry of Youth and Sport in the area of preventing drug addiction and combating illicit drugs is as difficult as it is in the case of the Ministry of National Education, Higher Education and Research.

This is once again due to the fact that determining what specifically prevents a population of young people falling victim to drug addiction is quite simply impossible.

Consequently, only the costs linked to the problem of illicit drugs and directly identifiable as such may be considered. For example, we can take account of:

- ☞ posts of staff at the Ministry (or paid by the Ministry) specifically dedicated to the problem of drugs (or for which we know the share of total activity represented by drug-related work);
- ☞ prevention campaigns run by the Ministry.

In the French case, for example, only the cost concerning individuals whose activity is geared solely to the prevention of drug addiction has been counted. This amounts to 104 individuals (one per *department* and one per region) who, we know, spend half of their time on the problem of drugs. Consequently, this represents 52 individuals employed 100% in the area of drugs. Therefore, the estimated cost linked to these staff corresponds to the mean budgetary costs of these staff categories incremented by the mean overhead cost per staff member, multiplied by the number of staff working full time.

3.2.8 Ministry of Foreign Affairs

The expenditure allocated by this Ministry to the problem of drugs, like that of the Ministry of Co-operation and also the voluntary contribution to the European Union budget or international initiatives, is fairly easy to calculate, since this generally corresponds to specific budget headings which are simply added together.

In the case of France, for example, voluntary contributions to the UNDCP are managed by the Ministry of Foreign Affairs. Obviously, in other countries these voluntary contributions may be managed by other ministries.

Similarly, under co-operation initiatives run by the Ministry of Foreign Affairs, certain programmes have a "drugs" component. In France, this component is not clearly identified in each programme but it is known that all the drugs components of the various co-operation programmes managed by the Ministry of Foreign Affairs is equal to the amount of voluntary contributions to the UNDCP.

Therefore this type of expenditure is not, in principle, particularly difficult to calculate. Consequently, no special method is to be developed here, since it is solely a matter of identifying and calculating the budget headings earmarked for funding drug-related initiatives.

3.2.9 Ministry of Co-operation

Here, the expenditure of the Ministry of Co-operation is along the same lines as that of the Ministry of Foreign Affairs. In fact, the drug-related initiatives of the Ministry of Co-operation correspond to programmes aimed at combating large-scale trafficking and co-operation programmes in the sphere of policing. Consequently, the amounts to be calculated are easily identifiable.

By way of example, France funds long-term programmes aimed at West Africa, amounting to 197 million francs (121 MF for co-operation in crime prevention and investigation and 76 MF for co-operation in policing) over three years. The "drugs" component of this programme represents 20% of the total police allocation within the programme. Consequently, in annual terms, the programme represents a cost of 24.2 MF for the Ministry of Co-operation.

If the "drugs" component of this kind of programme is not clearly identifiable, the most relevant possible allocation criteria must be determined and the programme costs imputable to illicit drugs calculated accordingly.

Another example, again concerning West Africa, involves the presence of a "drugs" correspondent in each of the 12 countries of West Africa. In this case, the calculation is easy because these staff devote 100% of their time to illicit drugs.

3.2.10 Contribution to the European union budget

The last type of expenditure calculated within public spending concerns the different contributions of the country concerned to the European Union budget. It is sufficient to identify each corresponding budget heading within the state budget. Should this kind of data not be available, it is possible to use another indicator, albeit less accurate, by taking the European Union budget allocated to combating drugs and applying the share which the countries studied represents within the total budget of the European Union.

By way of example, the EU budget allocated to combating drugs in 1995 amounted to 27.4 million ecus, while the share of France in the total EU budget corresponded to 17%. Consequently, France's contribution to the European Union budget allocated to combating drugs may be estimated at 30.9 MF.

Finally we must mention the co-operation budgets within the Union in the area of justice and police, part of which goes towards combating drugs. Nevertheless, what share of these budgets is devoted to combating drugs is not known. It would therefore be necessary for the share to be calculated at the level of the Union so that each country could calculate its contribution on the basis of its contribution to the total EU budget.

3.3 State Health Insurance Office (CNAM – Caisse nationale d'assurance maladie)

The *Caisse nationale d'assurance maladie* is an entity specific to France, but the comments below apply to all countries, which will have to adapt these analyses to their national characteristics.

While the health insurance offices fund the care system and, consequently, the health expenses which may be attributed to the illicit drugs previously set out, the CNAM may also act in the area of prevention by funding prevention campaigns managed by the *Comité français d'éducation pour la santé* (CFES - French health education committee)[17].

While the first point is easy to deal with, it must be added that the CNAM also bears responsibility for managing work accidents and, in this respect, the proportion of work accidents linked to drug addiction in the workplace.

3. 3. 1 Funding of prevention campaigns by the CNAM

Funding for prevention campaigns from a public body (the CNAM) whose finances do not come under public authorities is easy to evaluate, since it corresponds to budget headings which are clearly identifiable as "drugs" sector funding.

The point to note here is the fact that prevention campaigns are not all funded by the public authorities and consequently that there may be other prevention campaigns to be taken into account for calculating social cost. Therefore each country must determine the source of funding for each prevention campaign in order, on the one hand, not to leave certain funding sources out of the calculation and, on the other hand, to avoid incorrect allocation of such resources.

3. 3. 2 The CNAM and the problem of work accidents

While it is clear that the consumption of illicit drugs, in the same way as alcohol, is a significant factor in a number of work accidents, the CNAM takes the attitude that the cost it bears for these work accidents attributable to illegal drugs is zero. The reason for this is that only accidents where liability arises directly from the exercise of the post occupied and the direct responsibility of the employer must be considered as work accidents. An accident occurring on the way to work or on the way home will be considered as a work accident, since it falls within the exercise of the post occupied. An injury to a person in his workplace by the use of a machine will be considered as a work accident. On the other hand, an accident linked to the consumption of drugs by an employee may not be considered as a work accident since the responsibility for it does not result from the conditions in which the work is performed but from the drug addiction of the employee.

[17] These campaigns may be in addition to those run by the public authorities, and notably the Ministry of Health. Since CNAM funding is independent within the state budget, the resources allocated by the CNAM to drug addiction prevention campaigns must be calculated.

Consequently, the CNAM may not, by definition, log this as work accident attributable to drugs. However, it is clear that certain accidents in the workplace which are attributable to illicit drugs are counted as work accidents and the CNAM bears the cost.

So the difficulty in evaluating the cost borne by the CNAM in terms of work accidents attributable to drugs is down to the fact that there are no figures regarding such accidents at the level of the CNAM.

Consequently, analysing work accidents is the only way to determine the cause and conditions in which they occur and thereby the percentage of work accidents attributable to illicit drugs.

The second type of information necessary for evaluating the different aspects covered under work accidents is based on the following components (see Table 17):

- ☞ work accidents in the strict sense of the term
- ☞ accidents between home and work
- ☞ the difference, in each of these categories, between cases declared, cases recognised and cases settled.

Table 17 - Number of work accidents and accidents between home and work[18]

	Work accidents	**Accidents between home and work**
Cases declared		
Cases recognised		
Cases settled		

Finally, the last kind of information for evaluating the cost of work accidents attributable to illicit drugs covers payments made for settled cases of work accidents and accidents on the way to and from work (see table 18), distinguishing between direct costs (daily allowances, doctors' fees, prescription costs etc), lump sum compensation payment and life-long pension payments.

Table 18 - Payments made for settled cases of work accidents and accidents between home and work

	Work accidents	**Accidents between home and work**
Direct costs		
Lump-sum payments		
Life-long pension payments		

Cost calculation of work accidents and accidents between home and work must take into account only those which have actually been settled for a given year. Information on payments made concerns only such cases. In reality, it would be preferable to use

[18] Industrial diseases are not to be calculated since these are not attributable to drugs.

cases recognised as work accidents, but if no compensation has been paid it is impossible to base calculations on this type of information.

To sum up, by applying the percentage of work accidents and accidents between home and work to the payments made for settled cases of work accidents and accidents between home and work, we obtain an estimation of the cost of work accidents, in the broad sense, attributable to illicit drugs.

3. 4 Insurance companies

All insurance companies are affected by the question of illegal drugs, since they are bound, for example, to cover car accidents under insurance policies taken out by insured drivers. In fact, a range of expenses linked to drugs may be covered by insurance companies (for example, damage to insured property theft, murder of individuals with life insurance policies etc).

Here we will simply look at car accidents in which illicit drugs are involved. If we take the case of France, we can already say that the evaluation of this cost by insurance companies is a delicate matter in the sense that, although the regulations in this area stipulate that any person under the influence of drugs (or alcohol) who causes an accident must declare this fact to his insurer, this does not often occur in practice and is difficult to establish for the insurers.

This mentality of "non-declaration" by the insured of a "mental" state incompatible with driving in the event of a road accident may be explained by certain articles in the Insurance code. These articles stipulate, firstly, that in the event of an accident caused by a person under the influence of drugs (or alcohol), an additional insurance premium is applicable. It is further to be noted that two main types of cover exist in insurance policies: third party liability cover, which must be taken by all drivers to cover the material damage and physical injury caused to others by their vehicle; comprehensive cover, which is not compulsory and protects the property of the insured person. But while insurance companies always compensate the victims of drivers under the influence of drugs (ie third party liability is always covered, regardless of the driver's state), the comprehensive guarantee is no longer effective in an accident caused by a driver under the influence of drugs. In other words, if a drug-driver causes an accident, the material damage and physical injury caused to others will be covered by the insurers of the driver responsible for the accident, but the damage caused to that driver's vehicle (or compensation for the vehicle) will not be covered by the insurer if the driver is proven to have been under the influence of drugs at the time of the accident.

With this imbalance of information between insured persons and insurance companies, it is therefore difficult to determine what share of the total expenditure of insurance companies for road accidents is attributable to illicit drugs.

The information required to estimate the proportion of expenditure due to drug abuse is as follows:

- ☞ the accident pay-outs under the bodily harm guarantee for people killed, indicated as *T*,

- the accident pay-outs in respect of corporal damage for people injured, indicated as *B*,
- the accident pay-outs in respect of material damage, indicated as *M*,
- the proportion of deaths attributable to illicit drugs, indicated as T_{ILS}
- the proportion of injuries attributable to illicit drugs, indicated as B_{ILS}
- the proportion of material damage attributable to illicit drugs, indicated as M_{ILS}

Consequently, the cost borne by the insurance companies for road accidents attributable to illicit drugs, indicated as CA_{ILS} is:

$$CA_{ILS} = (T_{ILS} \times T) + (B_{ILS} \times B) + (M_{ILS} \times M)$$

By performing this equation for all the accidents covered by insurers, we can estimate the cost borne by insurance companies and what is attributable to drugs.

3.5 Lost income and lost production attributable to drugs

Generally speaking, lost income and lost production correspond to a proportion of the costs calculated within a broader category referred to as "human capital". "Human capital" corresponds, overall, to the full set of past, present and future costs borne by society and the individual when the latter dies prematurely. This notion of "human capital" (or "value of life") is chiefly applied when economic evaluations are performed to aid decision-making on public investment in infrastructures (for example in the sphere of roads, in the building of a roundabout, the installation of traffic lights, the building of a motorway etc). In this context, the loss of income of a deceased person, lost production in the workplace linked to a premature death, the costs of training of deceased persons, the transfer of the damages for pain and suffering of the dead person etc are all items to be taken into account when evaluating the total cost of a premature death.

By way of example, we could refer to the research report drawn up by Michel Le Net (director of research at the Ecole nationale des ponts et chaussées) entitled "The value of life, application to an evaluation of the economic cost of accident risks on roads" and submitted in July 1992 to the Commissariat General for planning and the Ministry of Infrastructure, Housing and Transport. In this report, the human capital components linked to road accidents are divided up into three main categories of costs borne by the community[19]:

- **Direct market costs** which include *medical and social costs* (costs of ambulancing, first aid, medical care, medicines and special apparatus, convalescence, funerals, rehabilitation, reinsertion, home help), *material costs* (damage caused to vehicles, public property, private property, material damage caused to persons involved in the accident, damage caused to the environment, miscellaneous costs including the fuel burnt off in the traffic jam caused by the accident, towing, travel etc) and *overheads*

[19] In reality, these costs extend well beyond the value of life, as some of them concern injuries, material damage etc. It would be preferable, therefore, to speak of the components of the overall cost of road safety problems.

(fire service, police, expert appraisals, courts, insurance services, various administrative costs).

- **Indirect market costs** which cover *future production losses* in respect of persons killed and injured, temporary production losses in respect of persons imprisoned following the accident, persons held up by the accident, persons visiting accident victims, members of the household of the injured person, and *potential production losses* in respect of the potential descendants of the accident victim, the unemployed, volunteers, persons performing housework, retired persons.

- **Non-market costs** applying to those killed (non-pecuniary prejudice, pretium mortis, transfer of the deceased's pain and suffering to the beneficiaries) and those injured (damages for pain and suffering, aesthetic damage, loss of amenity, sexual prejudice, related prejudice, indirect damage to third parties).

Nevertheless, in our case we will not use the approach termed as "human capital", because what is dealt with here is solely the problems of the capitalised flux of future income lost by an individual who dies prematurely and the capitalised sum of production losses attributed to a premature death, as well as the other income and production losses attributable to illicit drugs. There are three main reasons underlying this choice: firstly, we are excluding from our analysis, as with any "COI" approach, all intangible costs, ie costs such as the pretium mortis or the transfer of the damages for pain and suffering from the deceased to the beneficiaries. In the evaluation previously given, however, these costs are calculated; then we will consider all lost income and lost production of deceased persons attributable to illicit drugs and will also take into account the lost income or production due, for example, to the imprisonment of individuals for drug offences. These losses may not be included in the "human capital" calculation; finally, some of the other costs given in the previous evaluation are computed in other sections of this report. This is the case, for example, for medical expenses, insurance etc.

3.5.1 Loss of income of individuals

Calculating lost income attributable to illicit drugs entails, on one hand, identifying the categories of individuals concerned and, on the other hand, defining the stages for putting a monetary value on the time lost by these individuals.

Firstly, as regards the categories of individuals concerned by lost income, the following three categories may be identified:

- individuals having died prematurely owing to "drug addiction". These deaths correspond either to pathologies linked to the consumption of illicit drugs or to persons deceased during road accidents involving illicit drugs or perhaps victims of crimes committed by persons under the influence of drugs etc,

- individuals having committed crimes or misdemeanours or caused road accidents under the influence of drugs or been convicted of drug offences,

- ☞ individuals hospitalised or on sick leave for reasons of drug addiction.

As far as the first category of individuals is concerned (ie premature death the cause of which is directly attributable to illicit drugs), the necessary stages for evaluating lost income in monetary terms are as follows: firstly, to define the notion of premature death; then to calculate the number of years lost by individuals owing to premature death; finally to place a value on the lost years by taking a level of income and capitalising fluxes of future lost income through a capitalisation rate.

The notion of premature death may be simply defined by the difference between the age corresponding to life expectancy at a given moment *t* and the age at which the individual studied died at the same moment *t*. In this context, and if we refer to the French study, life expectancy in France in 1997 corresponded to 77 years for men and 82 years for women. This means that a young man deceased in 1997 at the age of 20 years is considered as a person having died prematurely, with the number of years lost by that young man amounting to 57. On the other hand, a man deceased at the age of 77 years or above would be considered as a "normal" death, which would not be taken into account in the evaluation of lost income.

Table 19 shows the French example for alcohol, on the basis of clinical causes of death established in 1997 by joint services department no. 8 of the INSERM. The table lists the different pathologies for which alcohol may be considered as a risk factor, together with numbers of deaths attributable to alcohol and linked to road accidents, accidental falls, suicides and homicides. For each of the causes of death, the table shows the number of deaths attributable to alcohol (through attributable risk coefficients, ie the total number of deaths for a pathology *i* multiplied by the risk attributable to the risk factor "alcohol " for the same pathology *i*) and the mean age at death, with the data being established for each sex.

Table 19 - Deaths attributable to alcohol (men and women aged 20 years and over) [20]

Clinical causes of death	No. of deaths attributable to alcohol (men)	No. of deaths attributable to alcohol (women)	Mean age at death (men)	Mean age at death (women)
Mental disorders				
Psych and alc. dependence syndr	1,744	454	55	57
Disorders of the digestive tract				
Acute alcoholic hepatitis	151	84	55	52
Liver cirrhosis	5,341	1,772	60	60
Acute pancreatitis	134	88	62	71
Chronic pancreatitis	46	10	56	65
Cancers				
Mouth	1,178	76	60	67
Pharynx	2,375	80	60	61
Œsophagus	2,722	295	63	68
Rectum	174	54	67	71
Liver	3,028	573	66	70
Larynx	1,425	24	62	64
Pancreas	565	464	66	71
Breast	-	1,439	-	64
Cardiovascular illnesses				
Ischemic cardiopathy	6,291	674	67	75
Alcoholic cardiomyopathy	112	20	56	59
Cerebral vascular illness	2,303	835	68	75
Respiratory diseases				
Pneumonia, influenza	1,151	206	68	75
Other pathologies				
Fœtal alcoholism syndrome	nd	nd	nd	nd
Other causes of death				
Road accidents	1,999	717	41	50
Accidental falls	796	200	61	75
Suicides	3,769	361	48	52
Homicides	142	91	43	47
Total	35,446	8,517		

Source: Clinical causes of death: years 1996 and 1997, INSERM.

On the basis of this table, the lost income attributable here to alcohol may be estimated by considering, for each clinical cause of death and each sex, the difference between life expectancy (by sex) and the mean age at death. If we then consider a mean level of income and a capitalisation rate, it is possible to evaluate in monetary terms the amount of income lost by all the individuals deceased prematurely owing to alcohol consumption.

In other words, let us consider that:

- ☞ each clinical cause of death is identified by the index i (with $i = 1, \ldots, 22$)

[20] The maximum age taken corresponds to 77 years for men and 82 years for women.

- men are identified by the exponent 1 and women by the exponent 2
- n_i^1 corresponds to the number of men deceased owing to clinical cause of death *i*, and n_i^2 to the number of women deceased owing to the same clinical cause of death *i*
- t_i^1 is the difference between the life expectancy of men and the mean age at death for men owing to clinical cause of death *i*, and t_i^2 the difference between the life expectancy of women and the mean age at death for women owing to clinical cause of death *i*
- *r* corresponds to the capitalisation rate
- *R* is the mean income identical for both sexes
- and FRA_i represents the capitalised flow of income lost by men and women deceased prematurely for pathology *i*

in which case, FRA_1 represents the capitalised flow of income lost by men and women deceased prematurely for pathology 1 (i.e. Psychosis and alcohol dependence syndrome) and is calculated as :

$$FRA_i = n_1^1 \left\lfloor \frac{t_1^1 \times R}{(1+r)^{t_1^1}} \right\rfloor + n_1^2 \left\lfloor \frac{t_1^2 \times R}{(1+r)^{t_1^2}} \right\rfloor$$

where (t_1^1 x *R*) and (t_1^2 x *R*) represent the non-capitalised flow of income lost by a man deceased prematurely and a women deceased prematurely respectively. The capitalised flow of income (indicated as *FRA*) lost by men and women for all clinical causes of death corresponds to:

$$FRA = \sum_{i=1}^{n} FRA_i$$

The remaining questions centre on the level of income to take into account and the capitalisation rate to apply.

Firstly, the income level to take into account corresponds to the Gross Disposable Income (GDI) after tax per inhabitant in year *t*. The GDI corresponds to the share of primary income available to an individual for purchases and savings. More specifically, the income is constituted by the total income derived by an individual from his economic activity, either directly (income from salaried or non-salaried activity) or indirectly (income from investment in moveable or fixed assets). In the national treasury, this is gross income and includes social contributions, including employer contributions. The GDI is the primary income incremented by the transfers received (social benefits) and minus taxes and social contributions paid.

Then, for the capitalisation rate, it is preferable to use the 6% standard rate applied in most international studies, as in the 1998 report of the "National Institute on Drug Abuse" (NIDA) and the "National Institute on Alcohol and Alcoholism" (NIAA) entitled *The economic cost of alcohol and drug abuse in the United States, 1992*. It should be noted that the higher the capitalisation rate, the greater the future depreciation since this increases the denominator and therefore decreases the FRA, and inversely. Nevertheless, the rate may vary, according to the economic circumstances of the period in question.

Table 20, which illustrates the French example for alcohol, evaluates lost income for individuals deceased prematurely for clinical causes among deaths registered.

Table 20 – Lost income linked to premature deaths attributable to alcohol (men and women aged 20 years and over) [21]

Clinical causes of death	Years lost (men)	Years lost (women)	No. of deaths (men)	No. of deaths (women)	Income lost (men) (1)	Income lost (women) (1)
Mental disorders						
Psych and alc. dependence syndr	22	25	1,744	454	1,034.18	256.34
Disorders of the digestive tract						
Acute alcoholic hepatitis	22	30	151	84	89.06	42.25
Liver cirrhosis	17	22	5,341	1,772	3,271.13	1,052.37
Acute pancreatitis	15	11	134	88	81.31	48,94
Chronic pancreatitis	21	17	46	10	27.29	6,40
Cancers						
Mouth	17	15	1,178	76	721.04	46.07
Pharynx	17	21	2,375	80	1,454.34	47.75
Œsophagus	14	14	2,722	295	1,633.72	176.93
Rectum	10	11	174	54	94.11	31.07
Liver	11	12	3,028	573	1,675.72	327.42
Larynx	15	18	1,425	24	862.41	14.42
Pancreas	11	11	565	464	322.05	261.40
Breast	-	18	-	1,439	0,00	879.64
Cardiovascular illnesses						
Ischemic cardiopathy	10	7	6,291	674	3,442.77	302.58
Alcoholic cardiomyopathy	21	23	112	20	67.35	11.68
Cerebral vascular illness	9	7	2,303	835	1,177.66	385.52
Respiratory diseases						
Pneumonia, influenza	9	7	1,151	206	583.85	89.71
Other pathologies						
Fœtal alcoholism syndrome	nd	nd	nd	nd	nd	nd
Other causes of death						
Road accidents	36	32	1,999	717	852.26	346.32
Accidental falls	16	7	796	200	486.92	92.67
Suicides	29	30	3,769	361	1,954.50	182.38
Homicides	34	35	142	91	64,17	40.46
Total					***19,895.85***	***4,642.35***

(1) Million francs

The second category of individuals suffering a loss of income attributable to drugs are those imprisoned for drug offences (i.e. serving a prison sentence) and, consequently, have no income.

[21] The maximum age taken corresponds to the 75-79 age-group for men and the 82-84 age-group for women.

As regards individuals imprisoned for drug offences, one further piece of information is necessary and this concerns the length of imprisonment of all drugs offenders. This information, provided under the item dealing with prison administration expenditure, is simply multiplied by the Gross Disposable Income used previously, converted into monthly GDI, making, in the French case:

monthly GDI = 97,012 / 12 = 8084.3

This yields a total, in the French case, of:

Lost income of individuals imprisoned for drugs offences
= (194,122.5 months x 8084.3FF)

making 1,569.34 MF lost by individuals imprisoned for drugs offences.

In fact, the capitalisation method is not used here, since the mean prison term is 18.1 months, ie a year and a half. It does not seem judicious, therefore, to capitalise the lost income or, in other words, capitalising a sum of money over such a short time appears to be a needless refinement in a stable economic situation.

Nevertheless, it must be noted that, as regards other crimes and misdemeanours involving drugs (eg driving under the influence of illicit substances, thefts, rapes, murders etc attributable to drugs) and whose perpetrators are imprisoned, it is particularly difficult if not impossible to obtain data owing to the lack of data on the subject. However, should such data be available, the method used would be identical, although capitalisation may be necessary, depending on the mean duration of sentences which may be high in some cases.

Finally the last category of individuals suffering lost income attributable to illicit drugs corresponds to the individuals who are hospitalised or on sick leave. In fact, estimating lost income for this category of individuals proves more complex in the sense that the estimation we can carry out for this type of category is biased by special cases such as the existence of complementary sickness insurance which covers the lost income by paying the share of income not covered by Social Security. Consequently, the following hypotheses must be made:

1. All the individuals making up the population studied, when hospitalised or on sick leave, are subject to a waiting period of X days (3 days in the case of France) in which they receive no allowance.
2. Beyond those X days, they receive only Z% of their salary (about 75% in France).

On the other hand if there are no data on sick leave attributable to illicit drugs (which is the case in France), it is possible to estimate them on the basis of hospital stays, a technique used when estimating health costs. Obviously, these figures are far from giving us a fully accurate picture as, by definition, the figures for hospital stays do not take account of sick leave not involving a period in hospital.

If we know the number of hospital stays attributable to illicit drugs, a second necessary piece of information corresponds to the mean duration of a hospital stay for the

pathologies concerned or, failing that, the mean duration of a hospital stay, indicated as *D*. We must then perform the following calculation.

$$W = D - X$$

i.e. the mean duration of stay *D*, reduced by the number of days of waiting *X* when the individual receives no allowance.

By way of example, the mean duration of hospital stays applied for France is 7 days. [22] Consequently, of those 7 days we have 3 days' waiting (indicated as X) which correspond to a total loss of mean daily income (salary indicated as Y) and *W* corresponds to 4 days remunerated at Z% (75%) of the mean daily salary, amounting to a loss of 25% of that salary. In other words, we obtain a loss of income per hospital stay, indicated as R, equal to:

$$R = (3 \times Y) + (1 - Z)Y \times W$$

i.e. in the French case:

$$R = (3 \times 265.77) + (1 - 0.25) \times 265.77 \times 4$$

with the daily salary corresponding to the annual GDI divided by 365 days.

Therefore, if we take the number of stays attributable to illicit drugs used to calculate health costs attributable to the same risk factor, we simply add up these stays for all pathologies and multiply the total number of stays attributable to illicit drugs by the loss of income *R* calculated above. This makes it possible to estimate the total lost income of persons on sick leave (hospitalised) attributable to illicit drugs.

3.5.2 Lost production in the workplace

Lost production in the workplace linked to premature deaths, imprisonment and days of hospitalisation attributable to illicit drugs is not easily quantifiable since there is no satisfactory indicator available. However, it may be evaluated by constructing an aggregate sum made up of the added value produced during the year, on one hand, and the quantity of hours worked annually by the population as a whole on the other hand. This measurement corresponds to the "apparent hourly added value of work", with reference to the "apparently hourly productivity of work".

As the INSEE points out (1988), "the apparent hourly productivity of work index makes a correlation between the variation in volume of gross added value for one year over the previous year and the variation over the same period in the volume of hours worked. The latter is evaluated by adding together the number of hours worked by salaried staff, non-salaried staff, those not employed, those performing various jobs in the agricultural sector and the number of hours worked on an unrecorded basis. Growth in apparent hourly productivity of work is often the result of higher capital consumption and the term "apparent" indicates that its causes must not be attributed solely to work productivity" (p. 104).

[22] *The pathologies dealt with in 1993 in short-stay care departments – survey on hospital death rates 1992 - 1993*, volume 2, n° 274 bis, p. 14.

Bearing in mind the reservations of the INSEE as regards apparent hourly productivity of work, we will opt for this principle overall, except that our calculation will not correspond to a ratio of variation but to the ratio of two variables: the gross added value produced during the year and the number of hours worked annually.

The choice of the "gross added value" variable is due to the fact that it is shorthand for the wealth creation of a company or a business sector over the year, with the value of intermediate consumption deducted and not counting redemption[23]. In addition, this added value is then generally shared between the company, the state and the employees. Therefore, in our further calculations we must be careful not to forget to remove the salaries already previously computed and the compulsory deductions dealt with in the following item. Finally, this seems an interesting indicator on the whole, since it enables us, initially, to calculate the loss caused by illicit drugs to the community as a whole in terms of wealth creation.

To simplify the presentation of the approach used, we will look again at the French example giving figures for alcohol, since data is extremely scarce in the area of illicit drugs. Even so, the approach set out here for alcohol is identical to the one that would be used in the case of illicit drugs.

Data-wise, the INSEE (1998) put forward, for 1997, a figure for gross added value of 7,491,414.0 MF for a total GDP of 8,137,000.0 MF[24]. The INSEE also gives the figure of a working week of 39.8 hours for 1996, making 1,870.6 hours annually (39.8 hours x 47 weeks)[25]. Therefore, if we take the number of domestic jobs, in 1997, of 22.337 million (INSEE, 1998, p. 131)[26], and the unchanged number of hours worked per employee between 1996 and 1997, we obtain 41,783.6 million hours worked annually (1,870.6 x 22.337). Consequently, the added value generated per hour of work amounts to 179.3 francs (7,491,414 / 47,853,689), making 1,427.23 francs per working day[27]. Finally, in annual terms, the added value generated by each domestic job amounts to 335,399.05 francs.

On this basis, we can calculate, as for lost income, lost production in the workplace linked to premature deaths, imprisonments and hospitalisations attributable to alcohol.

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[23] Note that once redemption is deducted, we obtain the net added value. Moreover, the aggregate traditionally used to express the annual wealth creation of a country corresponds to the GDP, this being the sum of gross added value incremented by the VAT levied on products and by customs dues less import subsidies (INSEE, 1998, p. 102). Nevertheless, for our purposes, we think it more relevant to use added value.

[24] Note that GDP may be divided into market GDP (6,724,000.00 MF in 1997) and non-market GDP (1,413,000.00 MF in 1997). "The latter is defined as the entire activity of the administrations, including "non-market" production activity, i.e. totally or virtually free of charge (national education system, museums, medical screening etc)" (INSEE, 1998, p. 102).

[25] This working week of 39.8 hours corresponds to that worked by full-time salaried employees. The 47 weeks correspond to 52 weeks minus 5 weeks paid leave.

[26] It seems preferable here to use the number of domestic jobs rather than the working population. "Domestic jobs cover all physical individuals (whether resident or not) employed within a resident production unit. This is a population evaluated as an annual mean, where each person counts as one unit, regardless of the duration of their work. All types of job are counted, including insecure jobs. Distinctions are made between civil employment and military employment and salaried jobs and non-salaried jobs" (INSEE, 1998, p. 130). The work-force "comprises the active working population (in employment) and the unemployed" (INSEE, 1998, p. 72). In 1997 the work-force was 25.582 million.

[27] If we consider that one week comprises 5 days, we obtain 7.96 working hours per day (39.8/5).

Firstly, as far as premature deaths are concerned, we must recalculate these deaths in relation to the retirement age. Here the notion of premature death may be defined simply as the difference between the age corresponding to retirement age at a given time *t* and the age at which the individual studied died at the same time *t*. Within this framework, we will use the age of 65 years for men and women. A young man deceased in 1997 at the age of 20 years is considered as a prematurely deceased person, with the number of years of work lost by that young man amounting to 45. On the other hand, a man deceased at the age of 65 years or over will be considered as a "normal" death, which is not taken into account when evaluating lost production.

Table 21, drawn up on the basis of clinical causes of death established in 1996 and 1997 by joint services department no. 8 of the INSERM, lists the different pathologies for which alcohol may be considered as a risk factor. For each of these causes of death, the numbers of deaths attributable to alcohol (i.e. number of deaths for a cause of death *i* multiplied by the risk coefficient attributable to the risk factor "alcohol" for the same pathology *i*) and the mean age at death for all the deceased populations (i.e. "drinkers" and "non-drinkers"), with the data being established for each sex.

Therefore, 22,290 persons die prematurely in relation to retirement age because of alcohol (18,694 men and 3,596 women).

It is now possible, on the basis of this table, to evaluate lost production attributable to alcohol. By calculating, firstly, for each clinical cause of death and each sex, the difference between the retirement age and the mean age of death calculated, and then by applying the mean annual added value generated per domestic job (335,339. 05 F) and the capitalisation rate previously used (6%), it is possible to identify the total lost added value attributable to alcohol and linked to premature deaths, ie deaths before retirement age.

Table 21 - Deaths attributable to alcohol (men and women aged 20 years and over) [28]

Clinical causes of death	No. of deaths attributable to alcohol (men)	No. of deaths attributable to alcohol (women)	Mean age at death (men)	Mean age at death (women)
Mental disorders				
Psych and alc. dependence syndr	1.301	302	50	49
Disorders of the digestive tract				
Acute alcoholic hepatitis	112	70	49	48
Liver cirrhosis	3.301	1.055	53	52
Acute pancreatitis	62	16	51	53
Chronic pancreatitis	34	4	51	51
Cancers				
Mouth	727	28	54	53
Pharynx	1.508	44	54	52
Œsophagus	1.363	96	55	54
Rectum	54	14	56	55
Liver	1.044	132	57	55
Larynx	762	10	54	53
Pancreas	221	99	55	56
Breast	-	677	-	53
Cardiovascular illnesses				
Ischemic cardiopathy	2.005	62	54	55
Alcoholic cardiomyopathy	81	12	51	51
Cerebral vascular illness	590	94	54	52
Respiratory diseases				
Pneumonia, influenza	286	22	53	52
Other pathologies				
Fœtal alcoholism syndrome	nd	nd	nd	Nd
Other causes of death				
Road accidents	1.704	494	35	39
Accidental falls	376	26	47	51
Suicides	3.035	266	42	44
Homicides	128	74	40	41
Total	18.694	3.596		

Source: Clinical causes of death: years 1996 and 1997, INSERM.

Table 22 gives, for each clinical cause of death and each sex, an evaluation of losses in terms of added value for individuals deceased prematurely because of alcohol. In other words, it provides an estimate of losses in terms of generated wealth before this is shared out between companies, the state and employees.

[28] With the maximum age taken for men and women corresponding to 65 years.

Table 22 – Lost added value linked to premature deaths attributable to alcohol (men and women aged 20 years and over) [29]

Clinical causes of death	Years lost (men)	Years lost (women)	No. of deaths (men)	No. of deaths (women)	Lost added value (men) (1)	Lost added value (women) (1)
Mental disorders						
Psych and alc. dependence syndr	15	16	1.301	302	2.737,07	636,92
Disorders of the digestive tract						
Acute alcoholic hepatitis	16	17	112	70	236,34	148,22
Liver cirrhosis	12	13	3.301	1.055	6.585,49	2.146,45
Acute pancreatitis	14	12	62	16	130,29	32,20
Chronic pancreatitis	14	14	34	4	69,41	8,04
Cancers						
Mouth	11	12	727	28	1.421,74	54,77
Pharynx	11	13	1.508	44	2.949,11	89,67
Œsophagus	10	11	1.363	96	2.561,88	183,94
Rectum	9	10	54	14	94,41	25,73
Liver	8	10	1.044	132	1.757,83	243,14
Larynx	11	12	762	10	1.459,02	20,54
Pancreas	10	9	221	99	409,48	180,14
Breast	-	12	-	677	-	1.368,37
Cardiovascular illnesses						
Ischemic cardiopathy	11	10	2.005	62	3.874,14	117,70
Alcoholic cardiomyopathy	14	14	81	12	168,72	25,00
Cerebral vascular illness	11	13	590	94	1.159,37	191,84
Respiratory diseases						
Pneumonia, influenza	12	13	286	22	570,99	44,80
Other pathologies						
Fœtal alcoholism syndrome	nd	nd	nd	nd	nd	nd
Other causes of death						
Road accidents	30	26	1.704	494	3.017,95	953,31
Accidental falls	18	14	376	26	795,52	53,77
Suicides	23	21	3.035	266	6.139,19	553,10
Homicides	25	24	128	74	247,01	146,07
Total					**36.384,97**	**7.223,70**

(1) Million francs

In total, this amounts to 43,608.87 MF of lost added value for the individuals deceased prematurely because of alcohol (36,384.97 MF for men and 7,223.7 MF for women).

It must be noted however that this estimate does not correspond to lost production in the workplace as we understand it, since part of the added value is paid to the state and another part is paid to the employees in the form of income. But these two aspects are calculated, on one hand, in lost revenue dealt with under the previous item and, on the other hand, in losses of compulsory deductions dealt with in the following item.

[29] With the maximum age taken for men and women corresponding to 65 years.

Moreover, compared with both the previous and the following items, we must point out that the calculations are made for a population aged between 20 years and 65 years for men and women, whereas under the other two items, the calculations apply to a population aged from 20 to 77 years for men and to 82 years for women.

So a precise evaluation of lost production in the workplace linked to premature deaths attributable to alcohol must separate out from this lost added value the lost income and lost compulsory deductions for persons aged between 20 and 65 years.

Table 23 therefore identifies the losses in terms of capitalised primary income (at the unchanged capitalisation rate of 6%), primary income being the total income derived by households from their contribution to economic activity. In the national treasury, this is gross income and includes social contributions, including employer contributions. According to the INSEE (1998), primary income in 1997 amounted to 115,199.57 francs per inhabitant (the gross disposable income per inhabitant before tax being 107,942 francs and representing 93.7% of primary income)[30].

[30] For more details on the switch from primary income to gross disposable income, the reader should consult the following item dealing with lost compulsory deductions.

Table 23 – Lost primary income linked to premature deaths attributable to alcohol (men and women aged 20 years and over) [31]

Clinical causes of death	Lost primary income (men) (1)	Lost primary income (women) (1)
Mental disorders		
Psych and alc. dependence syndr	940,10	218,76
Disorders of the digestive tract		
Acute alcoholic hepatitis	81,17	50,91
Liver cirrhosis	2.261,92	737,24
Acute pancreatitis	44,75	11,06
Chronic pancreatitis	23,84	2,76
Cancers		
Mouth	488,33	18,81
Pharynx	1.012,93	30,80
Œsophagus	879,93	63,18
Rectum	32,43	8,84
Liver	603,76	83,51
Larynx	501,13	7,05
Pancreas	140,64	61,87
Breast	-	469,99
Cardiovascular illnesses		
Ischemic cardiopathy	1.330,65	40,43
Alcoholic cardiomyopathy	57,95	8,59
Cerebral vascular illness	398,21	65,89
Respiratory diseases		
Pneumonia, influenza	196,12	15,39
Other pathologies		
Fœtal alcoholism syndrome	nd	nd
Other causes of death		
Road accidents	1.036,58	327,43
Accidental falls	273,24	18,47
Suicides	2.108,63	189,97
Homicides	84,84	50,17
Total	**12.497,15**	**2.481,13**

(1) Million francs

So in terms of primary income, the losses linked to premature deaths attributable to alcohol for persons aged between 20 and 65 years amount to 14,978.28 MF (12,497.15 MF for men and 2,481.13 MF for women).

It should be pointed out that Table 23 gives only lost primary income, as the other columns presented in Table 22 (ie the number of years lost by men and by women and the number of deaths for men and for women) are identical for both tables. Consequently, it seems preferable, for simplicity's sake, not to repeat these columns of figures.

[31] With the maximum age taken for men and women corresponding to 65 years.

At present it is now possible to estimate lost production in the workplace linked to premature deaths attributable to alcohol by calculating the difference between losses in added value and losses in primary income. In fact that difference roughly reflects the share of wealth lost by companies (broadly speaking) after paying salaries and employer contributions (ie in global terms the primary income) but before the different taxes levied on companies. It is in this respect (owing to taxes paid by companies to the state) that we say that the estimate "roughly" reflects the share of wealth lost by companies since, to be absolutely correct, our calculations should take into account the various corporate taxes paid.

Nevertheless, and with the aforementioned reservation, Table 24 identifies the production losses linked to premature deaths attributable to alcohol. The results obtained therefore correspond to the difference between the columns of losses in tables 22 and 23. In fact, we should say that the real production losses correspond to losses in added value but if we are to divide the losses between the different categories of players, it seems preferable to break down the losses in order to gauge the share actually borne by individuals, companies and the state.

Table 24 - Lost production linked to premature deaths attributable to alcohol (men and women aged 20 years and over) [32]

Clinical causes of death	Lost production (men) (1)	Lost production (women) (1)
Mental disorders		
Psych and alc. dependence syndr	1.796,97	418,16
Disorders of the digestive tract		
Acute alcoholic hepatitis	155,16	97,31
Liver cirrhosis	4.323,57	1.409,21
Acute pancreatitis	85,54	21,14
Chronic pancreatitis	45,57	5,28
Cancers		
Mouth	933,42	35,96
Pharynx	1.936,18	58,87
Œsophagus	1.681,95	120,76
Rectum	61,98	16,89
Liver	1.154,07	159,63
Larynx	957,89	13,48
Pancreas	268,84	118,27
Breast	-	898,37
Cardiovascular illnesses		
Ischemic cardiopathy	2.543,49	77,27
Alcoholic cardiomyopathy	110,77	16,41
Cerebro-vascular illness	761,16	125,95
Respiratory diseases		
Pneumonia, influenza	374,87	29,41
Other pathologies		
Fœtal alcoholism syndrome	nd	nd
Other causes of death		
Road accidents	1.981,38	625,87
Accidental falls	522,28	35,30

[32] With the maximum age taken for men and women corresponding to 65 years.

Clinical causes of death	Lost production (men) (1)	Lost production (women) (1)
Suicides	4.030,56	363,13
Homicides	162,17	95,90
Total	**23.887,82**	**4.742,58**

(1) Million francs

In total, production losses in the workplace (or lost company wealth after salaries and employer contributions) linked to premature deaths attributable to alcohol amount to 28,630.4 MF (23,887.82 MF for men and 4,742.58 MF for women).

The second category of individuals generating production losses attributable to illicit drugs corresponds to the individuals imprisoned for drug offences or having committed crimes or misdemeanours or been responsible for road accidents while under the influence of drugs and sentenced to a term in prison.

As for the category of lost production featured previously, we will present, for simplicity's sake, the quantified French example for illicit drugs. For the individuals imprisoned for drug offences, we must firstly return, in our previous calculations, to the length of imprisonment of all detainees for drug offences (amounting, in the French case, to 194,122.5 months). Since the mean sentence (in length of imprisonment) is 18.1 months, capitalising the production losses for this category does not seem to serve much purpose. Consequently, we will take monthly added value as the basis for our calculation:

monthly A.V. = 335,399.05 / 11.75 = 28,544.6 FF[33]

Thus with a monthly A.V. of 28,544.6 francs and a total duration of imprisonment for all drugs offenders of 194,122.5 months, we can estimate the losses in added value generated by individuals imprisoned for drug offences at:

Losses in A.V. generated by individuals imprisoned for drug offences = (194,122.5 x 28,544.6)

making 5,541.15 MF of lost added value generated by individuals imprisoned for drug offences.

Nevertheless, we must deduct from that added value the share of monthly primary income already computed in lost income and that calculated in the compulsory deductions (see following item). With an annual primary income of 115,199.57 francs, the monthly primary income amounts to:

monthly P.I. = 115,199.57 / 12 = 9,599.96 FF[34]

[33] 11.75 months corresponds to 47 weeks (52 weeks less 5 weeks of paid leave) divided by 4 weeks.
[34] Contrary to added value, we take the figure of 12 months since we are taking the individual's viewpoint. For added value, we take the viewpoint of the company. We therefore compute the added value actually produced within the period of time actually spent by the individual in the company.

Therefore, by using the same durations of imprisonment, we obtain a total loss of primary income equivalent to:

Losses in P.I. of persons imprisoned for drug offences = (194,122.5 x 9,599.96)

making 1,863.57 million francs of lost primary income for individuals imprisoned for drug offences.

In total, lost production (ie lost wealth for the company after payment of salaries and employer contributions but before various corporate taxes) owing to individuals being imprisoned for drug offences amounts to 3,677.58 MF (5,541.15 MF – 1,863.57 MF).

As regards the other crimes and misdemeanours involving illicit drugs (e.g. driving under the influence of illicit substances, theft, rape, murder etc attributable to drugs), and whose authors are imprisoned, there is unfortunately no information for the case of France. Nevertheless, should information become available, the same approach as that used for persons imprisoned for drug offences should be used here.

Finally, the last category of individuals causing lost production attributable to illicit drugs corresponds to individuals who are hospitalised or on sick leave owing to a drug-related problem. Estimations for this category are easier than for the category of lost income since the absence of an individual from his workplace engenders a straight loss for the company. Nevertheless, as in the case of premature deaths, we will have to pass through different stages to determine the production losses linked to hospital stays attributable to illicit drugs.

Here again, and for clarity's sake, we will take the French example for the case of alcohol, since data for illicit drugs are extremely scarce. Nevertheless, the approach taken here for alcohol is identical to the one that would be used for illicit drugs.

We know that the added value generated per day of work and per domestic job amounts to 1,427.23 francs. Therefore, each day of an individual's hospitalisation costs the company the equivalent of this daily added value. If we now take the data concerning the duration of hospital stays (i.e. 7 days in the French case), it is possible to estimate the losses in added value linked to hospital stays attributable to alcohol[35].

In other words, if we take the number of stays attributable to alcohol calculated previously under the item concerning health costs, and add up all the stays for all pathologies, this gives us a number of stays equal to 383,381 (with Hill coefficients), namely 297,266 stays for men and 86,115 for women. Consequently, the total number of days of hospitalisation attributable to alcohol amounts to 2,683,667.

Consequently, by applying to these days of hospitalisation the amount of mean daily added value for domestic jobs, i.e. 1,427.23 francs, it is now possible to calculate the total lost added value attributable to hospital stays (Table 25).

[35] The comments made in this connection under lost income apply here too.

Table 25 – Losses in added value linked to hospital stays attributable to alcohol (total in MF)

Losses	Hill Coefficients
Lost income per hospital stay	1,427.23
Number of hospital stays	2,683,667.00
Total	***3,830.21***

Thus, losses in added value linked to hospital stays attributable to alcohol are equivalent to 3,830.21 million francs if we apply Hill coefficients.

In fact, the question is whether this amount of lost added value is to be considered as the entire production loss linked to hospital stays attributable to alcohol. While, theoretically, added value does indeed represent the wealth created by a company or business sector, we know that, under the previous item, we have allocated part of that added value to lost income and that, under the next item, we will allocate another part of it to compulsory deductions. But, whereas for lost income, we adopted the viewpoint of the individual, here we have, once again, to consider the viewpoint of the company. In other words, as for the case of premature deaths, we must use the primary income which includes employer charges, i.e. 115,199.57 francs. Therefore, if we consider, as with the case of premature deaths, that the number of days worked per domestic job was an annual total of 235 (47 weeks x 5 working days a week), the daily primary income amounts to 490.21 francs. Consequently, by applying the number of days lost owing to hospital stays attributable to alcohol, we obtain Table 26.

Table 26 – Lost primary income linked to hospital stays attributable to alcohol (total in MF)

Lost primary income	Hill Coefficients
Lost income per hospital stay	490,21
Number of hospital stays	2 683 667,00
Total	***1 315,56***

Thus, lost primary income linked to hospital stays attributable to alcohol is equal to 1,315.56 million francs if we apply Hill coefficients.

Thus, if we calculate the difference between lost added value and lost primary income, the production losses linked to hospital stays attributable to alcohol amount to 2,514.65 MF (Table 27).

Table 27 - Lost production linked to hospital stays attributable to alcohol (total in MF)

Lost production	Hill Coefficients
Lost added value	3 830,21
Lost primary income	1 315,56
Total	***2 514,65***

In conclusion, the total production losses correspond to the sum of the lost income of the three categories of individuals suffering a loss of income owing to illicit drugs.

3.6 Losses in compulsory deductions attributable to illicit drugs

While lost income and production attributable to drugs form a substantial part of the cost linked to the imprisonment of persons sentenced for drug offences, premature deaths and hospitalisations attributable to drugs, there is a second aspect concerning the losses arising from the same causes, namely the loss of compulsory deductions.

In the French case, and according to the INSEE (1998), the share of compulsory deductions in the GDP amounted to 46% in 1997, which corresponds to 3,748.0 billion francs. Among the major items under compulsory deductions, *state levies* accounted for no more than a third of all compulsory deductions in 1997, whereas *social contributions* represented 42% and *taxes levied for local authorities* corresponded to 16% of the total.

Where evaluation of the social cost is concerned, it appears normal, therefore, to integrate lost compulsory deductions linked to imprisonment, premature deaths and hospital stays attributable to illicit drugs. These imprisonments, deaths and hospital stays cause a drop in the amount of compulsory deductions and therefore affect the resources made available to the community.

To calculate these lost compulsory deductions, we must exploit the data previously used but also transpose the percentage of compulsory deductions to the individual level. Under the previous item (see item 2.6), we interpreted individual income as GDI (gross disposable income) but after tax. We also know that GDI before tax amounts to 107,942 francs (INSEE, 1998), which corresponds to primary income (total income derived by households from their contribution to economic activity, either directly (income from salaried or non-salaried activity) or indirectly (income from investment in moveable or fixed assets)) incremented by the transfers received (social benefits) and minus taxes and social contributions paid. This transition from primary income to GDI is shown in Table 28.

Table 28 - Transition from primary income to gross disposable income of households (in % of primary income and in francs)

	In % of primary income (1997)	Amount in francs (1997)
Primary income	**100.0%**	**115,199.57**
inc.: - Remuneration of salaried staff	69.8%	80,409.30
- Gross margin of individual companies	12.3%	14,169.55
- Income from assets	17.9%	**20,620.72**
Net redistribution transfers	**- 6.3%**	**- 7,257.57**
inc.: - Standard taxes on income and assets	- 10.6%	**- 12,211.15**
- Social contributions paid	- 30.5%	**- 35,135.87**
- Social contributions received	33.8%	**38,937.45**
- Other net transfers	1.0%	**1,152.00**
Gross Disposable Income	**93.7%**	**107,942.00**

Source : INSEE (1998), p. 93

Thus, if we apply the deductions linked to taxes and social contributions paid, we obtain a loss of compulsory deductions equal to 47,347.02 francs, 41.1% of deductions in relation to primary income.

Here again, and for clarity's sake, we will take the French example for the case of alcohol, since data for illicit drugs are extremely scarce. Nevertheless, the approach taken here for alcohol is identical to the one that would be used for illicit drugs.

In fact, evaluating lost compulsory deductions is fairly simple. Since all the data previously used remain unchanged, except for the GDI of 97,012 F (multiplication coefficient in the estimation method) which is replaced by an amount of deductions equal to 47,347.02 francs, we can say that lost deductions amount to 48,81% of income losses linked to premature deaths attributable to alcohol. Consequently, in Table 29 we apply this percentage to lost income attributable to premature deaths in order to determine lost compulsory deductions linked to premature deaths attributable to alcohol.

This puts the lost compulsory deductions linked to premature deaths attributable to alcohol at 11,977.09 million francs, with a breakdown between men and women corresponding to 9,711.16 million francs and 2,265.93 million francs respectively.

Table 29 – Lost compulsory deductions linked to premature deaths attributable to alcohol (MF)

Lost compulsory deductions	Method 1
Lost income linked to premature deaths (men)	19,895.85
Lost income linked to premature deaths (women)	4,642.35
Total lost income linked to premature deaths	**24,538.20**
Lost compulsory deductions linked to premature deaths (men)	9,711.16
Lost compulsory deductions linked to premature deaths (women)	2,265.93
Total lost compulsory deductions linked to premature deaths	**11,977.09**

For imprisonment for drug offences, the same approach as the one used to compile Table 29 yields Table 30.

Table 30 - Lost compulsory deductions linked to imprisonment for drug offences (MF)

Lost compulsory deductions	Amount in MF
Lost income linked to imprisonment	1,569.34
Lost compulsory deductions linked to imprisonment	765.99

Thus, for imprisonment for drug offences, lost compulsory deductions amount to 765.99 MF (1,569.34 x 0.4881).

For other crimes and misdemeanours involving drugs (e.g. driving under the influence of illicit substances, thefts, rapes, murders etc attributable to drugs) and whose perpetrators are imprisoned, unfortunately no data is available. However, should such data be available, the method used here would apply.

Finally, for persons hospitalised we may say that they are not subject to compulsory deductions on lost salary linked to days of hospitalisation (3 days waiting period and 25% not covered for each day of additional hospitalisation in the French case).

This gives us an amount for daily "compulsory deductions" of 129.72 francs (47,347.02 francs/ 365 days). As a result, for a mean duration of hospitalisation of 7 days, we obtain for the 3 days of waiting a loss of compulsory deductions through hospitalisation equal to 389.16 francs (129.72 x 3), whereas for the 4 remaining days the loss of compulsory deductions owing to a hospital stay is 129.72 francs (129.72 x 0.25 x 4). This means that the lost compulsory deductions for a hospital stay correspond to 518.88 francs (389.16 + 129.72). In total, in the case of alcohol, the loss of compulsory deductions linked to hospitalisation attributable to alcohol for 383,381 stays in hospital of a mean duration of 7 days amounts to 198.93 MF.

3.7 Privately funded associations

The existence of private associations (associations geared to research, prevention, patient and family support etc) in the area of drug addition must obviously be taken into account in the social cost of illicit drugs. While *a priori* there seems to be no difficulty in evaluating the cost of these operatives (since the global budget of each association is made public in principle), a few aspects must nevertheless be clarified to avoid certain errors and facilitate presentation of the results. There are three key points to remember:

- ☞ Firstly, the source of these associations' funding requires special attention. It may be that part of their budget is drawn from public (or semi-public) funding. As this funding would already be taken into account, in public authority budgets for example, only the portion of funding derived exclusively from the private sphere should be counted.

- ☞ Then there is a valuable distinction to be drawn between private associations in terms of their role. In other words, it may be useful to distinguish between private associations geared to research on the one hand and prevention on the other hand if, for example, we wished to evaluate the share of the social cost dedicated to research, prevention and/or enforcement. Generally speaking, associations engaged in prevention include not only those active in pure prevention but also those working in the health and social sphere. It is possible, therefore, to break down this prevention aspect into pure prevention and "social/health"'.

- ☞ Finally, it is worth distinguishing, in the budget of an association engaged in prevention, the share financing the running of the association and the share actually allocated to its objective. In other words, identifying the budget share actually devoted to prevention enables us to determine exactly what goes towards the prevention effort. It should be noted, in this connection, that associations are generally somewhat reluctant to pass on this kind of information.

3.8 Other costs borne by private operatives

There are other costs attributable to drugs to be borne in mind. This item is not exhaustive but presents the three main other costs borne by private operatives, which are to be added to those previously mentioned, such as lost income of individuals.

These are fines on persons convicted of drug offences (3.8.1), other sanctions linked to drugs convictions (3.8.2) and legal costs (3.8.3).

3.8.1 Fines on persons convicted of drug offences

In addition to terms in prison, those convicted of drug offences bear an additional cost corresponding to fines. Where the data are available, obviously it is fairly easy to evaluate the cost. In the French case, for example, the figure given by the Ministry of Justice[36] in 1996 is 2,139 fines for all drug offences, with the mean amounting to 2,460 F.

Table 31 classifies fines by type of offence (obtaining, purchase, use, illicit use, trafficking, sale and transport, offering and supplying, abetting use, others) but also distinguishes fines for convictions for single offences and convictions for multiple offences.

Table 31 - Number of convictions with fines for drug offences and mean amount of fines

Type of offences	All convictions		Convictions for a single offence		Convictions for multiple offences	
	Number of fines	Mean amount	Number of fines	Mean amount	Number of fines	Mean amount
Obtaining, purchase, use	804	2.571	277	2.330	527	2.698
Illicit use	1.073	2.170	700	2.003	373	2.483
Trafficking (import, export)	32	2.594	5	2.600	27	2.593
Sale, transport	143	3.362	8	2.125	135	3.435
Offering and supplying	67	3.072	33	2.788	34	3.347
Abetting use	18	4.750	14	5.607	4	1.750
Others	2	6.000	2	6.000	0	0
All offences	**2.139**	**2.460**	**1.039**	**2.175**	**1.100**	**2.730**

Here, since the amount of the fines is specifically linked to a drug offence (even in the case of multiple offences) we can take all convictions (i.e. both single and multiple offences). It is simply a matter of multiplying the total number of convictions by the mean amount of fine to determine the total amount of fines borne by private agents and attributable to drug offences.

In the French case, this makes a total of 5.26 million francs of fines borne by persons convicted of drug offences.

3.8.2 Other sanctions linked to drugs convictions

This last type of sanction suffered by individuals convicted for drug offences corresponds to alternative measures or corrective measures. Table 32 provides an

[36] Convictions in 1996, Etudes & Statistiques Justice n° 11, Ministère de la Justice, 1998

overview of these different sanctions such as suspension of driving licence, community service, day-fines etc.

Unfortunately, evaluating this mixed bag of sanctions in monetary terms is tricky, for reasons of both the nature of the sentences (for example the confiscation of a vehicle or corrective measures) and the unavailability of data to properly evaluate these different aspects.

Table 32 - Number of convictions with alternative measures or corrective measures for drug offences

Type of offences	Total	suspens.of driving licence	comm. service	day-fines	confisc. of driving licence.	prohibition from French territory	Confisc	Corrective measures	Others
Obtaining, purchase, use	467	17	189	95	0	1	30	133	2
Illicit use	557	17	223	104	1	5	14	191	2
Trafficking (import, export)	17	1	15	1	0	0	0	0	0
Sale, transport	90	4	42	20	0	2	0	22	0
Offering and supplying	170	6	77	24	0	0	0	63	0
Abetting use	14	0	1	1	0	0	5	7	0
Others	1	0	0	0	0	0	0	1	0
All offences	**1.316**	**45**	**547**	**245**	**1**	**8**	**49**	**417**	**4**

3.8.3 Legal costs

Computing the legal costs borne by individuals is made difficult by the fact that, in the case of drug offences, for example, not all the individuals concerned have recourse to a lawyer. Furthermore, some may receive full or partial legal aid, depending on their income. Finally, as we do not know the number of individuals sentenced for crimes or misdemeanours attributable to drugs (other than drug offences as such), part of the legal costs involved would be left out of the calculation.

In sum, estimating this kind of cost is extremely difficult if not risky, although legal costs should be included in the calculation of the social cost of drugs and are likely to represent a fairly substantial cost in relation to those that we have been able to calculate.

Nevertheless, were the necessary information to be available, the rule to be applied is extremely straightforward. It would suffice to know how many individuals had used the

services of a lawyer in a case involving illicit drugs and then multiply that number by the mean legal costs involved. It must be borne in mind however that only those paying their lawyer with their "own money" must be counted and not those receiving legal aid, since the cost of legal aid would in principle have already been counted in the budget of the Ministry of Justice.

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CONCLUSION

HOW THE SOCIAL COST OF LICIT DRUGS (ALCOHOL AND TOBACCO) AND ILLICIT DRUGS IS CALCULATED IN FRANCE

Co-operation Group to Combat Drug Abuse and illicit trafficking in Drugs

4. Conclusion: How the social cost of licit drugs (alcohol and tobacco) and illicit drugs is calculated in France[37]

Two pieces of research, conducted under the scientific supervision of Pierre Kopp, economist and professor at the University of Paris I (Panthéon - Sorbonne), have attempted to estimate the social cost, in France, of licit drugs (alcohol and tobacco) and illicit drugs. The first, called "Le coût social des drogues illicites" ("The social cost of illicit drugs") was written for the French Monitoring Centre for Drugs and Drug Addiction (O.F.D.T). [38] The second, entitled "L'impact des modalités organisationnelles et de la réglementation publique sur la consommation de substances addictives" ("The impact of organisational methods and public regulation on the use of addictive substances"), was produced under the co-operation agreement signed on 26 October 1995 between France's drug control agency (M.I.L.D.T) and the French National Institute for Statistics and Medical Research (I.N.S.E.R.M.).

These two studies provide a detailed example of how a social-cost analysis of illicit drugs is conducted and the findings which such studies may produce. It would therefore seem useful to conclude this report by briefly outlining the principles for calculating the "social cost" of drugs (1), the nature of the costs considered (2), the limitations (3) and the principal findings (4) developed in these two pieces of research conducted under the scientific supervision of Pierre Kopp.

4.1 Principles for calculating the "social cost" of drugs

Drugs impose costs on society. Use of licit drugs (alcohol and tobacco) and the use and trafficking of illicit drugs have a broad range of social consequences for both the individual and society. In economic terms these consequences may be measured by estimating the "social cost" generated by the use and trafficking of these substances. These calculations are prevalence-based, which means estimating the costs of drug problems whose source may be in the past but which become apparent in the course of a year.

The "social cost" measured in this report is generated by trafficking in illicit drugs and by the use (whether or not abuse) of all three substances considered. It would be erroneous to attribute this "social cost" to abuse alone when we are unaware whether there is a level of use below which the risk would be nil. This question is much debated, especially in the case of alcohol and cannabis[39]. On the other hand, it has been

[37] The term « drugs » is equivalent to that recommended by the O.F.D.T. The definition of drugs is « a natural or synthetic substance, taken with a view to modify the state of mind, having a potential toxic use, abuse or dependence of which the usage may or may not be legal. Traditionally, the term "drug" covers the following four sub-groups: alcohol, tobacco, psychoactive medicines, and illicit drugs. Psychoactive medicines include the four following classes: hypnotic, neuroleptique, anxiolitiques, anti-depressants. Illicit drugs are: narcotic substances (other than medical prescription) and certain substances not classed as narcotics and not being used for their original purpose: glue, solvents, mushrooms, hallucigens, synthetic substances, medicines, etc.

[38] Office Français des Drogues et des Toxicomanies (Director: Jean-Michel Costes), 105, rue Lafayette, 75010 Paris. Convention No. 97-11. Scientific director: Pierre Kopp, economist, professor at University of Paris I (Panthéon - Sorbonne).

[39] W.H.O [1999].

established that zero risk is incompatible with the use of tobacco [40] and "hard" drugs, however small the quantity.

Social-cost analysis comes within the tradition of English-language literature which deals with psychotropic substances using the cost-of-illness (COI) method. In other words, the "social cost" approach takes only those costs borne by private and public agents as a whole and specifically excludes the "revenue" or "benefit" aspect connected with use of these substances. Thus, an approach based on the concept of "social cost" proves very different from the "cost-benefit" method traditionally used in public-sector economics, which advocates, in the choice between two possible actions[41], adopting that which will generate the highest net revenue, i.e. the greatest positive difference between revenue and costs.

Since we are not offered a genuine practical choice (it is not possible to decree a drug-free world)[42], we logically settle for measuring the social cost of drugs in order to highlight the
burden which they represent for society. Given that it is impossible to compare two projects only one of which can be implemented, use of a theoretical calculation becomes inevitable. In actual fact, two assumptions are made: on the one hand, that full factor employment exists (i.e. all existing resources are employed to produce goods and services) and, on the other hand, that resource reallocation due to the abolition of drugs would not affect the level of social benefit. On these two assumptions, all consequences of drugs are therefore treated as a social cost and the source of a loss of collective well-being.

Broadly speaking, this would mean that if there were no consumption of or business in tobacco, alcohol or illicit drugs, all the resources used in these "industries" would have to be found alternative employment in other types of activity; secondly, taking this to be the case, resource reallocation would, ceteris paribus, create the same amount of benefit without the costs previously generated (second assumption). This new resource allocation would therefore enable the total benefit created by the economy as a whole to be kept constant whilst the total cost generated by this economy was reduced and collective well-being consequently increased.

This argument is akin in spirit to the concept of opportunity cost used in economic theory: the possibility of using the resources allocated to an activity in an alternative and more beneficial way. For example, in this report and COI studies generally, if we suppose that a disease linked to the use of tobacco, alcohol or illicit drugs did not exist, the resources mobilised by society for treatment of this disease could be used

[40] C. Hill, "Tabac et risque de cancer", *T.H.S,* No. 2, 1999.
[41] As when comparing two strategies for treating drug addicts.
[42] We have already shown that an even simpler issue such as whether to prohibit or legalise illicit drugs remains unanswered. The question is whether society would be better off authorising the use of one or more new drugs. The answer can be affirmative only if society's collective well-being is increased (or the social cost of drug abuse diminishes). Nobody knows what impact the legalising of illicit drugs would have on social cost. The increase in use, the substitution effects between tobacco, alcohol and currently illicit drugs, a reduction in the negative effects of drugs attributable to their current illegality, and, a fortiori, the outcome of all these various combinations, are impossible to predict. It is not possible to prove the merit of prohibition over legalisation, or vice versa. The debate is therefore bound to continue, despite being incapable of solution and delaying the start of more fruitful discussions in terms of practical results. This sterile confrontation between conflicting beliefs is hampering rational discussion of drugs policy. P. Kopp, *Drogues: réduire le coût social* ("Drugs: Reducing the social cost"), Fondation Saint Simon, 1998.

differently. In this connection, we shall speak of a counterfactual scenario, reflecting an alternative state of affairs.

Of course, the content of this counterfactual scenario does not lay claim to realism, since it implies that users of psychoactive substances will shift their consumption to non-harmful goods and services, i.e. to activities not imposing costs comparable (in value) to those generated by the use and trafficking of licit and illicit drugs.

4.2 Nature of costs considered

This study confines itself to "tangible costs" [43] and excludes "intangible costs" such as the suffering of drug victims and their families.

The social costs as measured in COI studies therefore cover all tangible costs borne by society, i.e. not only by private agents (reflected in private costs) but also by public authorities (public costs), and caused by use and trafficking of psychoactive substances (but excluding their purchase cost).

COI studies do not include the cost of substance purchase in their estimates of social cost on the grounds that consumers' expenditure on alcohol, tobacco or illicit drugs would be transferred to other goods or services if these substances did not exist. Consequently, consumers' expenditure does not in any way influence the total social cost.

This COI definition of social cost corresponds to what economic theory calls "externalities". "Externalities" in the strict sense are the damage caused by one agent (or group of agents) to another agent (or group of agents). However, in the case of drugs, users are the primary victims of the consequences of drug use - hence a broader acceptation in which "externalities" in the broad sense also include the damage which users involuntarily inflict upon themselves, in addition to that which they visit upon others.

As for private costs, they include, in addition to costs borne directly by users of psychotropic substances (consumers' expenditure, lost earnings due, for example, to premature death, some non-reimbursable medical expenses, etc.), the private indirect or external costs borne by private agents who are not substance users (individuals and organisations). The latter category encompasses not only costs inflicted by substance users on other private agents who are not users (for example, firms which incur costs relating to production losses due to the absenteeism of substance users who have been hospitalised as a direct result of their use of alcohol, tobacco or illicit drugs) but also the expenditure incurred directly by private agents (chiefly associations)[44].

[43] Tangible costs measure monetary losses (such as lost earnings), whereas intangible costs put a money value on subjective injury (pain and suffering, for example).

[44] This classification raises a problem of economic theory. Externalities in the strict sense are defined as the damage caused by an individual or institution to others (individuals, firms, society). However, in the case of drugs, users are the primary victims of the consequences of drug use. It is generally accepted that externalities, in the broad sense, comprise the damage which users involuntarily inflict upon themselves and that which they visit upon others. The sum total of externalities is therefore equal to the "social cost" as calculated in COI studies.

Table 33 - Social cost of drugs in cost-of-illness (COI) studies

Type of cost	Drug users	+ Non-users	+ Central and local government	+ Social security	= Society
Direct costs	(1) Purchase of drugs	(2)	(3) Public cost of prevention and maintenance programmes (treatment orders, methadone centres, etc.)	(4) Cost of medical treatment (overdoses) and substitution (Subutex)	
Cost of direct conse-quences	(5) Cost of treatment for drug addicts (non-reimbursable part); court fees not claimable	(6) Cost of treatment for diseases transmitted by drug addicts (non-reimbursable part); cost of material damage and personal injury	(7) Treatment cost out of public-sector budget; legal costs; legal advice and assistance	(8) Cost of treatment for drug addicts (reimbursed part); cost of treatment for drug addicts' victims (reimbursed part)	
Cost of indirect conse-quences	(9) Lost earnings	(10) Lost productivity; lost earnings	(11) Lost tax; sundry social assistance	(12) Lost social insurance contributions	
Cost of intangible conse-quences	(13) Loss of well-being due to drug addiction, i.e. disease, premature death, or incarceration	(14) Loss of well-being due to drug addiction (family), offences committed by drug addicts, deaths due to diseases transmitted by drug addicts, etc.			

Notes: Externalities in the strict sense = 3 + 4 + 6 + 7 + 8 + 10 + 11 + 12
Externalities in the broad sense = externalities in the strict sense + 5 + 9
"Social cost" as defined by economic theory = 1 + (5 + 9) + externalities in the strict sense = 1 + externalities in the broad sense
"Social cost" as defined by COI studies = externalities in the broad sense
For studies including intangible costs: "Social cost" = "Social cost" as defined by COI studies + intangible costs.

Public costs, on the other hand, cover three types of expenditure relating to drug use (and trafficking, mainly of illegal substances) by private agents. The first category of expenditure includes public expenditure as defined in the national accounts, i.e. that shown in the central government budget. We here find the expenditure incurred by the various ministries (such as the Ministry of Employment, Solidarity and Public Health, the Ministry of Justice, the Ministry of the Interior, the Ministry of Defence, etc.). The second category of expenditure represents all resources committed by local government (regional, local and district councils). Lastly, all social transfers count as public costs, occurring mainly in the health sector. In actual fact, this expenditure is not generally regarded as a public cost (as defined in national accounts) in studies carried out in France and most other European countries, since these costs are paid for by society as a whole, i.e. also by households and firms, which are private agents.

Nevertheless, when comparing various studies internationally we should note that the British and American approaches include all health-service costs in public expenditure.

Finally, we should point out that lost earnings and productivity due to premature death are calculated using the human capital approach, taking the present value of future earnings. This method, which is the one most frequently used, differs from the willingness-to-pay approach[45], which assesses the value of human life according to the sum individuals are willing to pay to improve their life expectancy. As a rule, the figures obtained with the human capital method are lower than those using the willingness to pay approach.

4.3 Limitations

It is now time to voice some reservations, which are an essential part of any attempt at analysis in a field where data are often unreliable. We shall therefore list below the main reservations which the reader should bear in mind when forming an opinion as to the limitations of this report.

First of all, it must be pointed out that it has been impossible to include all components of social cost, since it appears that some data do not exist - a very pronounced obstacle in the case of illicit drugs. Thus the latter's contribution to the "social cost" is considerably underestimated.

The second aspect concerns health-care costs more generally. We have to admit that in this area we have come up against some serious problems. Firstly, data are often lacking, even if certain tools have been introduced by the competent authorities (the French medical IT programme (PMSI), for example). Nevertheless, these tools are not always exhaustive or, unfortunately, reliable. On the one hand, we should point out that the number of hospital stays which we have used is the number of stays in short-term treatment centres estimated by the DRESS. As for the PMSI task force (from whom we were unable to obtain data), the information contained in their database concerns only a certain number of hospitals. Thus, whether in DRESS studies or PMSI data, there are a number of hospital stays which do not figure. On the other hand, its seems that there are discrepancies (often large) between the various existing sources. We have therefore endeavoured, as far as possible, to cross-check the various data items and to verify the consistency of the figures put forward in this report.

It seems certain that health-care costs attributable to alcohol are underestimated by comparison with those for tobacco, since the health costs attributable to alcohol should be much higher. In actual fact, it appears that a large proportion of hospital patients have alcohol problems, although the primary and secondary diagnoses make no mention of them[46]. Thus a large number of patients hospitalised for a specific disease are concurrently suffering from a second, alcohol-related, disease. Unfortunately, the secondary diagnoses, which should record this aspect, are too infrequently mentioned.

[45] T.A. Hodgson and M. Meiners, "Cost-of-Illness Methodology: A Guide to Current Practices and Procedures", *Milbank Memorial Fund Quarterly*, 60(3), 1982, pp. 429-462.

[46] Telephone discussion with Mrs Burette (of the PMSI task force).

Still on the subject of health-care costs, it emerged that some hospital costs were not necessarily available. In order to get round this difficulty we have taken an average for the diseases for which we did have the hospital costs.

Similarly, with regard to attributable risks, it appeared that the diseases taken into account did not cover the whole range of diseases for which tobacco, alcohol or drugs could constitute risk factors. This is particularly true of illicit drugs, since, as far as we are aware, no study of the subject has been made in France. Consequently, the health-care costs attributable to illicit drugs include only the AIDS/HIV costs attributable to these drugs and the cost of Subutex treatment. Unfortunately, we have been unable to provide estimates for all the other diseases for which illicit drugs are a risk factor.

As regards alcohol-related insurance costs, we only have the proportion of road deaths attributable to alcohol. Thus, to calculate both material damage and personal injury (dead and injured), we have used the same figure (0.34) as that for the number of alcohol-related road deaths. It may seem that this figure is rather high for material damage. However, the seriousness of road accidents due to alcohol should, in all likelihood, offset the small number of such accidents in comparison to the greater number of small collisions in urban environments.

Here again, it has been impossible to take account of some aspects of road accidents relating to public spending or health-care costs. For example, it has not been possible to include the cost of calling out the fire brigade. Furthermore, no data could be gathered on the cost of first aid (SAMU and SMUR) or costs relating to treatment centres specialising in serious road casualties.

Lastly, it has proved impossible to include in this study the body of costs for indictable offences attributable to alcohol or drugs (other than alcohol-related breaches of the Highway Code and drug offences), since the cost of court cases concerning theft, rape, conjugal violence, child abuse, homicide (other than alcohol-related), unintentional injuries and petty crime attributable to alcohol or drugs, as well as other associated costs (investigation, trial and imprisonment, lost earnings, lost production, and lost income tax and social insurance contributions), are not calculated owing to a crucial lack of statistics.

All in all, the chief aspects which we have just outlined constitute a bias which tends to reduce the estimate of social cost. We therefore think it reasonable to suggest that the estimates provided here could be revised upwards. Consequently, our findings will be based on figures in the top of the range, which will still be below the real level but which we are unable to improve upon in the absence of the above-mentioned data.

4.4 Principal findings

In France, the total social cost for all three types of substance amounts to 218 billion francs, which is 2.68% of GDP. This "cost" can be approximately broken down into 115 billion francs for alcohol (1.42% of GDP), which thus heads the list, 90 billion francs for tobacco (1.1% of GDP), and 13 billion francs for illicit drugs (0.16% of GDP).

Table 34 Indicators of the social cost of drugs (alcohol, tobacco, and illicit substances)

	Alcohol	Tobacco	Illicit drugs	Total
Social cost (millions of francs)	115 420.91	89 256.90	13 350.28	218 028.09
Share of each substance in total social cost	52.94%	40.94%	6.12%	100.00%
Social cost / GDP	1.42%	1.10%	0.16%	2.68%
Per capita cost (francs)	1966.28	1520.56	227.43	3714.28

These findings are surprising inasmuch as they differ notably from those of studies[47] carried out abroad using a similar methodology. [48] In France, the social cost of alcohol is greater than that of tobacco, whereas the contrary is observed in Canada (1.4% as against 1.1%) and Australia (2.4% as against 1%). The social cost of alcohol in France (1.42%) is approximately 50% higher than in both these countries. The "French exception" is undoubtedly even more marked than our figures suggest, since, unlike the Canadian and Australian studies, we include as cost sources of alcohol-related indictable offences only breaches of the Highway Code and homicides caused by persons under the influence of alcohol. We take no account - owing to lack of data, and unlike studies abroad - of theft, rape, conjugal violence, child abuse, unintentional injuries and petty crime attributable to alcohol, or of the costs linked to these aspects (investigation, trial and imprisonment, lost earnings, lost production, and lost income tax and social insurance contributions).

However, the social cost of illicit drugs in France comes within the norm for other countries (0.16% of GDP in France, 0.2% in Canada, 0.2% in Switzerland, 0.4% in Australia, and 0.4% in the United Kingdom), i.e. a long way behind alcohol and tobacco. [49]

Drug-related deaths are the most obvious component of the social cost of drugs. This report takes account only of premature deaths and not of all deaths attributable to the three substances studied. [50] Consequently, the line for "drug-related premature deaths" indicates the number of deaths used to calculate the social cost, whereas the line for

[47] E. Single, L. Robson, X. Xie and J. Rehm, “The Cost of Substance Abuse in Canada”, *Addiction*, Vol. 93, No. 7, 1998.

[48] See H. Harwood, D. Fountain and G. Livermore, "The Economic Costs of Alcohol and Drug Abuse in the United States, 1992: A Report", *Addiction*, Vol. 94, No. 5, 1999, pp. 631-635.

[49] The United States is a special case, the social cost of illegal drugs being 1% of GDP and that of alcohol 2%. These figures are doubtless explained in part by the enormous prevalence of illicit drugs in that country and the large proportion of indictable offences attributable to alcohol. The NIDA report (1998) entitled *The Economic Costs of Alcohol and Drug Abuse in the United States* stresses that the social cost of alcohol-related crime is a third of that linked to illicit drugs, which is a very significant fact given that alcohol is legal.

[50] In a social-cost approach, we must consider only those deaths which generate "costs" for society. In other words, when we calculate lost earnings for individuals who have died prematurely - as a result of alcohol or tobacco for example - we must take only the fraction of the population dying before the age of average life expectancy (77 for men and 82 for women). It is only on this condition that we are able to assume that these premature deaths (i.e. before the statistical average age of 77 or 82) cause lost earnings. Past this statistical age, deaths attributable to tobacco, alcohol or illicit drugs can no longer be regarded as resulting in lost earnings for the deceased. In fact, earnings received beyond the average age of life expectancy represent a "bonus" for longer-than-average life. Obviously, the reasoning is the same for lost income tax and social insurance contributions and lost production, although in the latter case premature deaths must be calculated in relation to the age of retirement, i.e. 65.

"drug-related deaths" shows the total number of deaths attributable to each of the three substances studied, and it is this figure which is traditionally taken to represent all deaths attributable to alcohol, tobacco or illicit drugs. Thus the figures in the first line are automatically higher than those in the second.

Table 35 - Estimated premature deaths and total deaths attributable to drugs (alcohol, tobacco, illicit drugs) [51]

	Alcohol	**Tobacco**	**Illicit drugs** (1)	**Total**
Drug-related deaths (2)	60 000	60 000	547	115 000
Drug-related premature deaths	43 963	41 777	547	82 287
Total number of deaths in France in 1997 (3)	529 640			
Drug-related deaths as a proportion of total deaths	11.33%	11.33%	0.10%	22.76%
Drug-related premature deaths as a proportion of total deaths	8.30%	7.89%	0.10%	16.29%

(1) Includes only AIDS/HIV and overdose deaths.

(2) Approximate figures drawn: for drugs, from the O.F.D.T, Drogues et toxicomanies. Indicateurs et tendances (1999); for alcohol, from C. Got and J. Weill, L'alcool à chiffres ouverts (1997), Seli Arslan and the Parquet Reynaud report; for tobacco, from C. Hill, F. Doyon and H. Sancho-Garnier Epidémiologie des cancers (1997), Medecine-sciences Flamarion, Paris.

(3) "Causes médicales de décès: année 1997" ("Medical causes of death: 1997"), INSERM, Service commun n°8.

Thus with 82 287 premature deaths attributable to these three substances, we are able to conclude that alcohol, tobacco and illicit drugs are the cause of 16.29% of the deaths recorded in France for 1997, and this is certainly an underestimate. Taken in isolation, premature deaths due to tobacco (41 777) account for 7.89% of all deaths in France in 1997, those due to alcohol (43 963) representing 8.3% of this total, and illicit drugs representing only 0.1% of deaths in France[52].

A breakdown into the major elements of social cost (for all substances combined) shows us that "lost earnings and production" accounts for over half (52.33%) of the total social cost borne by society. Next come health-care costs (21.52%), followed by lost income tax and social insurance contributions (11.45% of the total), insurance company costs (10.6%) and lastly, a long way behind, general government spending (2.5%).

[51] According to our estimates and with a reference population aged from 20 up to the 75-79 bracket for men and the 80-84 bracket for women. However, the total number of deaths given by INSERM represents all deaths occurring in France in 1997, i.e. a population much larger than the one which we have used. In other words, if we take the total population according to INSERM, the figures which we have indicated here should be much higher.

[52] We should point out that for drugs, only AIDS/HIV and overdose deaths are counted here.

Table 36 - Itemisation of social cost of drugs (alcohol, tobacco and illicit substances) (Upper-end hypothesis in millions of francs)

	Alcohol	Tobacco	Illicit drugs	Total	Percentage of total social cost
Health-care costs (1)	18 421.76	26 973.70	1 524.51	46 919.97	21.520%
General government spending (2)	570.70		4 855.08	5 425.78	2.489%
National health-insurance fund (CNAM)	3 430.34	18.50		3 430.34	1.573%
Prevention costs				18.5	0.008%
Insurance	23 120.00			23 120.00	10.604%
Lost earnings and production (3)	57 555.66	50 446.70	6 099.19	114 101.55	52.333%
Of which: - Earning lost by private agents	25 159.96	24 188.20	1 774.73	51 122.89	23.448%
- Production lost at workplace	32 395.70	26 258.50	4 324.46	62 978.66	28.886%
Lost income tax and Social insurance contributions (3)	12 280.53	11 806.30	866.24	24 953.07	11.445%
Privately funded associations	5.70	na	na	5.7	0.003%
Other drug-related costs	36.22	11.70	5.26	53.18	0.024%
TOTAL	**115 420.91**	**89 256.90**	**13 350.28**	**218 028.09**	**100.000%**

1) For illicit drugs, health-care costs include only those costs relating to treatment of AIDS/HIV and to Subutex treatment. This figure is therefore far from reflecting the actual situation, since it has been impossible to take account of hospital stays and urban medicine.

2) In actual fact, the various costs are allocated differently for each type of substance between general government spending, CNAM costs and prevention costs. Thus for alcohol and tobacco, the CFES advertising campaign (prevention) was funded by the CNAM. However, other significant CNAM costs have prompted us to deal with this fund separately in the case of alcohol. To take another example, a proportion of the prevention costs for tobacco are paid by the Ministry of Employment and Solidarity. Consequently, these costs should be entered as general government costs. Yet the insignificant amount of these costs (some hundred thousand francs) prompted us to include them under prevention costs. Lastly, under general government costs for alcohol we have counted, for the Ministry of Employment and Solidarity, all costs relating to the special alcoholism-prevention programme run by the Ministry (Item 47-17), although some of this expenditure is financed by the private sphere or bodies other than the Ministry.

3) Lost earnings, production, income tax and social insurance contributions include only premature AIDS/HIV deaths attributable to drug addiction, premature deaths from overdoses, and incarceration for drug offences. Here again the figure is far from reflecting the actual situation since it has not been possible to take account of hospital stays.

This initial French study enables us for the first time to put a rough figure on the economic burden of drugs in France. It emerges from the initial statistical data in this report that drugs (licit and illicit) impose a heavy social cost on society.

Every year 2.68% of GDP, according to our calculations, or almost 3% (adjusted for underestimation) is wasted. Half this sum represents lost earnings and productivity resulting from death and absenteeism, and 20% represents health-care costs, with the remainder split between the other headings.

The cost to society of tobacco and illicit drugs seems "normal" when compared with studies abroad. However, the burden of problems relating to alcohol consumption seems high (1.65% of GDP), which suggests the hypothesis of a "French exception", reflecting in its "social cost" the fact that France leads the Europe of Fifteen in consumption of pure alcohol.