EMCDDA SCIENTIFIC REPORT

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Co-ordination of the implementation of the EMCDDA standard guidelines on the drug-related deaths in the EU Member States, and the collection and analysis of information on drug-related deaths

EMCDDA project CT.99.RTX.04

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Abbreviations

The Member States of the European Union

Au	Austria
Be	Belgium
Dk	Denmark
Fi	Finland
Fr	France
Ge	Germany
Gr	Greece
Ir	Ireland
It	Italy
Lu	Luxembourg
NL	the Netherlands
Pt	Portugal
Sp	Spain
Sw	Sweden
UK	United Kingdom
UK/EW	United Kingdom/England and Wales
UK/NI	United Kingdom/Northern Ireland
UK/Sc	United Kingdom/Scotland

Other abbreviations

DRD	Drug-Related Death
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
GMR	General Mortality Register
ICD	International Classification of Diseases
NFP	National Focal Point
SR	Special Register
WHO	World Health Organisation

Executive summary

The key-indicator drug-related death (DRD)

Data on drug-related deaths count as one of the five epidemiological key-indicators of the EMCDDA to be implemented in the Member States of the European Union. However, figures on drug-related deaths are not directly comparable between countries due to procedural differences occurring at various steps in the chain from the death scene to the final statistics on drug-related deaths. The EMCDDA's ultimate goal is to establish objective and reliable figures on drug-related death that are comparable between Member States. Comparability will be reached if in all Member States similar procedures will be followed. In order to set realistic goals for the coming years, priorities have been set at the endpoint of the chain of procedures by harmonising data extraction and classification from different registers.

The DRD-Standard

A provisional standard, coined the "DRD-Standard, version 1.0" was developed for this purpose. The current report describes the results of a field trial to test the feasibility of implementing this standard in the Member States of the European Union. The field trial was conducted in May and June 1999.

The DRD-Standard V1.0 specifies the required key data (codes or classes of drug-related deaths), age and gender breakdown, registration year and procedures to extract data from the two main sources of information on drug-related deaths. Part I of the DRD-Standard applies to General Mortality Registers, whereas part II applies to Special Registers. A General Mortality Register (GMR) contains a country's national vital statistics and is available in each Member State of the European Union. A Special Register (SR) is commonly held by the police or a forensic institution and is available in some Member States, either at the local, regional or national level.

Current ICD-9

The standard for GMRs is based on a series of codes from the 9th edition of the International Classification of Diseases system (ICD) referring to underlying causes of death. Several external causes of death (E-codes) have to be selected in combination with a nature of injury code ('N-code') to specify relevant substances and to avoid overinclusion of deaths that are not the target of this project (e.g. paracetamol overdose).

Restriction to direct deaths

The large majority of the cases selected under DRD-Standard V1.0 concern acute or direct deaths due to drug overdose (poisoning). The current DRD-Standard focuses on underlying causes of death only. In the future, methods of collecting data on indirect drug-related deaths will be investigated in order to provide estimates of overall drug-related mortality.

Future ICD-10

It is expected that in the near future all Member States will have implemented an ICD-10 coded General Mortality Register. Therefore, the future of the key indicator drug-related deaths will strongly depend on ICD-10 based GMRs. A separate report will be published on the feasibility of implementing a draft ICD-10 based standard.

Compliance of the GMRs with the DRD-Standard

With regard to the data that were received from the GMRs, the results of the field trial are as follows:

- For eight countries, data could be provided that matched the DRD-Standard fully or without major deviations. These are the countries Austria, Belgium, France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom (England, Wales, and Northern Ireland).
- For seven countries the data deviated from the DRD-Standard to varying degrees. These are the countries Denmark, Finland, Greece, Ireland, Luxembourg, Portugal, and Spain.
- The transition from ICD-9 to ICD-10 coded GMRs is promising. In the near future more countries will comply with the DRD-Standard.

Compliance of the SRs with the DRD-Standard

Given the fact that the data from the Special Registers differ much in scope, characteristics, and breakdown into causes of death, these data must be handled with extra caution. Data from Special Registers were received from Austria, Denmark, Finland, France, Germany, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. No data were received from the SRs from Belgium and Greece.

With the exception of Denmark and Germany, all countries delivering SR-data were able to apply the required age breakdown retrospectively. With regard to the breakdown in causes of death, full compliance with the DRD-Standard V1.0 counts for the five countries Austria, Finland, France, Luxembourg, and the United Kingdom. However, from these five countries, only the SRs of four countries have complete national coverage. Partial compliance for the delivered data counts for the seven countries Denmark, Germany, Italy, the Netherlands, Portugal, Spain, and Sweden.

Selection of codes for analyses

For the GMR-data, the following three selections of codes were analysed:

- Selection A: the Restrictive estimate, which includes Drug psychosis, Drug dependence, Nondependent drug abuse, and Accidental poisoning, all due to drugs of abuse.
- Selection B: the Broad estimate, which includes selection A plus Intentional and Undetermined poisoning, both due to drugs of abuse.
- Selection C: the All-Inclusive estimate, which includes selection B plus deaths due to psychoactive medicines.

For the SR-data, the following three selections of codes were analysed:

- Selection D: Overdoses, excluding medicines.
- Selection E: Overdoses, including medicines.
- Selection F: Overdoses and other indirect causes like suicide, disease, and accidents.

Results of the analyses of GMR-data

Some results of the analyses of GMR-data are as follows:

- Selection A (Restrictive) and B (Broad) show a rather similar trend over the years.
- Selection C minus B (medicines) shows a diverging trend from selections A and B, which suggests a different population.
- Among the countries complying with the DRD-Standard, the percentage of deaths due to psychoactive medicines is the highest in France (52%), followed by Belgium (42%), the Netherlands (41%), and Sweden (41%). Compared to these countries, Austria (7%) and The United Kingdom (England and Wales; 8%) show a strikingly low percentage of medicines cases.
- From the countries complying partially with the DRD-Standard, Finland is on top of the list as far as the proportion of deaths due to medicines are concerned. In Finland 73% of the cases concern benzodiazepines.
- Most persons dying from the use of typical drugs of abuse are fairly young (between 15 and 34 years).
- In most countries an ageing trend can be observed over the past ten years.
- The large majority of deceased is male (between 73 and 85%).
- Opiates are most commonly involved in deaths due to typical drugs of abuse.

Results of the analyses of SR-data

Some results of the analyses of SR-data are as follows:

- In general, the SRs do not contain significant numbers of medicines cases.
- The SRs of Finland and Sweden contain more cases of indirect causes of death compared to the United Kingdom, Luxembourg, and Austria. The Swedish and Finnish SR have a broad inclusion of cases that have been found positive on drugs of abuse.
- For selection D (overdoses due to drugs of abuse), there are hardly any deaths counted in the age group of 65 years and over. The age group distribution seems to match selection B (broad) from the GMRs.
- Most drug-related deceased are male, with proportions varying between 72 and 86%.
- Opiates account for most drug-related deaths.
- Most opiate deaths also involve (multiple) other drugs.

Recommendations

Finally, the following recommendations are given:

The DRD-Standard

1) It is recommended that selection B (broad) from the GMRs be installed as the standard estimate of the number of drug-related deaths for the Member States of the European Union. Selection B includes Drugs psychoses, Drug dependence, Nondependent drug abuse, Accidental poisoning, Intentional poisoning, and Undetermined poisoning, all with regard to drugs typical of abuse. The GMRs from the eight countries Austria, Belgium, France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom already comply with this standard.

2) Given the current transition to ICD-10, it is recommended that in the near future the ICD-10 equivalent of selection B (broad) from the GMRs be applied as the standard estimate of the number of drug-related deaths. ICD-10 promises that more countries will comply with the DRD-Standard.

3) It is recommended that, in co-operation with Eurostat and the WHO, all Member States be requested to implement ICD-10 in their GMRs by appropriate coding systems. From a technical point of view, it is recommended that ICD-10 X-codes and Y-codes be registered in combination with at least one T-code as an explanation to the underlying cause of death.

4) It is recommended that data from the SRs be applied as a backup estimate of the number of drug-related deaths for the countries Austria, Finland, France, Germany, Greece, Italy, Portugal, Sweden, and the United Kingdom.

Improvements

5) It is recommended that in publications about drug-related deaths countries be grouped together that comply equally well with the DRD-Standard.

6) It is recommended that deaths due to unspecified substances be checked for being deaths mainly due to drugs of abuse.

7) It is recommended that data be collected by 5-year age groups.

8) It is recommended that from each SR more specific information be collected about the substances involved in drug-related death.

9) It is recommended that for future data collection the data be delivered directly into general databases, without the detour of spreadsheets.

Additional projects

10) It is recommended that post-mortem protocols be standardised.

11) It is recommended that a separate EMCDDA-project be launched to estimate the number of indirect drug-related deaths.

1. Introduction

1.1 Key indicator drug-related deaths

Data on drug-related deaths count as one of the five epidemiological key-indicators of the EMCDDA to be implemented in the Member States of the European Union. Figures on drug-related deaths can be useful to monitor trends in the most severe consequence of drug use. Such data are also of potential value in estimating the prevalence of problematic drug use (see: EMCDDA project CT.99.RTX.05). However, it is acknowledged that figures on drug-related deaths are not directly comparable between countries due to conceptual differences and due to procedural differences occurring at various steps in the chain from the death scene to the final statistics on drug-related deaths. Variations can be observed in particular with regard to the:

- cause of death investigation, including post-mortem examinations
- completion of death certificates
- codification or classification
- data entry (bound by the characteristics of a register)
- data extraction to calculate the number of drug-related deaths ('definition').

The EMCDDA's ultimate goal is to establish objective and reliable figures on drug-related death that are comparable between Member States. Comparability will be reached if in all Member States similar procedures are followed for each of the above mentioned steps. In order to set realistic goals for the coming years, priorities have been set at the endpoint of this chain by harmonising data extraction and classification from different registers. As a result of previous projects (EMCDDA, July 1997, July 1998, and May 1999), a provisional standard, coined the "DRD-Standard, version 1.0" was developed for this purpose. The current report describes the results of a field trial to test the feasibility of implementing this standard in the European Member States.

1.2 About the DRD-Standard

The DRD-Standard V1.0 specifies the required key data (codes or classes of drug-related deaths), age and gender breakdown, registration year and procedures to extract data from the two main sources of information on drug-related deaths. Part I of the DRD-Standard applies to General Mortality Registers, whereas part II applies to Special Registers. A General Mortality Register (GMR) contains a country's national vital statistics and is available in each Member State of the European Union. A Special Register (SR) is commonly held by the police or a forensic institution and is available in some Member States, either at the local, regional or national level. Since data linkage between both systems is not possible on a structural basis, the standard was split in two parts.

The standard for GMRs is based on a series of codes from the 9th edition of the International Classification of Diseases system (ICD) referring to underlying causes of death. The codes are specified at four-digit level. Several external causes of death (E-codes) have to be selected in combination with a nature of injury code ('N-code') to specify relevant substances and to avoid overinclusion of deaths that are not the target of this project (e.g. paracetamol overdose).

Table 1 below shows the main categories of ICD-9 codes on which the DRD-Standard V1.0 is based. Only a selection of these categories will actually be used to estimate the number of drug-related deaths, as will be further explained in paragraph 4.1.1 below.

Table 1: Categories of ICD-9 codes

Category	**ICD-9 code(s)**
Drug psychoses	292
Drug dependence	304.0-9
Nondependent drug abuse	305.2-9
Accidental drug poisoning	E850.0, E850.8-9[1)], E851-2, E853.2, E854.1-2, E855.2, E855.9, and E858.8-9[1)]
Suicide and self-inflicted drug poisoning	E950.0-5[1)]
Drug poisoning undetermined intent	E980.0-5[1)]

[1)]in combination with N-codes (N965.0, N968.5, N969.6, and N969.7, see Box 1 in paragraph 3.1 and Annex 1)

The large majority of the cases selected under DRD-Standard V1.0 concern acute or direct deaths due to drug overdose (poisoning). There are also deaths where drug use may have played a contributory role but is not considered to be the direct underlying cause of death, such as infectious diseases or traffic accidents. However, registration procedures in most countries do not allow extracting data on contributory causes of death in a reliable way. Therefore the current DRD-Standard focuses on underlying causes of death only. In the future, methods of collecting data on indirect drug-related deaths will be investigated in order to provide estimates of overall drug-related mortality.

Similar to the standard for GMRs, the standard for Special Registers (SRs) distinguishes a broad category of direct drug-related deaths, which is further specified by classes of drugs. In addition, a broad category is included comprising various causes of death grouped under the umbrella term ‘other deaths’. Cases counted in this category concern indirect drug-related deaths and deaths among known drug abusers, whether or not (causally) related to drug use.

With regard to the General Mortality Registers, this report restricts itself to ICD-9 coded registers. It is expected that in the near future all Member States will have implemented an ICD-10 coded General Mortality Register. Therefore, the future of the key indicator drug-related deaths will strongly depend on ICD-10 based GMRs. A separate report will be published on the feasibility of implementing a draft ICD-10 based standard.

For more details about the standard see Annex 1.

2. The field trial

2.1 Objectives

The specific objectives of the field trial were:

- To evaluate the availability of data and to examine the degree of compatibility with the DRD-Standard.
- To analyse data according to cause of death, age, gender and substance to explore their potential use in monitoring trends in drug-related deaths.
- To determine the degree of consistency between estimates of drug-related deaths based on the GMRs, the SRs and the old, country-specific standards.
- To draw conclusions about the feasibility of the DRD-Standard on the basis of the field trial and the working plans of the National Focal Points (NFPs) delineating future perspectives on implementing the DRD-Standard.
- To make recommendations for improving the DRD-Standard.

2.2 Course and methods of the field trial

Step 1: Development of the draft DRD-Standard

Version 1.0 of the DRD-Standard is the outcome of several EMCDDA projects on drug-related deaths, in which national experts and representatives of the WHO and Eurostat have greatly contributed. In project CT98.EP.11, a questionnaire was distributed among the national experts to pre-test the feasibility of implementing the requirements of the standard without asking for actual data. DRD-Standard 1.0 was drafted on the basis of the results of this pre-test.

Step 2: Informing the National Focal Points (NFPs)

In May 1999 a letter of explanation was sent to inform the National Focal Points (NFPs) about the background and objectives of the field trial. They were asked to nominate a national expert on drug-related death to participate in the field trial. The tasks and functions of this expert were defined. In addition, the NFPs were asked to establish a National Working Group consisting of experts from various fields to support the implementation of the DRD-Standard. The nominated expert would act as a contact person between the National Focal Point, the National Working Group, and information sources on drug-related deaths. A review of the organisations and experts whose kind co-operation made the field trial possible, is given in Table 2.

Table 2: Contact persons at the Reitox National Focal Points and national experts nominated to participate in the field trial of DRD-Standard V1.0

COUNTRY	CONTACT PERSON NATIONAL FOCAL POINT	NATIONAL EXPERT(S)
AU	**Martin Busch** Austrian Health Institute (ÖBIG)	**Rainer Eigner** Federal Ministry for Social Security and Generations (FMSG) **Jeannette Klimont** Austrian Central Statistical Office (ÖSTAT)
BE	**Ann DeSmet** Scientific Institute of Public Health Louis Pasteur	**Ann DeSmet** Scientific Institute of Public Health Louis Pasteur
DK	**Kari Grasaasen** National Board of Health	**Henrik Sælan** Medical Office of Health, Copenhagen **Lene Haastrup** National Board of Health
FI	**Ari Virtanen** Drug Monitoring Centre of Finland (STAKES)	**Hilkka Ahonen** Statistics Finland **Erkki Vuori** Department of Forensic Medicine, University of Helsinki
FR	**Hélène Martineau** French Observatory for Drugs & Drug Addiction (OFDT)	**Eric Jougla** National Institute of Health and Medical Research (INSERM)
GE	**Roland Simon** Institut fur Therapieforschung (IFT)	**Axel Heinemann, Klaus Puschel** Institut für Rechtsmedizin, Universität Hamburg
GR	**Anna Kokkevi** University Mental Health Research Institute (UMHRI)	**Chara Spiliopoulou** Department of Forensic Medicine and Toxicology, University of Athens
IR	**Mary O'Brien, Rosalyn Moran** Health Research Board	**Mary Heanue** Central Statistics Office (CSO)
IT	**Silvia Zanone** Department of Social Affairs of the Presidency of the Council of Ministers	**Teodora Macchia** Instituto Superiore di Sanita
LU	**Alain Origer** Directorate of Health	**Alain Origer** Directorate of Health
NL	**Margriet van Laar, Guus Cruts** Trimbos Institute	**Margriet van Laar, Guus Cruts** Trimbos Institute
PT	**Maria Moreira** Instituto Português da Droga e da Toxicodependência (IPDT)	**Estela Pinho Marques** Instituto de Medicina Legal de Coimbra
SP	**Elena Garzón** Government Delegation to the National Plan on Drugs	**Teresa Brugal** Instituto Municipal de Salud Pública
SW	**Ola Arvidsson, Daniel Svensson** National Institute of Public Health	**Lars Age Johansson** Statistics Sweden **Anna Fugelstad** Karolinska Institute
UK	**Stephane Aujean** Institute for the Study of Drug Dependence, Drugscope	**John Corkery** Drugscope, St George's Hospital Medical School

Step 3: Data collection

In June 1999 the national experts were requested to deliver the data. They were sent the "Guidelines for applying the DRD-Standard Version 1.0" and spreadsheets for entering data from GMRs and SRs (see Annex 1). The GMR spreadsheet runs from DRD1 to DRD55. These codes for drug-related death cases are explained in the "Explanation to Table 1" of Annex 1. The format of the spreadsheet by which data from the Special Registers was delivered is given in Table 2 of Annex 1. The experts were asked to deliver data according to the standard as much as possible. In case the requirements could not be met, the expert was asked to act according to his or her own insight and/or to discuss this decision with their National Working Group on DRD. Deviations from the DRD-Standard had to be noted on a technical sheet.

In November 1999 the field trial and some preliminary results were discussed among the experts during a meeting held at the EMCDDA in Lisbon. The last data were received by the end of March 2000 (with the exception of data from Italy).

Annex 4 reviews the data that were delivered during the field trial. Sometimes, deviations from the DRD-Standard were so substantial that the standard was actually modified and did not fulfil its main objective, that is to harmonise data collection. Data delivered according to a 'nationally' modified standard could not be processed in a standardised way, and in such a case the expert was asked to deliver data again within the limits of the DRD-Standard. Annex 4 shows the final data deliveries that were acceptable within these limits.

Step 4: Data processing

For purposes of data analyses the received data from single spreadsheets were entered into unified databases. The spreadsheet data from the General Mortality Registers were transferred to the uniform SPSS database "GMR_01.sav". The spreadsheet data from the Special Registers were transferred to the uniform SPSS database "SR_01.sav".

GMR data were stored as values on the following variables: Country, Year, Gender, Age, DRD (=code number), and Number of cases (aggregated in the respective category). Given the limitations of the General Mortality Register in their country, the experts were sometimes forced to deviate from the DRD-Standard. Annex 5 reports all these deviations as they have appeared in the SPSS database. It should be clearly noticed that responsible use of this database requires a close look at all these deviations for each computation. The deviations sometimes imply that a preferred computation will not be warranted, or can only be made with the risk of overinclusion or underinclusion of cases.

SR data were stored as values on the following variables: Country, Year, Gender, Age, Cause, and Number of cases (aggregated in the respective category). The values on "Cause" refer to 17 kinds of drug-related deaths. These concern 5 standardised causes of death within the broad category 'overdose', as specified in the DRD-Standard. The subdivisions in the broad category 'other causes' were not a priori specified in the DRD-Standard itself, but spaces were left blank for countries to fill in their own causes of death as included in their Special Register. This resulted in 12 additional retrospectively defined causes of death (see Annex 6). Given the limitations of the Special Register in their country, the experts were sometimes forced to deviate from the DRD-Standard. Annex 6 reports all these deviations as they have appeared in the SPSS database. Again, it should be clearly noticed that responsible use of this database requires a close look at all these deviations for each computation. And again, the deviations sometimes imply that a preferred computation will not be warranted.

Privacy laws enacted by the European Union and the respective Member States regulate the DRD database. In accordance with these legal privacy regulations, the database only contains anonymous statistical data.

Technical details about the SPSS database (e.g. variables, value labels) are available from the EMCDDA and/or project co-ordinators at request.

Step 5: Data analyses

The collected data were subjected to various analyses. These include:

- *Computations of the number of drug-related deaths*

First, a selection of codes or causes of death was made to compute the number of drug-related deaths in each country. For GMR data a proposal for three selections of DRD-codes was discussed at the expert meeting in November 1999. These selections include a Restrictive, a Broad and an All-Inclusive estimate, which vary with respect to the inclusion of different manners of death and types of substances. After the meeting the codes belonging to these selections have been slightly revised. Similarly, data stored in SRs were selected on the bases of a D, E, and F selection, which also vary in degree of comprehensiveness. For a detailed explanation of the selections: see chapter 4. The feasibility of calculating these estimates depends on the degree of compliance between the DRD-Standard and the actually provided data. For countries with deviating data, the resulting figure on drug-related deaths may be an overestimation or an underestimation. This will be mentioned explicitly in the results' section. The reason to apply selections as well to data from 'deviating' countries was that such estimates might still provide a reliable measure of *trends* in drug-related mortality. This hypothesis was examined by means of correlational analyses between different data sources offered by the GMRs and SRs (cross-validation – see paragraph 4.3).

- *Trends, age, gender, and substance*

The selections described above formed the basis of subsequent analyses. Briefly, for the GMRs and SRs separately analyses were made about:
-trends across years for specific selections of causes of death
-age and gender distribution (also for different selections)
-proportion of drug-related deaths due to opiates compared to other drugs

- *Cross-validations*

Finally, comparisons were made between selections of GMR data, selections of SR data and old, non-standardised, country-specific data on drug-related death. This was done by means of bivariate correlational analyses (GMR – SR; GMR – old standard; SR - old standard) for annual figures across intervals of preferably at least 10 years. Analyses were carried out according to specific hypotheses (see paragraph 4.3).

3. Results: Availability of data

This chapter reports on the feasibility of the DRD-Standard, version 1.0. First it will be inquired to what extent the DRD-Standard has shown feasible for the General Mortality Registers (paragraph 3.1). Next it will be inquired to what extent the DRD-Standard has shown feasible for the Special Registers (paragraph 3.2).

3.1 General Mortality Registers

The DRD-Standard V1.0 for GMRs requires countries to provide data according to four criteria:

1. according to ICD-9 codes (underlying causes)
2. broken down by four-digit codes
3. for combinations of E and (multiple) N-codes
4. broken down by gender and age group

Data were required for each year as of 1985 in order to determine trends in drug-related mortality. However, this criterion was not used to establish compliance. Annex 4 shows the years for which retrospective data were actually available.

All countries were able to provide data according to the required age and gender breakdown (criterion 4). The main bottleneck concerned the extraction of data according to the DRD-codes following from criterion 1, 2, and 3. Annex 5 gives a country by country overview of the data that could be delivered according to the DRD-codes. It is indicated whether the data are expected to contain false positives (overinclusion) or false negatives (underinclusion). Annex 5 also describes the nature of the deviations from these DRD-codes and explains the deviating codes as stored in the SPSS database. Countries have been assigned to the category “compliance” or the category “partial compliance” on the basis of the nature and estimated ‘severity’ of their deviations from the DRD-Standard V1.0. For a clear understanding, Box 1 reiterates the logic and technical details behind the combination of E and N codes, which turned out to be the main problem in various countries.

Box 1: Note on the combinations of E and N-codes

The combination of an E-code with one or more N-codes is used when the E-code itself is not sufficiently specific for the relevant substances. For example, E950.0 (intentional poisonings due to analgesics, anti-pyrethics and anti-rheumatics) does not only refer to opiates but also to a variety of other substances, such as paracetamol. By combining E950.0 with the N-code for opiates (965.0) it is possible to extract only opiate suicides. Similarly, E950.3 (intentional poisoning due to tranquillisers and other psychotropic agents) may contain deaths due to various medicaments, including antidepressants. However, when combining E950.3 with 969.4, only cases due to benzodiazepines are selected.

If such a *simple combination* (one E and one N code) cannot be made, two options are possible for calculating the number of drug-related deaths. 1. Cases are counted for the E-code only without the restriction imposed by the N-code. The consequence is always an overestimation of the number of deaths due to inclusion of irrelevant cases. 2. Cases for such simple combination are *excluded.* The consequence is logically an underestimation of the number of drug-related deaths because relevant cases are not counted.

There are also *complex combinations* consisting of one E code and multiple N-codes. These multiple N-codes occur in combination with four E-codes:

- E850.8: Accidental poisoning due to analgesics, antipyrethics and antirheumatics: Other
- E858.8: Accidental poisoning by other drugs: Other (including drug combinations)
- E950.4: Suicide due to other specified drugs and medicaments
- E980.4: Undetermined poisoning due to other specified drugs or medicaments

Previous studies in the United States and the United Kingdom showed that these ‘non-specific’ E-codes could ‘hide’ quite a number of deaths due to combinations of drugs, such as opiates and cocaine. Therefore, it was decided to extract cases by combining the E-codes with N-codes. One N-code would not suffice because this might lead to double counting of cases in countries where the register allows the recording of more than one N-code. For example, accidental poisoning due to opiates and cocaine could be coded to E858.8 together with 965.0 and 968.5. If a DRD-code would specify “E858.8 AND 965.0” and another DRD-code “E858.8 AND 968.5”, such a case could be counted twice. This could be avoided by combinations of N-codes.

If the underlying E-code would be extracted alone, that is without N-codes, the consequence would be definitely an overestimation because of the inclusion of many ‘false positives’ (e.g. deaths related to the use of paracetamol). If the codes would be excluded this could *theoretically* imply an underestimation. However, in practice this depends greatly on the coding practices in countries. In countries with registers based on a maximum of one N-code, such combined cases are probably coded under other (DRD)-codes. Therefore the resulting data loss may be minimised (see paragraph 3.1.1).

3.1.1 Category I: Compliance

Acceptable compliance with the DRD-Standard V1.0 requires that E-codes can be combined with at least one N-code. From Annex 5 it can be concluded that the General Mortality Registers of the following countries comply with the standard:

- Austria
- Belgium
- France
- Germany
- Italy
- the Netherlands
- Sweden
- United Kingdom/England and Wales
- United Kingdom/Northern Ireland

It is preferred that E-codes can be combined with two N-codes instead of only one. In case of only one N-code, the national experts have chosen different solutions to deal with this problem (see Annex 5). Austria converted the DRD-codes in question into E-codes with one N-code. Germany excluded these DRD-codes (i.e. did not deliver data). The UK (E&W) included the data for these E-codes without N-codes.

Together with the national experts an attempt was made to determine whether these procedures would result in an over- or underestimation of the number of drug-related deaths computed on the basis of three selections of DRD-codes (see paragraph 4.1.1). For both Austria and Germany, it appeared that cases would be rarely coded to these complex DRD-codes. For Austria, no cases were counted under the converted DRD-codes. Thus the possible risk of false positives or negatives, respectively, appeared to be minimal.

To strengthen this conclusion, the total number of drug-related deaths were computed according to selections A, B, and C for countries that showed full compliance (at least two N-codes) and had determined the proportion of cases coded to these difficult DRD-codes. The results showed that for Belgium (1994), France (1997), the Netherlands (1995), and Sweden (1996), the proportion of such ‘difficult cases’ varied between 0% to 3%. For the UK (E&W, 1998) these proportions were higher: 9 -12%. This confirms the conclusion of minimal false and negative positives, because this complex coding procedure was in particular indicated by the risk of data loss in the UK when excluding the non-specific E-codes listed in Box 1.

However, the data for the UK (E&W) from 1987-1992 will certainly comprise an overinclusion of irrelevant cases. For 1992 the proportions of cases coded under the complex DRD-codes were 17% (selection A), 40% (selection B), and 32% (selection C). These values are much higher than for 1998, which is suggestive of overinclusion for the 1992 data.

3.1.2 Category II: Partial compliance

The General Mortality Register of some countries cannot combine an E-code with any N-code, because E-codes are not recorded or are lost for combination with N-codes. The

possible consequences have been described in Box 1 in paragraph 3.1. Annex 5 shows that this problem applies to Spain and Greece.

Spain

In Spain, no data were provided for DRD-codes requiring combinations of E and N-codes. The consequence will be that the resulting data are underinclusive, and the resulting computations of the number of drug-related deaths will be underestimated. For example, no data are available for intentional and undetermined opiate poisoning.

Greece

In Greece, the data have been provided but largely on the basis of E-codes only, which will in theory result in overinclusion. The actual data that were received suggest that all cases have been lumped into one cluster of deaths: accidental poisoning (see also chapter 4). No explanation was yet received as to why certain data could or could not be delivered.

For five countries, the deviations were more heterogeneous in nature. This applies to Denmark, Finland, Ireland, Luxembourg, and Portugal.

Denmark: retranslation to ICD-8

The General Mortality Register of Denmark has switched directly from ICD-*8* codes to ICD-*10* codes. To enable data delivery for the years 1985 through 1993, Denmark had to retranslate the ICD-9 codes of the DRD-Standard into the corresponding ICD-8 codes. No perfect match was possible between ICD-8 and ICD-9 codes. Annex 5 shows for which codes underinclusion or overinclusion is expected.

Finland: deviating E-codes

The Finnish General Mortality Register has applied ICD-9 codes from 1987-1995, which deviate from common ICD-9 practices issued by the WHO as shown in Table 3 below.

Table 3: Finnish ICD-9 codes compared to WHO

Causes of death	ICD-9 (WHO)	ICD-9 (Finland)
Accidental poisonings	E850.0 – E869.9	E840 – E850
Poisoning undetermined	E980.0-E980.9	E970-E979
Intentional poisoning	E950.0-E950.9	E950-E959

Letters (e.g. A-F) are used to give more specific information on the substances involved. This may be applied in addition to 3-digit codes to replace the 4-digit codes or be applied instead of N-codes. Nonetheless, Finland was able to provide data that matched the DRD-codes to a reasonable extent. Annex 5 shows that various codes are possibly overinclusive.

Ireland: underlying cause not assigned

The DRD-Standard selects cases on the underlying cause of death, which is either natural or external. For DRD1-19, the underlying cause of death is ‘natural’, whereas for DRD20-55, the underlying cause of death is external (E-codes; poisoning). For drug-related death cases, the Irish General Mortality Register does not register whether the underlying cause of death is natural or has an E-code. Therefore, cases cannot be selected on underlying cause.

Given the fact that cases are not selected on underlying causes only but also on contributing causes, the selection may also be overinclusive.

Luxembourg: only three-digit codes

From 1990 through 1997, the General Mortality Register of Luxembourg only contained ICD-9 codes aggregated to the three-digit level. The consequence is that many cells with DRD-codes at four-digit level have merged and that there is a high risk of overinclusion of irrelevant cases.

Portugal: only three codes

The General Mortality Register of Portugal has only information on the ICD-9 codes 292, E850.0, and E854.1. This implies that only DRD1, DRD20, and DRD29 could be delivered, and that no distinction could be made between selection A, B, and C (see chapter 4).

3.1.3 Conclusions

The following conclusions can be drawn with regard to data from the GMRs:

- For eight countries data could be provided that matched the DRD-Standard fully or without major deviations.
- For seven countries the data deviated from the DRD-Standard to varying degrees.

3.2 Special Registers

Data from Special Registers were received from Austria, Denmark, Finland, France, Germany, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. No data were received from the SRs from Belgium and Greece.

There are important differences in the coverage and characteristics of the Special Registers. Some registers have a national scope, whereas other registers only have a local scope. Moreover, some registers are police registers that mainly serve a law enforcement function, whereas other registers are forensic registers that mainly serve a public health function. These kinds of differences between the Special Registers are reviewed in Table 4 below.

Table 4: Coverage and characteristics of Special Registers

Country	Coverage	Characteristics
Austria	National	A register of suspected drug-related deaths that are reported obligatory by the police as well as institutes of forensic medicine.
Belgium	National	A police register. No data received during field trial.
Denmark	National	A police register of deaths due to the misuse of illegal drugs.
Finland	National	A forensic register of cases which have been found positive on drugs of abuse, after investigating post-mortem samples.
France	National	A police register.
Germany	National but Incomplete	A police register.
Greece	National	No data received during field trial.
Italy	National	A police register.
Luxembourg	National	A police register.
the Netherlands	Local	A municipal health service register, which only covers cases retrieved in the city of Amsterdam.
Portugal	Local or Regional	A network of forensic registers of cases retrieved in Coimbra, Central Region. No data were received for two other regions.
Spain	Local	A register of cases retrieved in the six major cities Barcelona, Bilbao, Madrid, Sevilla, Valencia, and Zaragoza, covering 39% of the total Spanish population.
Sweden	Local	A forensic register with a very broad inclusion of cases retrieved in the Stockholm area.
United Kingdom	National but Incomplete	A forensic register.

Similar to the General Mortality Registers, data from the Special Registers were requested for each year from 1985 onwards in order to determine trends in drug-related mortality. Annex 4 shows the years for which retrospective data were actually available.

The DRD-Standard V1.0 for Special Registers further requires countries to provide data broken down by:

- Cause of death:
  - Overdose
    - opiates only
    - poly-substances, including opiates
    - (poly-)substances, excluding opiates
    - psychoactive medicines
    - unspecified/unknown substances
  - Other causes (breakdown given by countries). For example:
    - non-poisoning suicide (e.g. drowning, hanging)
    - long-term disease (e.g. AIDS, hepatitis)
    - drug-related accidents
- Gender and age group

Annex 6 shows the availability of data according to the DRD-Standard. With the exception of Denmark and Germany, all countries delivering SR-data were able to apply the required age breakdown retrospectively. Denmark could provide gender breakdowns separately, but not in combination with breakdown by cause of death. In Germany, privacy regulations prescribe that, after a few years, data from the Special Register are only saved in aggregated form. Unfortunately, the age groups for this legally obliged aggregation differ from the age groups

of the DRD-Standard V1.0. Therefore, Germany could only deliver data from its Special Register according to the required age breakdown from 1995 onwards.

3.2.1 Compliance

With regard to the breakdown in causes of death, Annex 6 shows that full compliance with the DRD-Standard V1.0 counts for:

- Austria
- Finland
- France
- Luxembourg
- United Kingdom

3.2.2 Partial compliance

Partial compliance for the received data counts for:

- Denmark
- Germany
- Italy
- the Netherlands
- Portugal
- Spain
- Sweden

Denmark

Denmark delivered data for overdose cases in which the category “overdose by medicines” includes suicide.

Germany

Germany delivered data in which overdoses and other causes have been aggregated. Only for the past three years overdose (total) could be distinguished from other causes of death. Moreover, the German Special Register classifies ‘*methadone overdose*’ under ‘medicines/substitutes’.

Italy, the Netherlands, and Spain

Data from Italy, the Netherlands, and Spain only consist of unspecified overdoses that could not be broken down into substances. For the Netherlands (Amsterdam), most deaths probably refer to opiate overdose but since the frequency of post-mortem examinations is limited, toxicological information is largely lacking. For Spain (six cities) the data consist of unspecified overdose cases and the main substance involved is not known.

Portugal

The data for Portugal cannot be broken down into overdoses and other causes.

Sweden

The data from Sweden do not contain overdoses by poly-substances without opiates and medicines.

3.2.3 Conclusion

Given the fact that the data from the Special Registers differ much in scope, characteristics, and breakdown into causes of death, these data must be handled with extra caution. Nonetheless, the possibility remains that trends signalled in the General Mortality Registers will correlate with trends signalled in the Special Registers. If so, this will cross-validate the data from these different kind of registers.

4. Results: Analyses on DRD-Data

4.1 General Mortality Registers

4.1.1 Selection of DRD-codes to calculate the number of drug-related deaths

It was already mentioned above that not all the codes from the DRD-Standard, running from DRD1 through DRD55, would actually be used for analysis. Only a selection of these codes will be applied. In a previous project an inventory has been made of national definitions of drug-related deaths. This overview revealed differences with regard to 1) the types of substances and 2) the manners of death. Whereas agreement consisted on the inclusion of deaths due to typical drugs of abuse, such as opiates, cocaine, amphetamines, hallucinogens, and cannabis, opinions differed as regards the inclusion of deaths due to psychoactive medicines, such as benzodiazepines and barbiturates[1]. Further, *accidental* poisoning was included in the definitions of most countries but differences appeared with regard to other manners of death: intentional poisoning (suicide) or poisoning with undetermined intent.

There is no consensus yet on a European definition. Therefore three selections have been proposed at the DRD expert meeting in November 1999 to calculate or, more conservatively, to estimate the number of drug-related deaths in the EU countries. These are as follows:

- Selection A: the Restrictive estimate
- Selection B: the Broad estimate
- Selection C: the All-Inclusive estimate

At a conceptual level, selection A refers to all deaths due to: Drugs psychoses, Drug dependence, Nondependent drug abuse and Accidental poisoning, all related to the use of typical drugs of abuse (opiates, cocaine, amphetamines, cannabis, hallucinogens). Selection B is similar to A but also includes Intentional and Undetermined poisoning due to drugs of abuse. Selection C is most comprehensive in that it contains all deaths due to both typical drugs of abuse and psychoactive medicines as well as all manners of death (accidental, intentional, and undetermined).

Annex 3 gives an overview of the DRD-codes belonging to each of the selections. It is called ‘revised’ because after the DRD meeting it was decided to add three DRD-codes (DRD8, DRD11, and DRD19) to the A and B selections, which were originally only included in the C selection. These codes refer to Other or Unspecified drug dependence, and Other, mixed, unspecified nondependent drug abuse. It was assumed that the large majority of cases with these DRD-codes may be related to opiate deaths or other drugs of abuse.

[1] We refer to benzodiazepines and barbiturates as the main substance, not to combinations of substances (e.g. heroin and flunitrazepam). Moreover, other medicines, such as antidepressants and neuroleptics, are excluded because of their *relatively* low dependence potential. Although drug abusers may be treated commonly with antidepressants it is difficult to distinguish such overdose cases among drug addicts from other “therapeutic” overdoses.

To ensure that irrelevant cases would be excluded, Germany proposed to cut off the codes DRD8, DRD11, and DRD19 at the age of 35 years. However, this would probably eliminate a significant proportion of relevant cases given the increasing average age of people dying from drugs, as shown in non-standardised mortality data (see Figure 12 Annual Report 2000). A cut-off at age 65 might be more appropriate. For the current analyses, however, an overview has been made of the age distribution within the different selections to examine the contribution of the older age groups (see paragraph 4.1.2). It was expected that the higher age groups would be represented in particular among deaths due to psychoactive medicines. For future computations of the number of drug-related deaths in EU countries, it might be decided to exclude the highest age group. Further, Luxembourg proposed to transfer cases of undetermined poisoning from selection C to selection A. This suggestion is still open for discussion. For the current analyses the category Intentional poisoning has been excluded from selection A, because it may contain varying proportions of (un)deliberately misclassified suicides (Shai, 1994).

Table 5: Clusters of drug-related deaths

	M A N N E R O F D E A T H				
		P o i s o n i n g			
SUBSTANCE	**Unspecified** -psychoses -dependence -nondepen- dent abuse	**Accidental**	**Intentional** (suicide)	**Undetermined**	Total
Drugs of abuse -opiates -cocaine -stimulants -hallucinogens -cannabis	1	2	3	4	B
Subtotal	A		B – A		
Psychoactive medicines -barbiturates -benzodiazepines -other sedatives/ hypnotics	5	6	7	8	C – B
Total					C

Cluster A = Restrictive = 1 + 2
Cluster B = Broad = 1 + 2 + 3 + 4
Cluster C = All-Inclusive = 1 + 2 + 3 + 4 + 5 +6 + 7 + 8

Selection A, B, and C are based on different clusters of underlying selections according to the substances involved (drugs of abuse versus medicines) and the manner of death. The analysis in this chapter will focus on the totals for A, B, and C. For some analyses C minus B was applied to isolate all deaths due to psychoactive medicines from deaths due to typical drugs of abuse. For the sake of illustration, the number of cases for the full matrix made up

of 8 different cells has been calculated for each country, if applicable. Table 5 above shows how the two breakdowns result in 8 basic categories of drug-related deaths.

It was reviewed above that, with regard to their General Mortality Register, the countries Belgium, France, the Netherlands, Sweden, the United Kingdom/England and Wales (from 1993 onwards), and the United Kingdom/Northern Ireland comply fully with the DRD-Standard. Moreover, it was determined that deviations for Austria, Italy, and Germany would have a relatively minor impact on A, B, or C computations. Therefore, it is warranted in principle to compute the number of drug-related deaths in the 8 basic categories for all these countries. For Northern Ireland, however, this turned out not feasible because of too few cases in the 8 categories (total N=13 in 1997). If applicable, computations were also made for countries in category II (partial compliance), for investigational purposes only. This was done for Finland, UK (E&W, from 1987-92), Spain, Denmark, and Greece. However, great caution is warranted when interpreting the resulting data. Annex 7 contains tables reporting the number of drug-related deaths for the 8 basic categories and their clusters A, B, and C for the most recent year available.

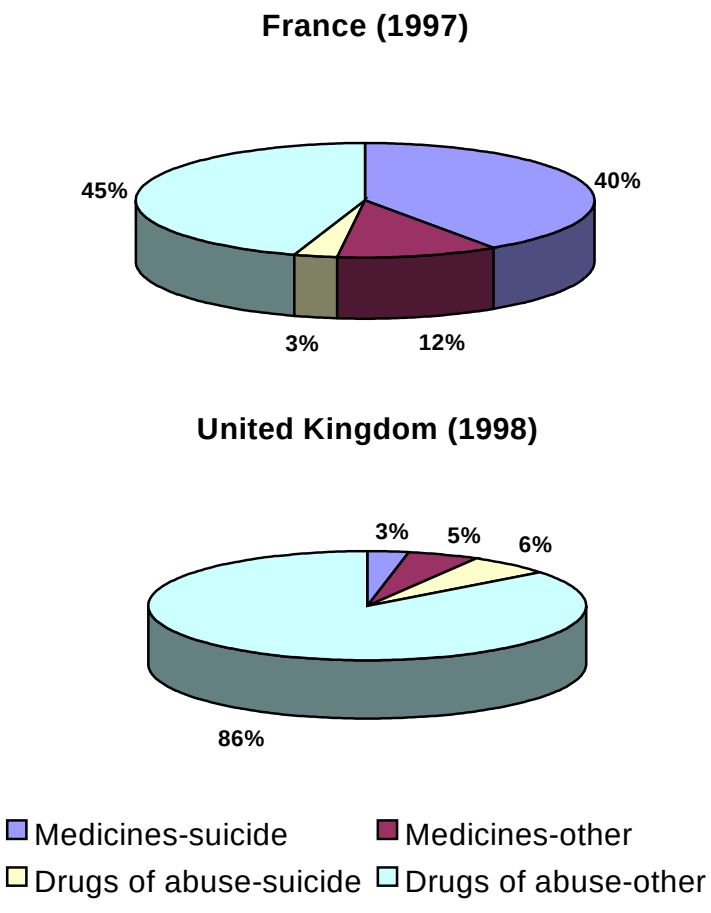


Figure 1: *Proportion of deaths due to psychoactive medicines (incl. barbiturates and benzodiazepines) and typical drugs of abuse in France and the UK.*

Among the countries from category I, the percentage of deaths due to psychoactive medicines is the highest in France (52%), followed by Belgium (42%), the Netherlands

(41%), and Sweden (41%). Compared to these countries, Austria (7%) and the United Kingdom (England and Wales; 8%) show a strikingly low percentage of medicines cases. Figure 1 above shows the distributions of deaths due to medicines and drugs of abuse in France and the UK. In all countries, most medicines cases refer to intentional poisoning (suicide). Moreover, the poisonings with undetermined intent due to medicines may contain a substantial proportion of cases of hidden suicide. Typical drugs of abuse are less commonly involved in suicides, although in the Netherlands they may constitute about one-third of the intentional poisonings counted under the DRD-Standard.

From the partially complying countries, Finland is on top of the list as far as deaths due to medicines are concerned. The large majority of cases concern benzodiazepine deaths. In 1995, the proportion of benzodiazepine cases among the medicines cases in Finland was 73%. For Greece all cases concern 'accidental overdose due to typical drugs of abuse'.

Figure 2 shows the results of the A, B, and C selections for the most recent year in the seven countries complying with the DRD-Standard. Note that population rates have been calculated over all age groups. For actual computations of the number of drug-related deaths the age group 15-64 years might be more appropriate.

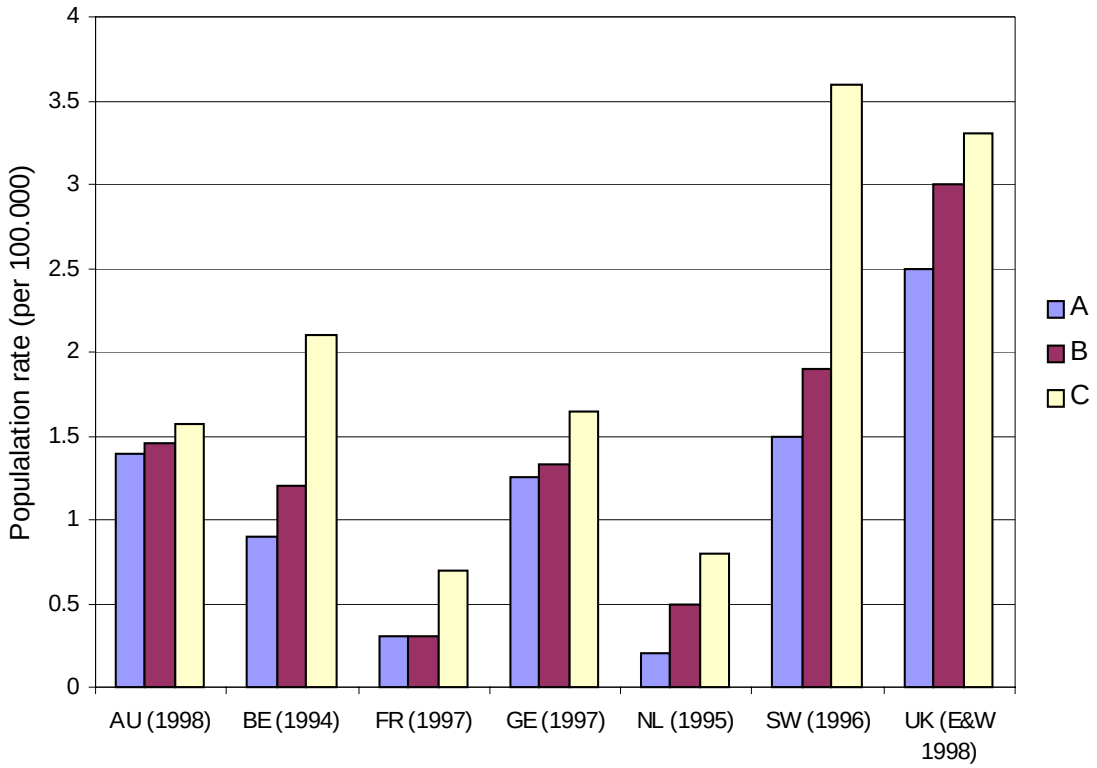


Figure 2: *Number of drug-related deaths per 100,000 inhabitants according to the restricted (A), broad (B), or all-inclusive (C) selections of DRD-codes.*

It is clear that for most countries, population rates for selection A and B (drugs of abuse) are relatively close together, whereas selection C appears to have a relatively great impact, especially in Sweden and Belgium.

For comparative purposes the A, B and C selections were also depicted for the countries that did not show full compliance (see Figure 3). It should be noted that these data are not reliable in that they contain irrelevant or just miss relevant cases. Paragraph 4.3 gives a comparison between these data and the old standard, which may give some insight into the degree of 'deviation'. It is clear that these data are not very reliable for Spain and Greece. The number of cases is almost the same within each category, which is contrary to the expectation. For Denmark the data show the expected increase from A to C but are overinclusive. For England and Wales, the data were also overinclusive (see paragraph 4.3.14). For Finland, the data may be consistent with the relatively low use of drugs of abuse (opiates) against the widespread use of benzodiazepines.

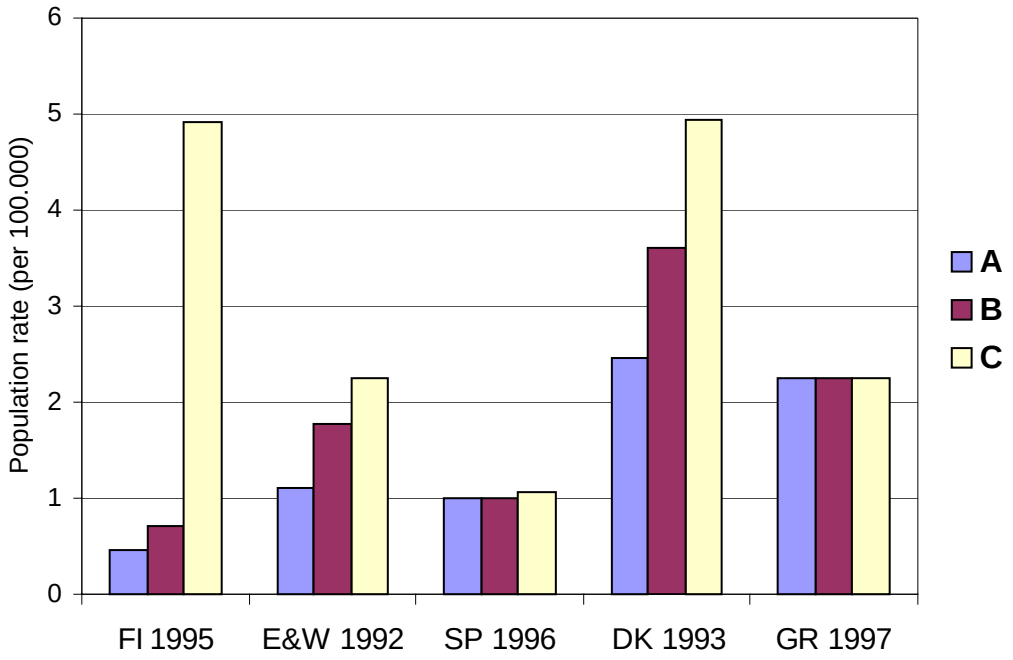


Figure 3: Number of drug-related deaths per 100,000 inhabitants according to the restricted (A), broad (B) or all-inclusive (C) selections of DRD-codes.

4.1.2 Trends, age, and gender breakdown

Trends have been calculated for the A, B, and C selection over all years for which data were available. To illustrate trends in mortality exclusively due to medicines (benzodiazepines, barbiturates, and other sedatives) a 'difference' selection (C minus B) was added. The figures can be found in paragraph 4.3, where they were used for making comparisons between data from the GMRs, SRs, and old standards.

If we restrict ourselves to the 'valid' countries from category I, it is evident that selection A and B show a rather similar trend. Moreover, the difference between A and B seems to be relatively small, although this may be deceptive. In some countries, poisoning with intentional and undetermined intent by typical drugs of abuse may have a significant impact (the Netherlands, Sweden, to a lesser extent the UK, and Belgium) but not in other countries (Austria, France, and Germany). For example, in the Netherlands population rates for B are almost twice the rates calculated under A.

Most peculiar is the trend observed for selection C minus B, which clearly diverges from A and B. This suggests that mortality related to typical drugs of abuse and mortality related to medicines (mainly benzodiazepines) refer to different populations (see also paragraph 4.3 below). Interestingly, most countries showed a decrease in the number of deaths due to medicines. This may be related to a more stringent prescription behaviour since in the eighties public awareness increased about the abuse liability of benzodiazepines.

Age and gender

For selection A, B, and C minus B, the proportions of deaths for the age groups 15-34, 35-64 and ≥ 65 years were calculated for all years available. In a similar vein, the gender distribution was given for the same selections. Trend figures were also made but not included due to space considerations. Figure 4 below gives the age distribution for the last recent year for the category I countries. Because age group proportions for selection A and B were almost similar, the former was not depicted.

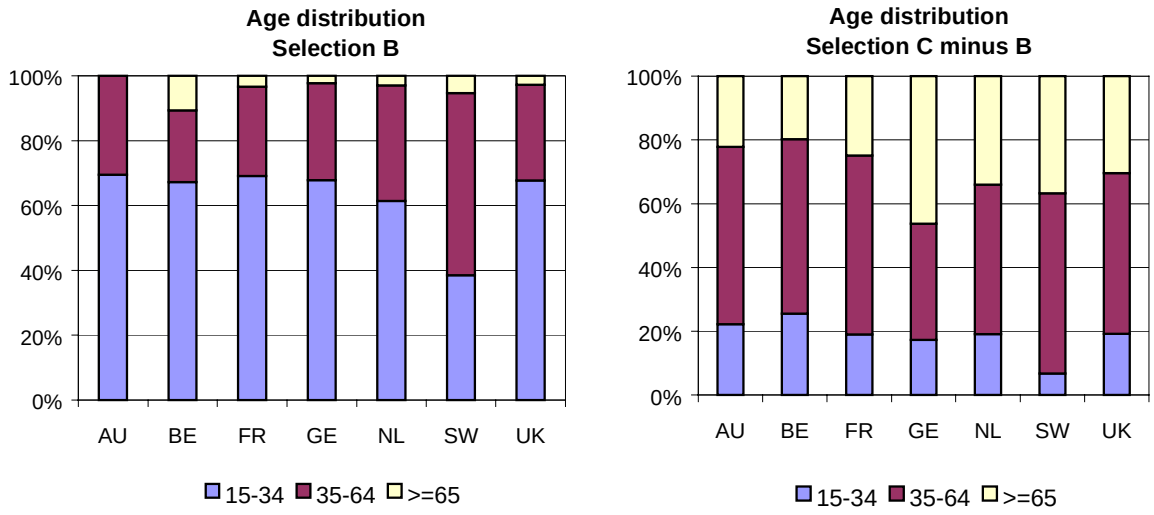


Figure 4: *Proportions of drug-related deaths by age groups for selections B (drugs of abuse) and C minus B (medicines only).*

Trends in age distribution were highly similar for selection A and B. Logically such an effect could be expected for countries with an almost similar number of cases in B compared to A. However, also for Sweden and the Netherlands where B differs from A, the age group distributions hardly differed. Most persons dying from the use of typical drugs of abuse are fairly young. With the exception of Sweden, over 60 per cent are between 15 and 34 years of age. In most countries but not all (e.g. Belgium) an ageing trend can be observed over the past ten years. In contrast, persons dying from the use of psychoactive medicines are on average older than those dying from typical drugs of abuse. Between 20 and 40 per cent of all cases fall in the oldest age group.

Figure 5 gives the age distribution for countries with deviating data. For Spain and Greece no difference selection (C-B) could be calculated because there were no or hardly any cases in this category. The other countries show the typical increase in older age groups among medicine deaths relative to drugs of abuse.

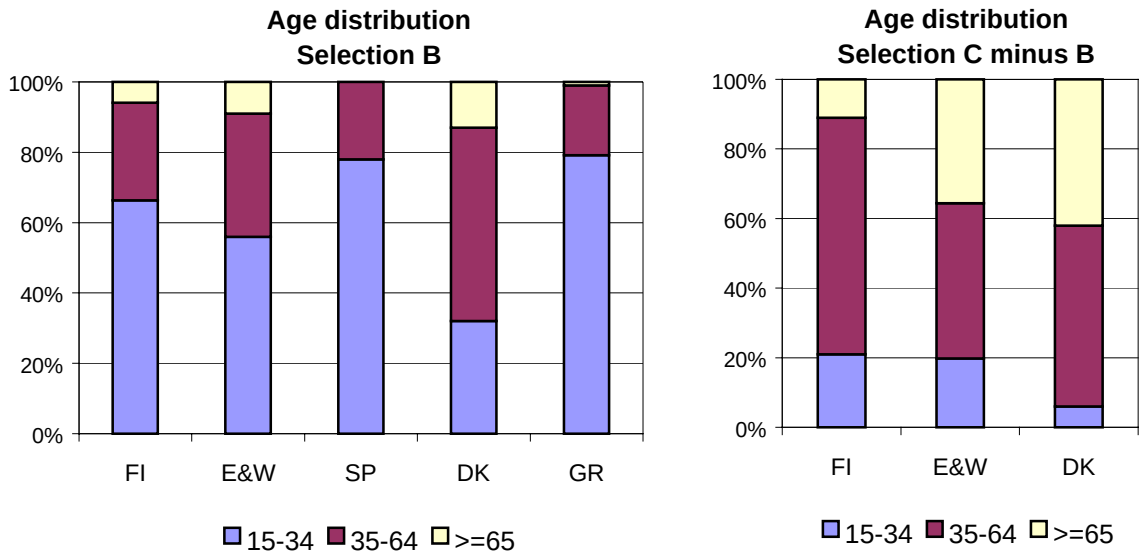


Figure 5: *Proportions of drug-related deaths by age groups for selections B (drugs of abuse) and C minus B (medicines only). Note that the data for these countries did not comply (fully) with the DRD-Standard.*

Similar to the age group distribution, the gender distribution was almost the same for selection A and B. Figure 6 shows the proportion of males among the drug-related deaths counted for selection B and C minus B (valid countries). It is clear that the large majority of deceased in category B is male (between 73 and 85%). The gender distribution remained fairly stable over the past 10 years. In contrast, the proportion of males among medicines deaths was much lower (between 44 and 67%).

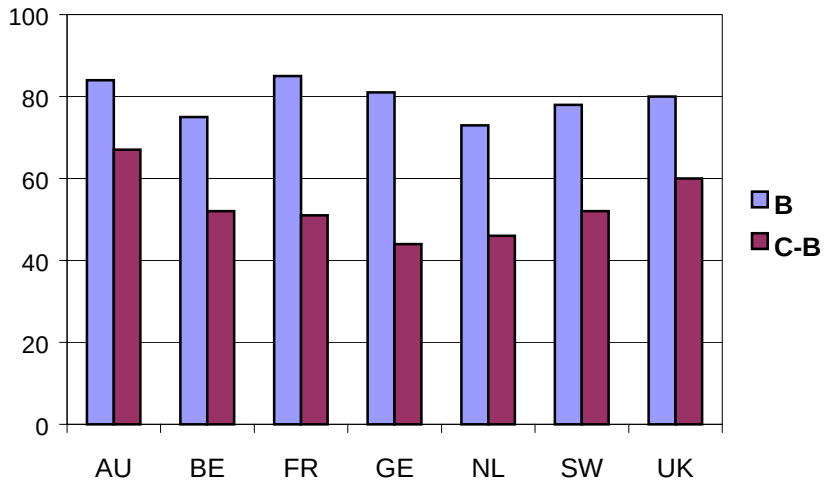


Figure 6: *Proportion of male deceased among the total number of drug-related deaths counted under selection B (drugs of abuse) and selection C-B (medicines).*

Figure 7 depicts the distribution of males for the selection B and C-B, representing drugs of abuse and medicines, respectively for the countries that did not comply (fully) with the DRD-Standard. Because of the low number of cases it was not warranted to calculate the proportion in C-B for Greece and Spain.

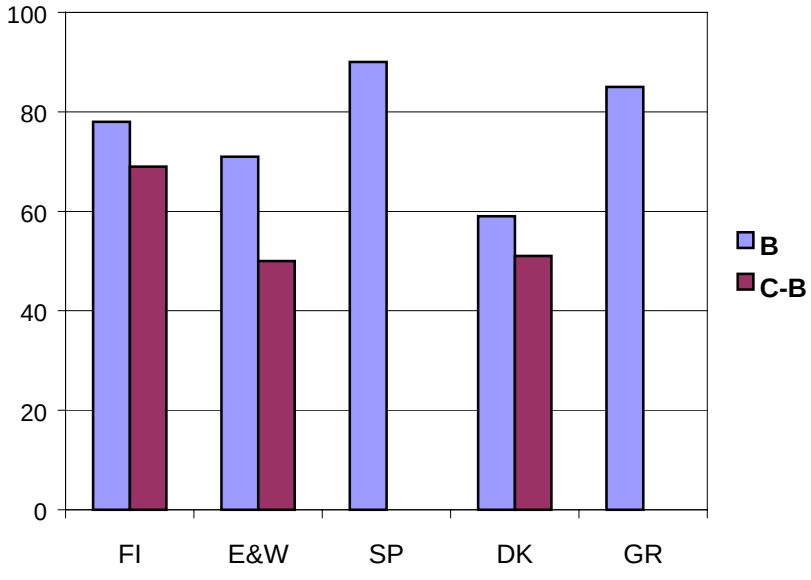
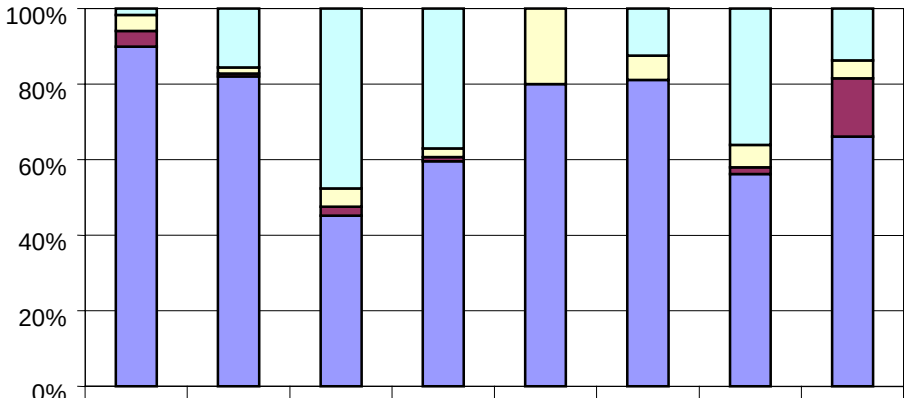


Figure 7: *Proportion of male deceased among the total number of drug-related deaths counted under selection B (drugs of abuse) or selection C-B (medicines). Note that the data for these countries did not comply (fully) with the DRD-Standard.*

In summary, (trends in) age and gender distributions for selection A and B are highly similar in all countries (category I). Selection C minus B (medicines) deviates both in terms of age group distribution (older) and gender (more females). These findings support the notion that the A/B versus the C selection refer to different types of populations.

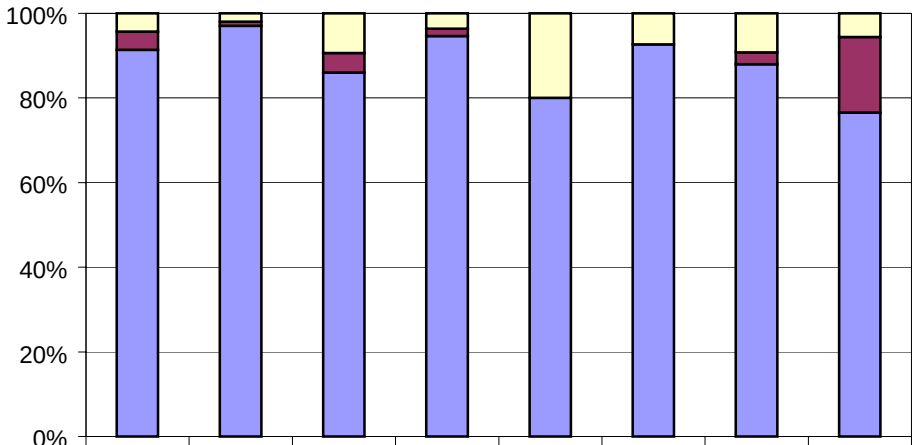
4.1.3 Substance-specific analyses

The DRD-Standard V1.0 aimed to collect data that could give insight into the substances involved in causing death. In addition with demographic data such information can be useful for prevention and policy activities. It must be noted, however, that the reliability of assigning substance-specific ICD-9 codes (and DRD-codes) depends greatly on the availability of information from toxicological analyses to ascertain the cause of death. Usually such information is not routinely forwarded to statistical offices, although wide differences between countries exist. However, 'substance-specific' codes may also be assigned on the basis of other than toxicological data, such as circumstantial evidence (e.g. information about the death scene). The selections A, B, and C are largely based on substance-specific cases. However, several codes have been included that were non-specific, although they assumedly referred to drugs of abuse (e.g. DRD8 and 11).



	Au 1998	Be 1994	Fr 1997	Ge 1997	NL 1995	Sp 1996	Sw 1996	UK/E&W 1998
Unknown	1.7	15.6	47.5	37.0	0.0	12.5	36.1	13.7
No opiate drug	4.2	1.6	4.9	2.3	20.0	6.4	5.9	4.8
Opiates a.o.	4.2	0.8	2.5	1.1	0.0	0.0	1.8	15.4
Opiates	89.8	82.0	45.1	59.6	80.0	81.1	56.2	66.1

Figure 8: *Proportion of opiates and non-opiate drugs of abuse among the total number of drug-related deaths counted under selection B.*



	Au 1998	Be 1994	Fr 1997	Ge 1997	NL 1995	Sp 1996	Sw 1996	UK/E&W 1998
No opiate drug	4.3	1.9	9.3	3.6	20.0	7.3	9.3	5.6
Opiates a.o.	4.3	1.0	4.7	1.8	0.0	0.0	2.8	17.8
Opiates	91.4	97.1	86.0	94.6	80.0	92.7	88.0	76.6

Figure 9: *Proportion of opiates and non-opiate drugs of abuse among the valid cases of drug-related deaths counted under selection B.*

Therefore analyses were carried out in two ways:

1. the proportions of deaths due to opiates, non-opiate drugs of abuse and unknown substances of all cases counted under B (see Figure 8)
2. the proportions of deaths due to opiates and non-opiate drugs of abuse of all cases counted under selection B for which information on the substance was known (valid cases, see Figure 9)

The category ‘opiates’ has been differentiated into ‘opiates only’ and ‘opiates with other substances’. However, it is not known whether this distinction is reliably made in the different countries. For example, in the Netherlands a priority rule specifies that deaths due to opiates where other drugs might have been involved as well are coded to ‘opiates’.

The results showed that in France, Germany, and Sweden, the proportion of deaths due to unknown substances is relatively high. At least for Germany it is known that the large majority of these cases actually refer to drugs of abuse. Concerning the valid cases (Figure 9), it is evident that opiates are most commonly involved in deaths due to typical drugs of abuse.

4.2 Special Registers

4.2.1 Selection of drug-related deaths from Special Registers

Paragraph 4.1.1 above described the selections A, B, and C of drug-related deaths from the General Mortality Registers. For the Special Registers, the selections are as follows:

- Selection D: Overdoses, excluding medicines
- Selection E: Overdoses, including medicines
- Selection F: Overdoses and other indirect causes (suicide, disease, accidents, etc.)

Just as selection A, B, and C for the General Mortality Registers, selection D, E, and F for the Special Registers are cumulative. That is, selection F contains selection E, which contains selection D.

Selection D from the SRs comes close to selection A and/or B from the GMRs. Selection E from the SRs comes close to selection C from the GMRs. Selection F from the SRs contains deaths in which drugs have played a contributing role but are not the primary underlying cause of death. Such cases are not included in selection C from the GMRs. Therefore, selection F from the SRs is an even broader definition of drug-related death than selection C from the GMRs.

Figure 10 below shows the effect of the different selections from the SRs. Only those countries are included for which a distinction could be made between the different selections. To enable comparison between countries, selection D was set at 100, and index numbers were computed for selection E and F.

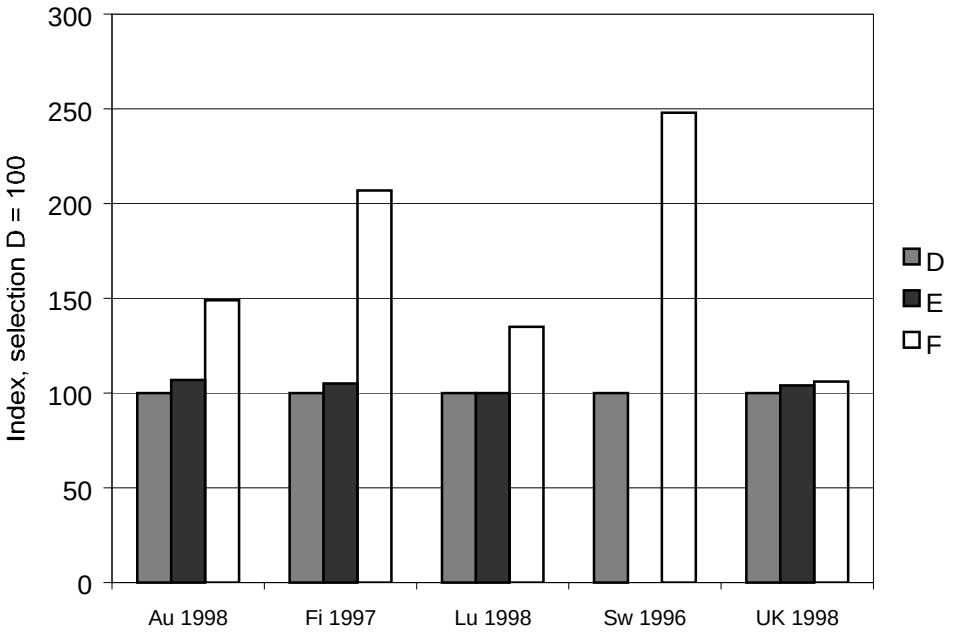


Figure 10: *Effect of selections from Special Registers. Selection D (set at 100) = overdoses excluding medicines, selection E = overdoses including medicines, and selection F = overdoses and other causes.*

It should be noted that the coverage of these registers is very different. The data from local registers, such as the Netherlands (Amsterdam) and Sweden (Stockholm) may not be representative for the whole country.

Figure 10 above shows that selection E does not add a significant number of cases to selection D. This indicates that the SRs do not contain significant numbers of medicines cases.

For the United Kingdom, selection F does not add a relevant number of cases to selection D and E. For the other countries, however, selection F does add a significant number of cases. Compared to selection D, the index for selection F increases from 100 to 135 for Luxembourg, 149 for Austria, 207 for Finland, and even 248 for Sweden. This means that the SRs of Finland and Sweden contain more cases of indirect causes of death compared to the United Kingdom, Luxembourg, and Austria. This result fits in with the characteristics of the SRs as described in Table 4 in paragraph 3.2 above. The Swedish and Finnish SR have a broad inclusion of cases that have been found positive on drugs of abuse.

4.2.2 Age and gender

The proportion of cases for selection D (overdoses due to drugs of abuse) has been calculated as a function of age group and gender (see Figures 11 and 12, respectively).

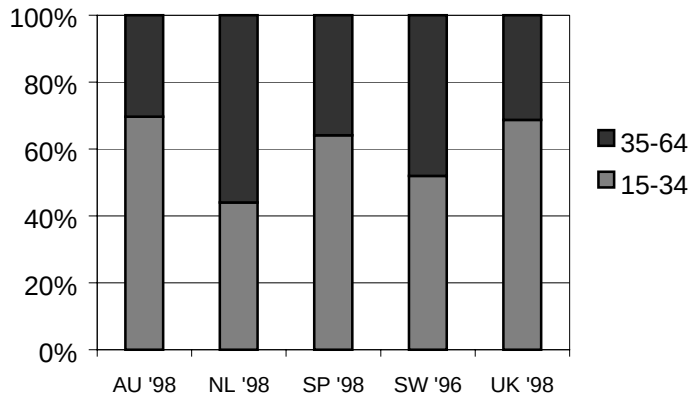


Figure 11: *Proportion of overdose deaths within the age groups 15-34 and 35-64 years based on data from Special Registers.*

There were hardly any deaths counted in the age group of 65 years and over. For Austria and the UK, the age group distribution seems to match selection B from the GMR. This also applies to Sweden, when taking the difference due to the inclusion of the older age group in the GMR into account. The deceased are oldest in the Netherlands (Amsterdam).

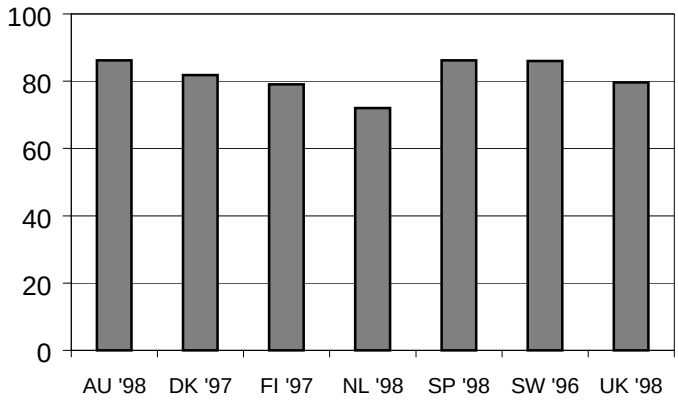
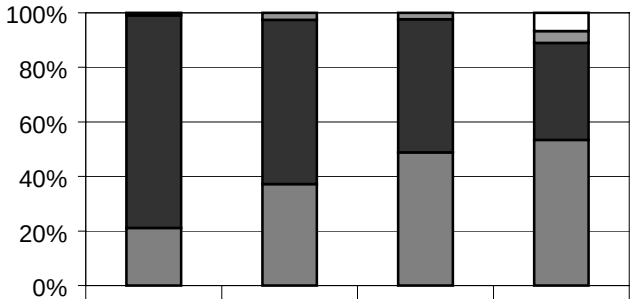


Figure 12: *Proportion of males among overdose deaths (excluding medicines) based on Special Registers.*

Concerning the gender distribution, it is clear that most drug-related deceased were male, with proportions varying between countries from 72 to 86 percent.

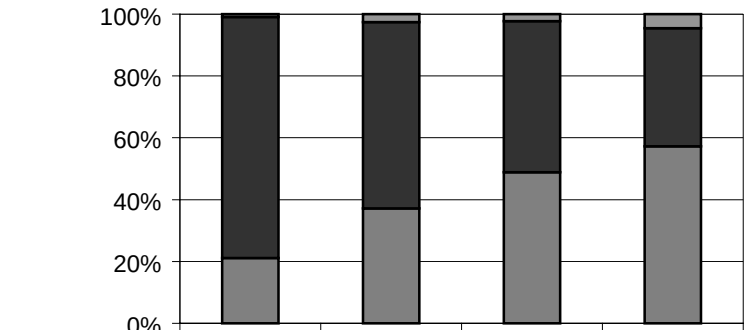
4.2.3 Substances

The proportion of overdose deaths due to different categories of substances is shown in Figure 13 (% of all cases) and Figure 14 (% of valid cases). Similar to the GMR data (see paragraph 4.1.3) opiates account for most drug-related deaths. However, SRs additionally indicate that most of these deaths not only involve opiates but (multiple) other drugs as well. Apparently, SRs are more suited to make such a distinction.



	Au 1998	Dk 1994	Fi 1997	UK 1998
Unknown	0	0	0	6.7
No opiate drug	0.9	2.6	2.3	4.3
Opiates a.o.	78	60.2	48.8	35.6
Opiates	21.1	37.2	48.8	53.4

Figure 13: *Proportion of opiates and non-opiate drugs of abuse among the total number of drug-related deaths counted under selection D.*



	Au 1998	Dk 1994	Fi 1997	UK 1998
No opiate drug	0.9	2.6	2.3	4.6
Opiates a.o.	78	60.2	48.8	38.2
Opiates	21.1	37.2	48.8	57.3

Figure 14: *Proportion of opiates and non-opiate drugs of abuse among the valid number of drug-related deaths counted under selection D.*

4.3 Trends and cross-validations

If a country has a Special Register (SR) that operates independently from its General Mortality Register (GMR), a cross-validation can be conducted between the two registers. Cross-validity will be demonstrated if the trends in the GMR parallel the trends in the SR. Selection A (restrictive) and B (broad) from the GMR mainly refer to direct deaths due to the use of typical drugs of abuse like opiates, cocaine, amphetamines, cannabis, and hallucinogens. Theoretically, these selections A and B from the GMR come close to selection D from the SR, which represents overdoses excluding medicines. The hypothesis is that selection A as well as selection B will correlate positively with selection D.

The hypothesis that two trends parallel one another will be tested by computing the statistical correlation between the two trends over the years. The hypothesis will be confirmed if the correlation between trends appears positive (>0) and statistically significant (one-tailed test).

Given the specific situation in a country, it will be further examined whether the trend in a country's *old* standard will either parallel a trend in selection A, B, or C from the GMR or a trend in selection D, E, or F from the SR.

4.3.1 Austria

Austria has a SR that is a police register that operates independently from the GMR. This offers the possibility to conduct a cross-validation between the two Austrian registers.

Old standard

Austria's old standard, as reported in the EMCDDA Annual Reports, is based on its Special Register. Table 6 below describes the Austrian old standard for drug-related deaths.

Table 6: Austrian old standard for drug-related deaths

Case definition	Deaths due to morphine type overdose.
Source of information	Cases are reported by the police and hospitals to the Federal Ministry for Social Security and Generations (FMSG), which orders forensic examination.
Technical information	According to a broader definition covering directly as well as indirectly drug-related deaths, the FMSG has information about a total of 162 cases in 1998.

Trends

Figure 15 shows the trend in drug-related deaths from 1985 through 1998 according to the GMR. Figure 16 shows the trend in drug-related deaths from 1989 through 1998 according to the SR.

The old standard reports fewer cases than selection D from the Special Register because it only includes morphine type overdoses. The old standard runs from 20 in 1989 to 108 in 1998, compared to 40 and 109 according to selection D. Notwithstanding this difference in the number of cases, a parallel trend is still expected because selection D must include the old standard. Therefore, selection D will correlate with the old standard by definition. The

correlation is as high as .98 (N=10, p=.000, one-tailed), which shows that data delivery according to the old standard is consistent with data delivery during the field trial. (In other words, this is not a contingent empirical correlation but a correlation by definition.)

Cross-validation: drugs of abuse

Since the Austrian GMR-data and SR-data overlap for the period from 1989 through 1998, the cross-validation can be conducted for this period of 10 years (N=10). The figure above shows that selection A and B more or less show the same pattern as selection D. The statistical correlation between selection A and D appears to be as high as .992 (N=10, p=.000, one-tailed). The statistical correlation between selection B and D appears to be as high as .993 (N=10, p=.000, one-tailed). This is a clear demonstration of cross-validity between the General and Special Register of Austria with regard to drugs of abuse.

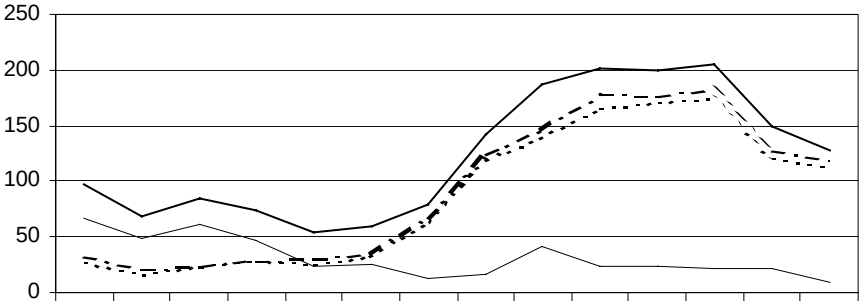
Apart from following the same trend, the figures above show that selection A and B are also very close to selection D in absolute numbers. The largest difference only consists of 18 cases in 1993 because of selection D reporting 156 cases and selection A reporting 138 cases.

Cross-validation: medicines

Selection C minus B from the General Mortality Register includes accidental and intentional poisoning by medicines. This selection comes close to selection E minus D from the Special Register, which represents overdoses by medicines. Therefore the next hypothesis states that selection C-B correlates with selection E-D. However, this hypothesis cannot be tested because there are too few cases in these categories to compute reliable correlations. Selection C-B runs from 24 cases in 1989 to only 9 cases in 1998. In the same period selection E-D runs from only 11 to 8 cases. In all these years the General Mortality Register contains a few more medicines cases than the Special Register. This can be explained by the fact that the Austrian Special Register is a police register that is based on legally obliged reports from the police and forensic institutes. It is very likely that the General Mortality Register contains medicines cases for which there was no legal obligation to report them to the Special Register.

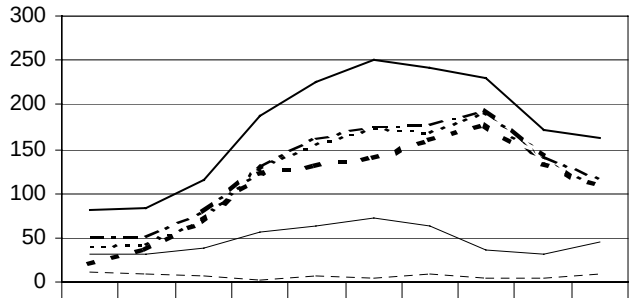
Conclusions

Given the positive results of the cross-validation and the conceptual coherence of the different figures, it can be concluded that for Austria the old standard and the different selections from the General and the Special Register seem to be valid estimates.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
C	98	69	85	74	54	59	79	142	187	202	200	205	150	127
B	32	21	24	28	30	34	66	125	146	178	176	184	128	118
A	27	16	24	28	26	33	63	118	138	165	170	175	121	112
C-B	66	48	61	46	24	25	13	17	41	24	24	21	22	9

Figure 15: *Number of drug-related deaths according to the Austrian GMR. A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines.*



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
F	82	83	116	187	226	250	241	230	172	162
E	51	51	78	131	162	177	178	195	141	117
D	40	43	71	129	156	173	170	191	136	109
F-E	31	32	38	56	64	73	63	35	31	45
E-D	11	8	7	2	6	4	8	4	5	8
Old	20	36	70	121	130	140	160	179	132	108

Figure 16: *Number of drug-related deaths according to the Austrian SR.*
D = overdoses excluding medicines, E = overdoses including medicines, F = overdoses and other causes (suicide, disease, accidents, etc.), E-D = overdoses by medicines, and F-E is other causes than overdose.

4.3.2 Belgium

During the field trial no data were received from the Belgian SR. However, the Belgian old standard, as reported in the EMCDDA Annual Reports, is based on the SR. The Belgian old standard therefore offers a possibility to compare the GMR with the SR.

Old standard

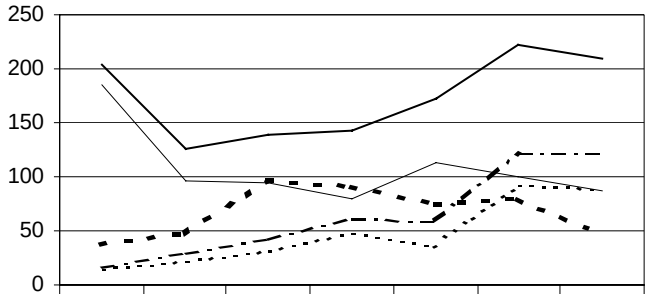
Table 7 below describes the old standard based on the Belgian SR.

Table 7: Belgian old standard for drug-related deaths

Case definition	Drug-related deaths known to the police.
Source of information	Cases are reported by the police and transmitted for recording to the police central office (Service Général d'Appui Policier).

Trends

Figure 17 shows the trends from 1988 through 1994 for the GMR as well as the old standard from the SR.



	1988	1989	1990	1991	1992	1993	1994
C	203	126	138	142	173	222	209
B	17	29	43	62	60	122	122
A	15	23	31	49	36	92	89
C-B	186	97	95	80	113	100	87
Old	37	49	96	90	75	80	46

Figure 17: *Number of drug-related deaths according to the Belgian GMR and the Belgian old standard from the SR. For the GMR: A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines. For the SR: Old = old standard.*

It is striking that the GMR contains many medicines cases as indicated by the large numbers for selection C-B. This explains that the old standard is closer to the restrictive estimate A and the broad estimate B.

Cross-validation: drugs of abuse

As explained above in paragraph 4.3.1, the hypothesis is that selection A and selection B from the GMR will correlate positively with the old standard from the SR. This hypothesis is

not confirmed. The correlation between selection A and the old standard is only .14 (N=7, p=.39, one-tailed) and the correlation between selection B and the old standard is only .15 (N=7, p=.37, one-tailed). Selection A and B from the GMR show an increasing trend from 1988 through 1994 from which the old standard from the SR starts to deviate after 1990 with a decreasing trend.

Conclusions

For Belgium no cross-validity has been demonstrated yet between the General and Special Register. In 1991 the SR starts to deviate from the GMR by a downward breach of trend. It may be that from 1991 onwards less priority was given in Belgium to reporting cases to a national police register. The Belgian GMR then may have remained more sensitive to the continuing increase in drug-related deaths. Selection A and B from the GMR therefore seem to be the most valid estimates for Belgium.

4.3.3 Denmark

Similar to Austria and Belgium the SR in Denmark is a police register that delivers data for the old standard.

Old standard

Table 8 below describes the old standard based on the Danish Special Register.

Table 8: Danish old standard for drug-related deaths

Case definition	• Deaths due to misuse of illegal drugs. • Deaths due to misuse or use of other drugs, if the intake is intoxicating and the dead person is known as an addict.
Source of information	Cases are reported by the medical officers and the police districts to the National Commission of Police.
Technical information	If no report from autopsy is available, the case is decided on available information of the deceased and circumstances of death.

The data that were delivered from the SR during the field trial indeed equal the old standard.

Trends

Paragraph 3.1.2 above explained that the data from the Danish General Mortality Register on the one hand are *over*inclusive, but on the other hand are *under*inclusive. Notwithstanding these deviations it is still possible that the Danish GMR offers a valid measurement of the trend in drug-related deaths.

Figure 18 shows the trend in drug-related deaths from 1985 through 1993 according to the GMR. Figure 19 shows the trend in drug-related deaths from 1985 through 1993 according to the Special Register.

Cross-validation: drugs of abuse

Drugs of abuse are represented in the GMR by selection A and B and in the SR by selection D. Selection B from the GMR is in the same order of magnitude as selection D from the SR. The hypothesis is that the trend in selection A and B correlates with the trend in selection D. This hypothesis is confirmed. Selection A and B correlate .85 with selection D (N=9, p=.002, one-tailed).

Cross-validation: medicines

In the GMR medicines cases are represented by selection C-B and in the SR they are represented by selection E-D. However, the Danish E-D selection also includes suicides. Moreover, given the fact that there are only few E-D cases it cannot be tested whether there is a parallel trend in medicines cases.

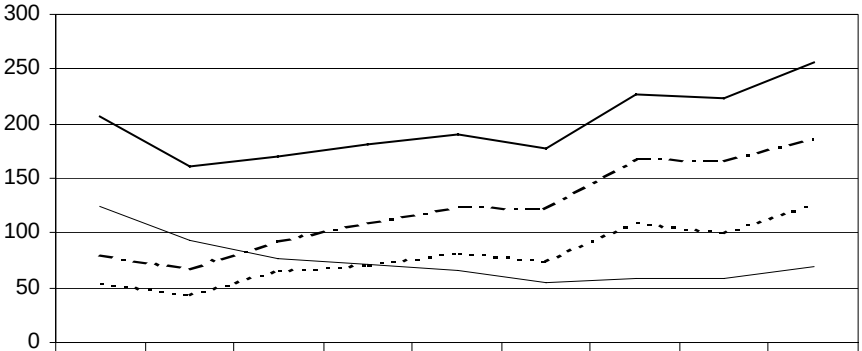
Conclusions

Given the positive results of the cross-validation, it may be concluded that the Danish registers offer a valid measurement of the trend in deaths due to drugs of abuse. No conclusions can be drawn for measuring the trend in deaths due to medicines.

Due to the deviation from the DRD-Standard, Version 1.0, the Danish GMR is overinclusive. Therefore the SR, on which also the Danish old standard is based, offers a more reliable estimate of the number of drug-related deaths.

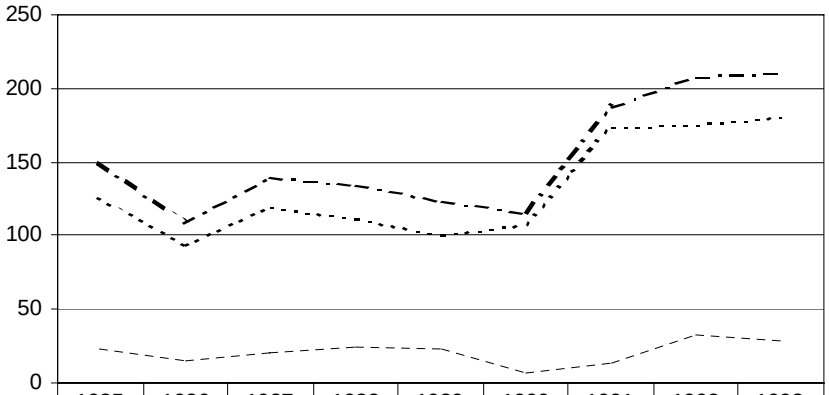
Future perspective

The Danish GMR changed to ICD-10 codes in 1994. It is expected that from 1994 onwards Denmark will comply fully with a next version of the DRD-Standard that will be based on ICD-10 codes as well.



	1985	1986	1987	1988	1989	1990	1991	1992	1993
C	206	161	170	181	191	177	227	224	256
B	81	68	94	110	125	123	169	166	187
A	54	44	66	72	82	75	109	101	127
C-B	125	93	76	71	66	54	58	58	69

Figure 18: *Number of drug-related deaths according to the Danish GMR. A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines.*



	1985	1986	1987	1988	1989	1990	1991	1992	1993
E = Old	150	109	140	135	123	115	188	208	210
D	127	94	119	111	100	108	174	175	181
E-D	23	15	21	24	23	7	14	33	29

Figure 19: *Number of drug-related deaths according to the Danish SR. D = overdoses excluding medicines, E = overdoses including medicines and suicides, and E-D = overdoses by medicines and suicides. Selection E equals the old standard.*

4.3.4 Finland

Contrary to Austria, Belgium, and Denmark, the SR in Finland is not a police register but mainly a forensic register. The data from the Finnish General and Special Register overlap for the 8 years from 1988 through 1995, which offers the possibility to conduct a cross-validation for this period.

Old standard

Table 9 below describes Finland's old standard as based on its GMR.

Table 9: Finnish old standard for drug-related deaths

Case definition	Deaths related to narcotic drugs due to: • mental and behavioural disorders; • accidental poisoning; • events of undetermined intent.
Source of information	Causes of death statistics at Statistics Finland.
Technical information	• From 1988 through 1995, cases are selected by ICD-9 codes. • Since 1996, cases are selected by ICD-10 codes related to harmful use, dependence syndrome, substance-induced brain syndrome, poisoning, and other drug-related syndromes.

Trends

Paragraph 3.1.2 above explained that the data from the Finnish GMR might be overinclusive. Nonetheless it is expected that selection A and B will be close to the old standard.

Figure 20 shows the trend in drug-related deaths from 1987 through 1995 according to the GMR. Figure 21 shows the trend in drug-related deaths from 1988 through 1997 according to the SR.

Cross-validation: drugs of abuse

Drugs of abuse are represented in the Finnish GMR by selection A, B, and the old standard, and are represented in the SR by selection D. As expected selection A and B, the old standard, and selection D are close to one another in order of magnitude. The hypothesis is that the trend in selection A and B will correlate with the trend in selection D. This hypothesis is confirmed by a correlation of .73 (N=8, p=.02, one-tailed) between selection A and D, and by a correlation of .87 (N=8, p=.002, one-tailed) between selection B and D. This demonstrates cross-validity between the Finnish General and Special Register for measuring the trend in deaths due to drugs of abuse.

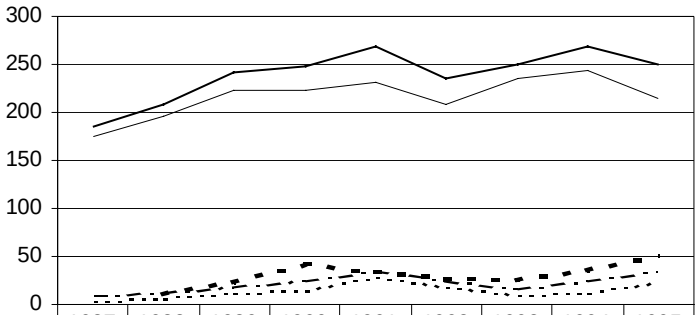
Cross-validation: medicines

The medicines cases in the GMR (selection C-B) far outnumber the cases of drugs of abuse and show a slow increasing trend. The medicines cases run from 175 in 1987 through 215 in 1995 compared to only 10 and 36 cases for drugs of abuse. The SR contains too few medicines cases (selection E-D) to test the hypothesis that the trend in medicines cases

correlates with the trend in the GMR. Apparently, the Finnish SR mainly aims at drugs of abuse and is not designed to detect all medicines cases.

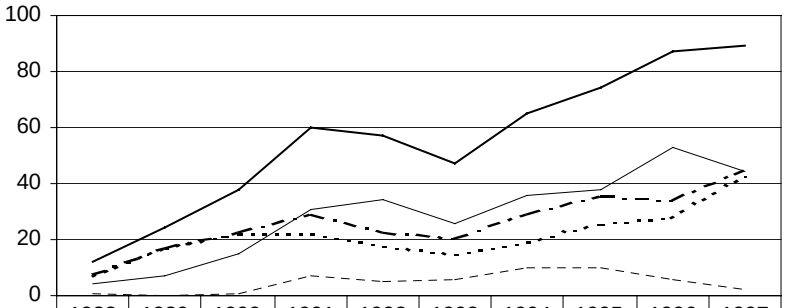
Conclusions

Given the similar order of magnitude and the cross-validity in trends, it may be concluded that selection A and B from the Finnish GMR and selection D from the Finnish SR seem to be valid estimates of the number of deaths directly caused by drugs of abuse.



	1987	1988	1989	1990	1991	1992	1993	1994	1995
C	185	208	241	248	268	235	251	268	251
B	10	13	18	25	36	26	16	24	36
A	4	7	12	14	30	19	11	12	23
C-B	175	195	223	223	232	209	235	244	215
Old		11	23	41	34	27	26	35	51

Figure 20: *Number of drug-related deaths according to the Finnish GMR. A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, C-B is deaths due to medicines, and Old = old standard.*



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
F	12	24	38	60	57	47	65	74	87	89
E	8	17	23	29	23	21	29	36	34	45
D	7	17	22	22	18	15	19	26	28	43
F-E	4	7	15	31	34	26	36	38	53	44
E-D	1	0	1	7	5	6	10	10	6	2

Figure 21: *Number of drug-related deaths according to the Finnish SR. D = overdoses excluding medicines, E = overdoses including medicines, F = overdoses and other causes (suicide, disease, accidents, etc.), E-D = overdoses by medicines, and F-E is other causes than overdose.*

4.3.5 France

During the field trial, data were received from the French SR from the year 1996 onwards, which is unfortunately too short a period for cross-validation with the French GMR. However, the French old standard, as reported in the EMCDDA Annual Reports, is based on the SR as well. The French old standard therefore offers a possibility to compare the GMR with the SR. The data that were delivered from the SR during the field trial indeed equal the old standard.

Old standard

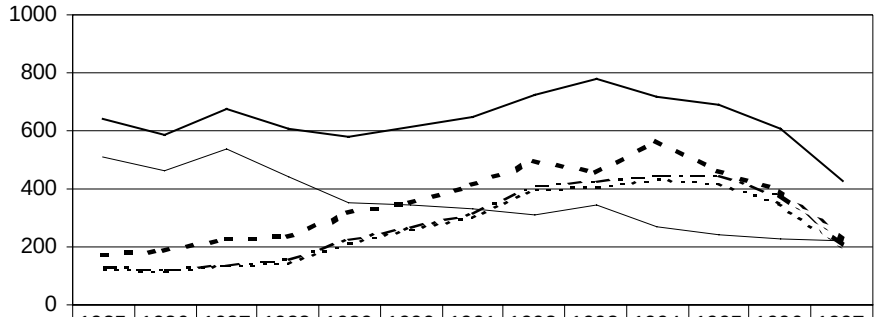
Table 10 below describes the old standard as based on the French SR.

Table 10: French old standard for drug-related deaths

Case definition	• Deaths due to overdose in the strictest sense of the term by heroin, medicines, solvents, cocaine, and unknown substances. • Deaths occurring directly and immediately after consumption of drugs.
Source of information	After investigations following suspicious death, which generally include an autopsy and a toxicological analysis, cases are reported by the police and the Gendarmerie to the Office Central pour la Répression du Traffic illicite de Stupéfiants (OCRTIS) at the Ministry of the Interior.

Trends

Figure 22 shows the trends from 1985 through 1997 for the GMR as well the old standard from the SR.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
C	639	589	679	605	577	616	649	721	776	719	687	604	425
B	131	126	140	161	226	271	316	413	430	451	445	377	204
A	125	120	135	147	217	261	306	398	410	434	421	350	187
C-B	508	463	539	444	351	345	333	308	346	268	242	227	221
Old	172	185	228	236	318	350	411	499	454	564	465	393	228

Figure 22: *Number of drug-related deaths according to the French GMR and the French old standard from the SR. For the GMR: A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines. For the SR: Old = old standard.*

It is striking that the GMR contains many medicines cases as indicated by the large numbers for selection C-B. The old standard also includes medicines cases, but each year contains fewer cases than selection C from the GMR.

Cross-validation

Although the GMR contains more cases, the hypothesis is that its selection C will correlate positively with the old standard from the SR. This hypothesis is confirmed. The correlation between selection C and the old standard is .62 (N=13, p=.01, one-tailed).

Conclusions

For France cross-validity has been demonstrated between the General and the Special Register in measuring the trend in drug-related deaths. It is possible that the GMR is more sensitive than the SR to detect the total number of cases.

4.3.6 Germany

For the required age breakdown Germany could only deliver data from its SR for the last four years from 1995 through 1998. However, the German old standard, as reported in the EMCDDA Annual Reports, is based on the SR as well. The German old standard therefore offers a possibility to compare the GMR with the SR.

Old standard

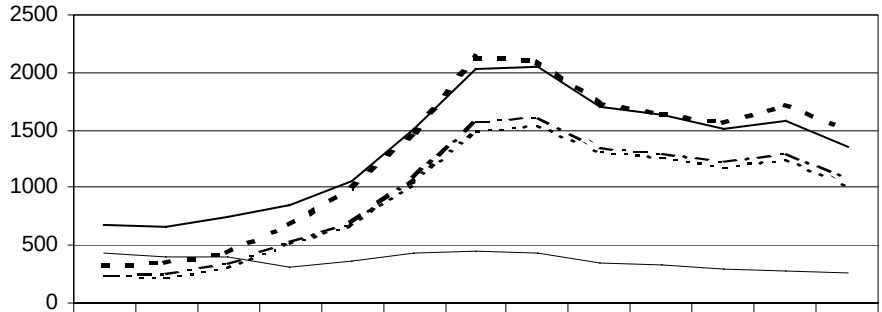
Table 11 below describes the old standard based on the German SR.

Table 11: German old standard for drug-related deaths

Case definition	• Deaths following intentional or unintentional overdose. • Deaths as a result of long-term abuse. • Deaths due to suicide resulting from despair about the circumstances of life or the effects of withdrawal symptoms. • Deaths due to fatal accidents suffered by people under the influence of drugs.
Source of information	Cases are reported by local police units that are working jointly with the forensic physicians, to the National Police Department, the Federal Criminal Police Office (BKA) that records the information.
Technical information	• From 1985 through 1990, the figures only refer to the former West Germany (the old Länder). • Since 1991, the figures refer to the reunited Germany, which includes the old and the new Länder.

Trends

Figure 23 shows the trends from 1985 through 1997 for the GMR as well as the old standard from the Special Register.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
C	682	654	746	849	1052	1507	2033	2055	1698	1637	1518	1580	1348
B	251	255	345	540	690	1077	1582	1619	1349	1308	1227	1305	1088
A	238	234	318	520	673	1037	1485	1543	1315	1268	1174	1248	1025
C-B	431	399	401	309	362	430	451	436	349	329	291	275	260
Old	324	348	442	670	991	1491	2125	2099	1738	1624	1565	1712	1501

Figure 23: *Number of drug-related deaths according to the German GMR and the German old standard from the SR. For the GMR: A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines. For the SR: Old = old standard. In 1991 a breach of trend took place due to the reunification of West and East Germany.*

Cross-validation: drugs of abuse

The old standard from the SR falls in the same order of magnitude as selection B from the GMR, but comes much closer to selection C. Each year the old standard contains more cases than selection B, which ranges from 43.6% more cases in 1989 to 24.1% more cases in 1988. The old standard contains more cases than selection B, because the old standard includes indirect causes of death.

Although the SR contains more cases, the hypothesis is that its selection A and selection B will correlate positively with the old standard from the SR. This hypothesis is confirmed. The correlation between selection A and the old standard is as high as .995 (N=13, p=.000, one-tailed), and the correlation between selection B and the old standard is as high as .997 (N=13, p=.000, one-tailed). Selection A and B as well as the old standard show an increase in cases from 1985 through 1992 and a decrease from 1993 onwards.

In 1990 West and East Germany reunified. The inclusion of the former German Democratic Republic in the Special Register means a breach of trend leading to higher drug-related death figures in 1991. This breach of trend may have inflated the correlations between the General and Special Register. However, when correcting for this breach of trend by looking at the comparable periods before and after the reunification, the significant positive correlations remain untouched. From 1985 through 1990 the correlation between selection A and the old standard is .997, and from 1991 through 1997 the correlation only decreases to .951. From 1985 through 1990 the correlation between selection B and the old standard is also .997 and from 1991 through 1997 this correlation only decreases to .974.

Conclusions

For Germany cross-validity has been demonstrated between the General and the Special Register in measuring the trend in drug-related deaths.

4.3.7 Greece

During the field trial no data were received from the Greek SR. However, the Greek old standard, as reported in the EMCDDA Annual Reports, is based on the SR. The Greek old standard therefore offers a possibility to compare the GMR with the SR.

Old standard

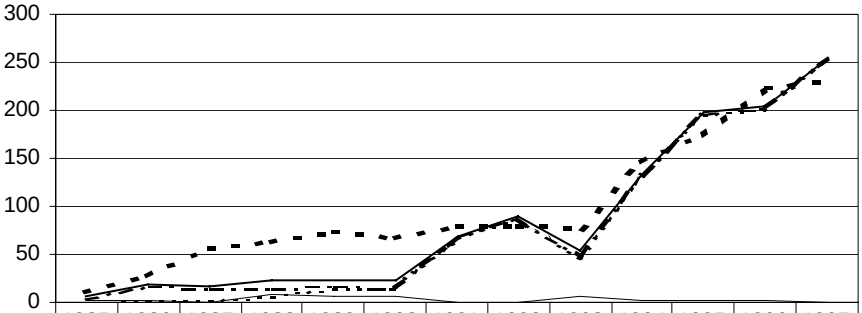
Table 12 below describes the old standard based on the Greek SR resembling selection E.

Table 12: Greek old standard for drug-related deaths

Case definition	• Deaths caused by overdose by heroin, morphine, psychotropic drugs, cocaine, and cannabis-alcohol. • Deaths caused by the synergetic activity of different drugs.
Source of information	Cases of sudden death are notified to the police who refer the cases to the forensic department for autopsy and toxicology, which notifies the police of the results. Cases are then reported by local police units to Section C of the Directory of Public Security at the Ministry of Public Order (Hellenic Police).

Trends

Figure 24 shows the trends from 1985 through 1997 for the GMR as well as the old standard from the SR.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
C	7	18	16	22	23	22	68	89	55	133	197	204	254
B	5	16	15	14	17	15	68	88	48	131	195	202	254
A	1	3	3	7	14	15	66	87	46	131	195	200	254
C-B	2	2	1	8	6	7	0	1	7	2	2	2	0
Old	10	28	56	62	72	66	79	79	78	146	176	222	232

Figure 24: *Number of drug-related deaths according to the Greek GMR and the Greek old standard from the SR. For the GMR: A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines. For the SR: Old = old standard.*

The GMR only contains a few medicines cases as indicated by the small numbers for selection C-B that range from 0 in 1991 to only 8 in 1988. Therefore selection C runs very close to selection B. Moreover, selection B almost equals selection A through the years. From 1985 through 1990 selection B has fewer cases than the old standard, but from 1991 onwards selection B catches up and equals the old standard in order of magnitude. This may indicate that the GMR was underinclusive until 1991.

Cross-validation: drugs of abuse

Although the GMR contained fewer cases until 1991, the hypothesis is that its selection A and selection B will correlate positively with the old standard from the SR. This hypothesis is confirmed. The correlation between selection A and the old standard is as high as .96 (N=13, p=.000, one-tailed), and the correlation between selection B and the old standard is also as high as .96 (N=13, p=.000, one-tailed). Selection A and B as well as the old standard show an increase in cases from 1985 onwards.

Conclusions

For Greece cross-validity has been demonstrated between the General and the Special Register in measuring the trend in drug-related deaths. It is possible that until 1991 the SR was more sensitive than the GMR to detect the total number of cases.

4.3.8 Ireland

Ireland does not have a SR yet to cross-validate the data from the GMR. Ireland's old standard is based on the GMR. For the field trial only data for the all-inclusive selection C from the GMR could be delivered. Internal consistency of the Irish GMR will be demonstrated if selection C and the old standard will correlate over the years.

Old standard

Table 13 below describes the old standard based on the Irish GMR.

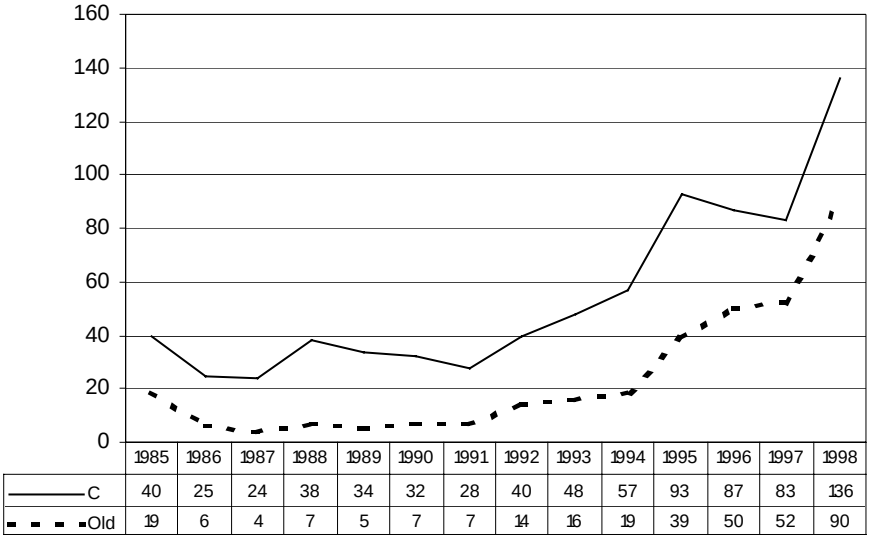
Table 13: Irish old standard for drug-related deaths

Case definition	• Deaths due to drug dependence. • Deaths due to poisoning by opiates and related narcotics.
Source of information	Cases are reported by regional registrars of births and deaths, who collect information from doctors, the police, and coroners, to the General Mortality Register at the Central Statistics Office (CSO).
Technical information	• Cases are selected by ICD-9 codes 304 (drug dependence) or 965.0 (poisoning by opiates and related narcotics). • The increase between 1995 and 1997 is (partly) due to an increased awareness of the need for more accurate information and reporting.

The Irish old standard is based on the ICD-9 codes 304 (drug dependence) and 965.0 (poisoning by opiates and related narcotics). These cases are represented in the DRD-Standard Version 1.0 in DRD2 through DRD11, DRD21, and DRD22 (see Table 1 within Annex 1). The DRD-Standard includes more drug-related death cases than the Irish old standard does. Therefore it is expected that the all-inclusive selection C from the GMR will include more cases than the old standard.

Trends

Figure 25 shows the trends from 1985 through 1998 for the Irish old standard and the all-inclusive selection C from the GMR.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
C	40	25	24	38	34	32	28	40	48	57	93	87	83	136
Old	19	6	4	7	5	7	7	14	16	19	39	50	52	90

Figure 25: *Number of drug-related deaths according to the Irish GMR. C = all-inclusive estimate, and Old = old standard.*

Internal consistency

As expected the all-inclusive selection C each year contains more cases than the old standard. The correlation in the trend between selection C and the old standard is as high as .97 (N=14, p=.000, one-tailed). In general there is an increasing trend in the number of drug-related deaths between 1985 and 1998.

Conclusions

Internal consistency has been demonstrated for the Irish GMR with regard to the all-inclusive selection C and the old standard. On the one hand selection C may be *over*inclusive, but on the other hand the old standard may be *under*inclusive.

4.3.9 Italy

The data from the Italian SR match with the old standard, as reported in the EMCDDA Annual Reports.

Old standard

Table 14 below describes the old standard based on the Italian SR.

Table 14: Italian old standard for drug-related deaths

Case definition	Deaths directly due to drug misuse (acute intoxication, overdose).
Source of information	Cases are reported by local and special police units to the Central Drugs Directorate at the Ministry of the Interior.

Trends

Figure 26 shows the trends from 1985 through 1996 for the GMR and from 1985 through 1998 for the old standard from the SR.

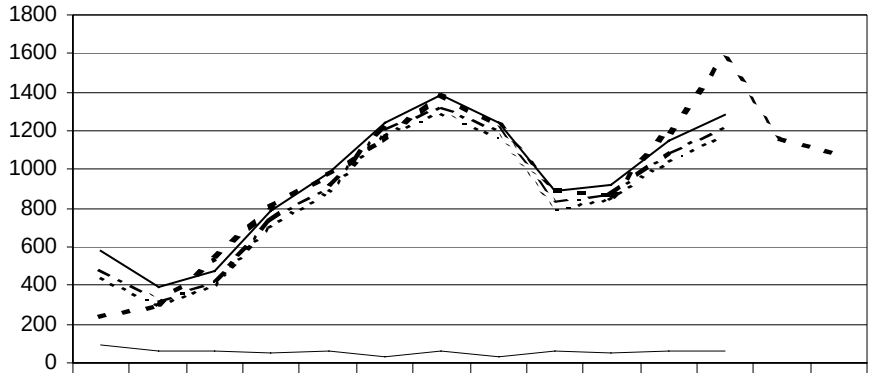
From 1987 onwards, the number of drug-related deaths according to the old standard from the SR are in the same order of magnitude as the all-inclusive selection C from the GMR. In 1995 and 1996, the SR signals more cases than the GMR, whereas in 1985 and 1986 the GMR signalled more cases.

Cross-validation: drugs of abuse

The hypothesis is that selection A and selection B from the GMR will correlate positively with the old standard from the SR. This hypothesis is confirmed. Selection A and B correlate .95 with the old standard (N=12, p=.000, one-tailed).

Conclusions

Cross-validation has been demonstrated between the Italian GMR and SR. It is possible that in the last years the SR signals more cases than the GMR. The figure of drug-related deaths from the SR is recommended as a backup estimate for selection B from the GMR.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
C	582	390	481	784	980	1245	1388	1244	892	920	1144	1286		
B	486	324	424	733	922	1209	1326	1210	835	870	1084	1221		
A	450	297	400	704	894	1177	1297	1174	801	847	1048	1183		
C-B	96	66	57	51	58	36	62	34	57	50	60	65		
Old/SR	242	292	543	809	974	1161	1383	1217	888	867	1195	1566	1160	1076

Figure 26: *Number of drug-related deaths according to the Italian GMR and the Italian old standard from the SR. For the GMR: A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines. For the SR: Old = old standard.*

4.3.10 Luxembourg

The SR in Luxembourg is a police register that delivers the data for the old standard. Cross-validity between the GMR and the SR can be examined for the 8 years from 1990 through 1997.

Old standard

Table 15 below describes the old standard for Luxembourg.

Table 15: Luxembourg old standard for drug-related deaths

Case definition	Deaths due to voluntary or accidental intoxication (overdoses) by: • the abuse of illicit drugs; • any other drug in the case that the victim is considered a regular consumer of illicit drugs.
Source of information	All suspected deaths require a judicial enquiry, and after forensic evidence from autopsy, cases are reported by the local police to the Special Drug Section (SDU) of the Judicial Police.
Technical information	Contrary to previous Annual Reports, the number of cases in 1991 is 16 instead of 17.

Given this definition of the old standard it is expected that the old standard will be close to the broad selection B of the GMR and will be close to selection E (overdoses including medicines) of the SR. Unfortunately, the GMR of Luxembourg does not offer the possibility to make a distinction between selection A (restrictive), B (broad), and C (all-inclusive).

Trends

Figure 27 shows the trend in drug-related deaths from 1990 through 1997 according to the GMR. Figure 28 shows the trend in drug-related deaths from 1985 through 1998 according to the SR.

As expected selection E (overdoses including medicines) and the old standard are very close to one another. This demonstrates internal consistency of the SR. The SR contains very few medicines cases (selection E-D), which are often zero.

Cross-validation

From 1990 through 1997 the GMR contains more cases than selection E (overdoses including medicines) from the SR. Probably this indicates that the data from the GMR are overinclusive because data could only be delivered at 3-digit level and not at 4-digit level. Nonetheless, the hypothesis is that the trend in the GMR correlates with the trend in selection D and E of the Special Register. This hypothesis is confirmed. The correlation between the GMR and selection D of the SR is as high as .94 (N=8, p=.000, one-tailed). The correlation between the GMR and selection E of the SR is as high as .93 (N=8, p=.000, one-tailed). In both registers the number of drug-related deaths increases until 1994 and starts to decrease in 1995.

Conclusions

For Luxembourg cross-validity has been demonstrated between the General and the Special Register in measuring the trends in drug-related death. The GMR is probably overinclusive, which makes the SR a better estimate of the total number of drug-related deaths.

Future perspective

The problem of the overinclusion of the GMR may be solved by future ICD-10 codes. This will require 4-digit coding of the ICD-10 F-codes and T-codes.

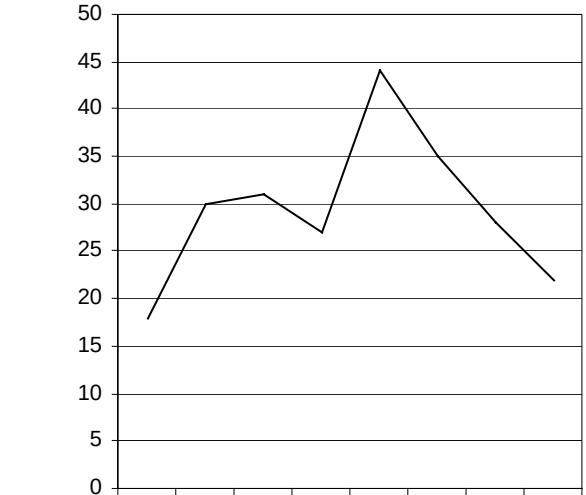
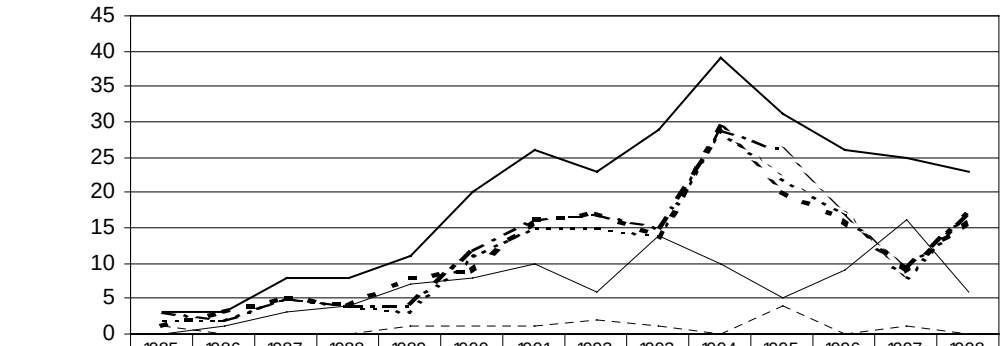


Figure 27: *Number of drug-related deaths according to the GMR of Luxembourg.*



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
F	3	3	8	8	11	20	26	23	29	39	31	26	25	23
E	3	2	5	4	4	12	16	17	15	29	26	17	9	17
D	2	2	5	4	3	11	15	15	14	29	22	17	8	17
F-E	0	1	3	4	7	8	10	6	14	10	5	9	16	6
E-D	1	0	0	0	1	1	1	2	1	0	4	0	1	0
Old	1	3	5	4	8	9	16	17	14	29	20	16	9	16

Figure 28: *Number of drug-related deaths according to the SR of Luxembourg. D = overdoses excluding medicines, E = overdoses including medicines, F = overdoses and other causes (suicide, disease, accidents, etc.), E-D = overdoses by medicines, F-E is other causes than overdose, and Old = old standard.*

4.3.11 The Netherlands

More or less similar to Finland, the Netherlands has delivered data from a Special Register which is not a police register, but a specific registration of a public health network within the city of Amsterdam. This public health register only contains cases from the city of Amsterdam. Therefore one could expect to find fewer cases in the Special Register than in the General Mortality Register. However, there is a main difference between the GMR and the Amsterdam registration. The GMR only includes persons who were officially recorded in the Population Register. The Amsterdam registration also includes (illegal) foreigners who were not included in the Population Register.

The data from the General and Special Register overlap for the 11 years from 1985 through 1995 which offers the possibility to conduct a cross-validation for this period for the trends in drug-related deaths.

Old standard

The Dutch old standard is based on the GMR. Table 16 below describes the Dutch old standard.

Table 16: Dutch old standard for drug-related deaths

Case definition	From 1985 through 1995, deaths due to: • drug psychoses, dependence, or nondependent drug abuse; • accidental poisoning by opiates and related narcotics, psychodysleptics, or psychostimulants. Since 1996, deaths due to: • mental and behavioural disorders due to drug use; • accidental poisoning by narcotics and psychodysleptics; • accidental poisoning by psychostimulants.
Source of information	Cases are reported by municipal registrars, who collect information from physicians and coroners, to the Causes of Death Statistics at Statistics Netherlands.
Technical information	• From 1985 through 1995, cases are selected by ICD-9 codes 292, 304, 305.2-9, E850.0, E854.1, or E854.2. • Since 1996, cases are selected by ICD-10 codes F11-F16, F18-F19, X42, or X41 in combination with T43.6. • Only persons retrievable in the Dutch population register are included.

The DRD-Standard Version 1.0 includes more ICD-9 codes than the Dutch old standard. Therefore it is expected that the restrictive selection A will already contain more cases than the Dutch old standard.

Trends

Figure 29 shows the trend in drug-related deaths from 1985 through 1995 according to the GMR. As expected, the restrictive estimate A contains a few more cases than the Dutch old standard. Figure 30 shows the trend in drug-related deaths from 1985 through 1998 according to the SR. The downward trend may partly be explained by the repatriation of foreigners who lived illegally in Amsterdam.

Cross-validation: drugs of abuse

Drugs of abuse are represented in the Dutch GMR by selection A, B, and the old standard, and in the SR they are represented by selection D. Contrary to expectation, the GMR does not contain substantially more cases than the local SR. In 1987 the SR contains even more cases than the broad selection B from the GMR: 61 cases compared to 54. This may indicate that the GMR is underinclusive. Another possible explanation is that the SR includes cases of (illegal) foreigners that are not included in the GMR.

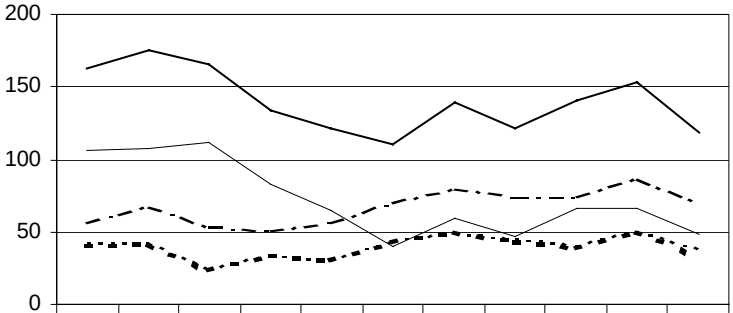
Notwithstanding differences in the number of cases, the hypothesis is that the trend in selection A and B will correlate with the trend in selection D. This hypothesis is *not* confirmed. The correlations between selection A and B from the GMR and selection D from the SR
are -.24. The number of cases in the SR shows a decreasing trend that is not reflected in the GMR.

Cross-validation: medicines

The number of medicines cases in the GMR (selection C-B) outnumbers the cases of drugs of abuse until 1989. From 1990 onwards there remain less medicines cases than cases of drugs of abuse. Because the SR contains no medicines cases it is not possible to cross-validate the registers for medicines.

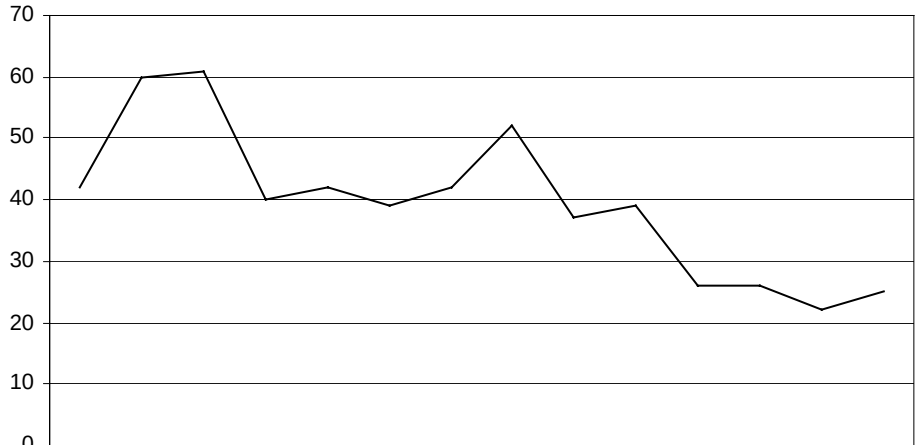
Conclusions

No cross-validity was demonstrated between selection A and B from the Dutch GMR and selection D from a local Dutch SR. The GMR may be underinclusive, and at the local level of Amsterdam there may be a downward trend in drug-related deaths that is not yet visible at national level.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
C	163	175	166	134	121	110	140	122	141	153	118
B	57	68	54	51	56	70	80	75	75	87	70
A	43	43	25	34	30	44	49	45	41	51	38
C-B	106	107	112	83	65	40	60	47	66	66	48
Old	40	42	23	33	30	43	49	43	38	50	33

Figure 29: *Number of drug-related deaths according to the Dutch GMR. A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, C-B is deaths due to medicines, and Old = old standard.*



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
D	42	60	61	40	42	39	42	52	37	39	26	26	22	25

Figure 30: *Number of drug-related deaths according to a local Dutch SR. D = overdoses excluding medicines.*

4.3.12 Portugal

During the field trial data from the Portuguese SR were only received for the years 1995, 1996, and 1997. The Portuguese old standard however is based on the SR. This offers the possibility to conduct a cross-validation between the GMR and the SR.

Old standard

The Portuguese SR is a local forensic register. Table 17 below describes the old Portuguese standard as based on the SR.

Table 17: Portuguese old standard for drug-related deaths

Case definition	Deaths due to overdose and related to drug consumption.
Source of information	Cases are reported to the delegations at the three Forensic Institutes of the Ministry of Justice.
Technical information	• The cases refer to Lisbon, Oporto and Coimbra regions. • Due to under-reporting in previous years, more cases are now reported.

Trends

Given the fact that the SR is a local register, one might expect that the Portuguese GMR would contain more drug-related death cases than the SR. However, as Annex 5 reviews, the GMR could only deliver data for DRD1 (drug psychoses), DRD20 (accidental poisoning by opiates and related narcotics), and DRD29 (accidental poisoning by psychodysleptics, including cannabis and hallucinogens). The data in the GMR are probably underinclusive, which explains why the local SR each year reports more cases. Moreover, the data in the SR are overinclusive because apart from "deaths due to overdose" they contain indirect deaths "related to drug consumption".

Figure 31 shows the trends in the number of cases from the General and Special Register.

Cross-validation: drugs of abuse

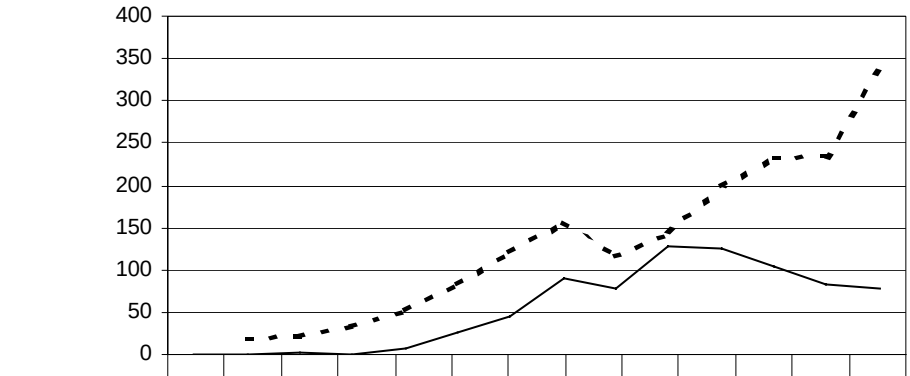
Although the GMR contains fewer cases, the hypothesis nonetheless is that its trend will correlate with the trend in the SR. This hypothesis is confirmed. The correlation is .74 (N=13, p=.002, one-tailed). From 1986 through 1998 both registers show an increasing trend. A difference is however that in the GMR the increase levels of after 1994 whereas in the SR the increase continues.

Conclusions

For Portugal cross-validity has been demonstrated between the General and Special Register (old standard) in measuring the trend in the number of drug-related deaths. The GMR is probably underinclusive, which at its local level makes the SR a better estimate of the total number of drug-related deaths (including indirect cases).

Future perspective

The problem of the underinclusion of the GMR may be solved by future ICD-10 codes. This will require that future X-codes and Y-codes can be combined with T-codes.



	1985	1986	1987	1988	1989	1990	1991	1993	1994	1995	1996	1997	1998
GMR	1	1	3	0	6	27	44	79	128	126	103	83	78
Old/SR		18	22	33	52	82	121	115	143	198	232	235	337

Figure 31: *Number of drug-related deaths according to the Portuguese GMR and the old standard according to selection F from a local SR.*

4.3.13 Spain

Similar to Portugal the old standard of Spain is based on a SR which is a local forensic register. The old standard matches with the data delivered during the field trial (selection E from the SR).

Old standard

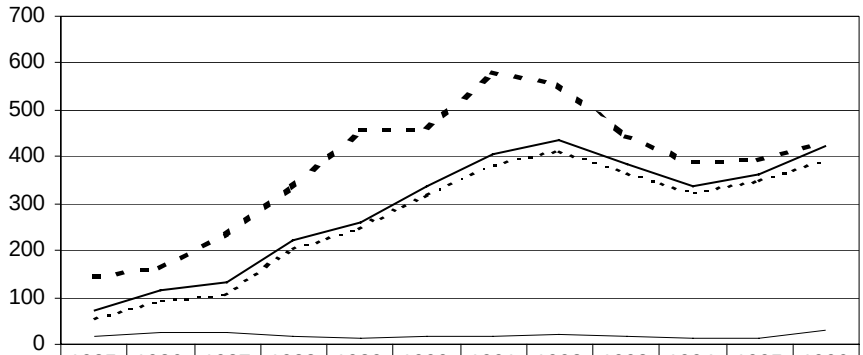
Table 18 below describes the old Spanish standard as based on the SR.

Table 18: Spanish old standard for drug-related deaths

Case definition	• From 1985 through 1995: Deaths due to acute reactions following opiate or cocaine consumption. • Since 1996: Deaths due to acute reactions following consumption of any psychoactive drug.
Source of information	Cases are reported by medical pathologists for the Mortality Indicator at the Delegación del Gobierno para el Plan Nacional Sobre Drogas.
Technical information	• The cases refer to the six large cities Barcelona, Bilbao, Madrid, Valencia, Zaragoza, and Seville. • A small breach of trend took place in 1996 due to a change from reporting only on opiate and cocaine cases to all psychoactive substances. • In 1997 and 1998 cases of Seville were estimated.

Trends

Given the fact that the SR is a local register, one might expect that the Spanish GMR would contain more drug-related death cases. However, the GMR is probably underinclusive. This may explain that each year the SR reports even more cases than the all-inclusive selection C from the GMR. Figure 32 shows the trends from 1985 through 1996 for the GMR as well as the trend for the old standard from the SR.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C	72	117	132	224	262	337	404	435	384	336	362	421
A=B	57	92	108	207	249	322	386	415	366	323	348	391
C-B	15	25	24	17	13	15	18	20	18	13	14	30
Old	143	163	234	337	455	455	579	556	442	388	394	429

Figure 32: *Number of drug-related deaths according to the Spanish GMR and the Spanish old standard from the SR. For the GMR: A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, and C-B is deaths due to medicines. For the SR: Old = old standard. (A equals B.)*

Cross-validation: drugs of abuse

Although the GMR contains fewer cases, the hypothesis nonetheless is that its trend will correlate with the trend in the SR. This hypothesis is confirmed. The correlation between selection B (which equals A) and the old standard is as high as .92 (N=12, p=.000, one-tailed). From 1985 through 1996 both registers show an increasing trend.

Cross-validation: medicines

The GMR contains only a few medicines cases, ranging from 13 to 30. Since no medicines cases are available from the SR, a cross-validation for medicines cannot be conducted.

Conclusions

For Spain cross-validity has been demonstrated between the General and Special Register (old standard) in measuring the trend in the number of drug-related deaths. The GMR is

probably underinclusive, which at its local level makes the SR a better estimate of the total number of drug-related deaths.

Future perspective

The problem of the underinclusion of the GMR may be partially reduced by future ICD-10 codes. This will require that future X-codes and Y-codes can be combined with T-codes.

4.3.14 Sweden

Similar to the Netherlands, Sweden has a local forensic register and has based its old standard on the GMR. The SR only covers the Stockholm area, and therefore it is expected that the GMR will contain more cases. The data from the General and Special Register overlap for the 10 years from 1987 through 1996 which offers the possibility to conduct a cross-validation for this period for the trends in drug-related deaths.

Old standard

Table 19 below describes the old Swedish standard as based on the GMR.

Table 19: Swedish old standard for drug-related deaths

Case definition	• Deaths due to drugs as *underlying* cause of death due to:
	  • dependence;
	  • poisoning.
	• Deaths due to drugs as *contributing* cause of death due to:
	  • dependence;
	  • poisoning.

Source of information	Cases are reported by physicians to the Cause of Death Register at Statistics Sweden and are reported and published by the National Board of Health and Welfare.
Technical information	Cases are selected by ICD-9 codes 304 (drug dependence), 965.0, 968.5, 969.6, or 969.7 (poisoning) for underlying as well as contributing causes.

Trends

The DRD-Standard Version 1.0 only includes deaths in which drugs are the underlying (direct) cause of death. The Swedish old standard however does not restrict itself to direct deaths but also includes deaths in which drugs have played a contributing cause. Therefore it is expected that the old standard will report more cases than the broad selection B.

Figure 33 shows the trend in drug-related deaths from 1987 through 1996 according to the GMR. As expected, the old standard each year contains more cases than the broad estimate B, ranging from 35% more cases in 1989 to 63% more cases in 1994. Figure 34 shows the trend in drug-related deaths from 1985 through 1996 according to the SR.

Cross-validation: drugs of abuse

Drugs of abuse are represented in the Swedish GMR by selection A, B, and the old standard. In the SR drugs of abuse are represented by selection D. As expected, the broad selection B from the GMR each year contains more cases than the local SR. The hypothesis is that the trend in selection A and B will correlate with the trend in selection D. This hypothesis is confirmed for selection A but not for selection B. The correlation for selection A is .68 (N=10, p = .016, one-tailed) and the correlation for selection B is .53 (N=10, p=.057, one-tailed). A difference is that selection A shows a stronger increase over the years than selection D.

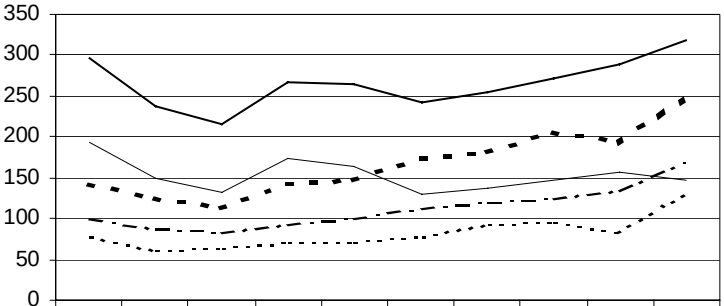
The old standard from the GMR and selection F from the SR both include contributing causes. Therefore the hypothesis is that the old standard will correlate with selection F. This hypothesis is confirmed. The correlation is .75 (N=12, p=.002, one-tailed).

Cross-validation: medicines

From 1987 through 1995 the number of medicines cases in the GMR (selection C-B) outnumbers the cases of drugs of abuse. Because no medicines cases were delivered from the SR during the field trial, it is not possible to cross-validate the General and Special Register for medicines.

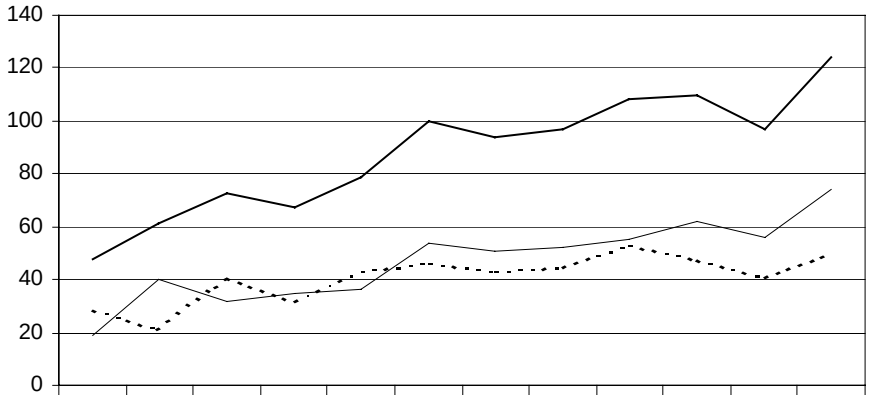
Conclusions

For Sweden cross-validity was demonstrated between the restrictive selection A from the GMR and selection D from a local SR. Cross-validity was also demonstrated between the broader old standard from the GMR and the broader selection F from the SR. It is possible that at national level an increasing trend in drug-related deaths still continues which in Stockholm area is levelling off.



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
C	295	238	216	268	264	242	255	272	290	317
B	101	89	84	94	101	112	119	126	134	169
A	78	61	64	71	72	79	94	95	84	130
C-B	194	149	132	174	163	130	136	146	156	148
Old	141	125	113	143	147	175	181	205	194	250

Figure 33: *Number of drug-related deaths according to the Swedish GMR. A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, C-B is deaths due to medicines, and Old = old standard.*



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
F	48	61	73	67	79	100	94	97	108	110	97	124
D	29	21	41	32	43	46	43	45	53	48	41	50
F-D	19	40	32	35	36	54	51	52	55	62	56	74

Figure 34: *Number of drug-related deaths according to a local Swedish SR. D = overdoses excluding medicines, F = overdoses and other causes (suicide, disease, accidents, etc.), and F-D = other causes (suicide, disease, accidents, etc.).*

4.3.15 United Kingdom (England and Wales)

Similar to the Netherlands and Sweden, England and Wales have based their old standard on the GMR. The United Kingdom also has a SR, which is a forensic register. Although not regional but national in scope, the British SR is underinclusive because it has no comprehensive coverage yet. Therefore it is expected that the GMR of England and Wales will contain more cases than the SR of the United Kingdom.

Old standard

Table 20 below describes the English and Welsh old standard as based on the GMR.

Table 20: English and Welsh old standard for drug-related deaths

Case definition	• Deaths due to drug dependence. • Deaths due to nondependent abuse. • Deaths due to accidental, suicidal, or undetermined poisonings.
Source of information	Cases are reported to the Office for National Statistics (ONS).
Technical information	• The cases refer to England and Wales and do not include Scotland and Northern Ireland. • Cases are selected by ICD-9 codes 304 (dependence), 305.2-9 (abuse), 965.0, 967, 968.5, 969, or 977.8-9 (poisoning).

Trends

Compared to the English and Welsh old standard, the DRD-Standard Version 1.0 aims at more specific selections. Therefore it is expected that the old standard will include more cases than the all-inclusive selection C.

Figure 35 shows the trend in drug-related deaths from 1985 through 1998 according to the GMR. Figure 36 shows the trend in drug-related deaths from 1989 through 1993 according to the SR.

As expected, the old standard each year contains more cases than the broad estimate C. This may indicate that the old standard is overinclusive.

It should be noted that selection A, B, and C are overinclusive from 1987 through 1992 (see paragraph 3.1.2). Notwithstanding this discontinuity in trend, it may be concluded that there is an increasing trend between 1985 and 1998. A correlation of .70 (N=13, p=.004, one-tailed) between the old standard and the all-inclusive selection C demonstrates internal consistency of the General Mortality Register.

Drugs of abuse are represented in the English and Welsh GMR by the restrictive selection A and the broad selection B. In the SR drugs of abuse are represented by selection D. As expected, the broad selection B from the GMR each year contains more cases than the incomplete SR.

Cross-validation: drugs of abuse and medicines

Given the discontinuities in trend in the registers, a cross-validation between the General and Special Register can only be conducted for the 5 years from 1989 through 1993. The hypothesis is that the old standard from the GMR will correlate with selection E (overdoses including medicines) from the SR. Requiring a p-value of less than .05, this hypothesis is confirmed by a correlation of .87 (N=5, p=.03, one-tailed).

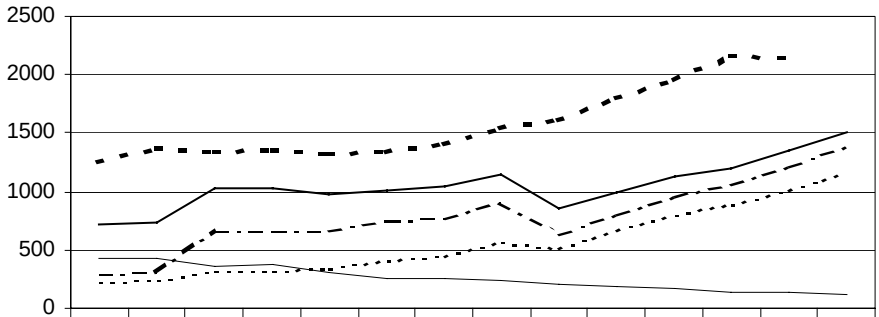
Cross-validation: medicines

In 1985 and 1986 the number of medicines cases in the GMR (selection C-B) still outnumbers the cases of drugs of abuse. Due to a steady decrease in medicines cases, the drugs of abuse cases outnumber the medicines cases in the following years. The SR contains too few medicines cases (selection E-D) to conduct a cross-validation for medicines only.

Conclusions

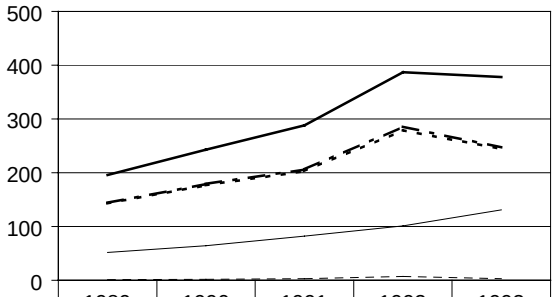
For England and Wales cross-validity was demonstrated between the old standard from the GMR and selection E from the SR. Both registers show a steady increase in the number of drug-related deaths.

Given the underinclusion of the SR and the possible overinclusion of the old standard, the restrictive selection A and the broad selection B from the GMR are probably better estimates of the total number of drug-related deaths.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
C	726	731	1031	1031	974	1002	1039	1149	850	998	1126	1207	1349	1514
B	293	307	673	662	674	745	779	907	641	808	953	1066	1211	1389
A	220	234	329	319	335	416	445	566	506	662	800	888	1014	1165
C-B	433	424	358	369	300	257	260	242	209	190	173	141	138	125
Old	1254	1362	1332	1348	1321	1339	1411	1533	1615	1796	1956	2150	2144	

Figure 35: *Number of drug-related deaths for England and Wales according to the GMR. A = restrictive estimate, B = broad estimate, C = all-inclusive estimate, C-B is deaths due to medicines, and Old = old standard.* ***Discontinuities in trends between the periods 1985-1992 and 1993-1998 are due to differences in coding procedures.***



	1989	1990	1991	1992	1993
F	196	243	288	387	378
E	144	179	206	286	247
D	143	177	203	279	244
F-E	52	64	82	101	131
E-D	1	2	3	7	3

Figure 36: *Number of drug-related deaths according to the British SR. D = overdoses excluding medicines, E = overdoses including medicines, F = overdoses and other causes (suicide, disease, accidents, etc.), E-D = overdoses by medicines, and F-E = other causes (suicide, disease, accidents, etc.).*

4.3.16 All countries taken together

In the paragraphs 4.3.1 through 4.3.15 above it was found feasible to conduct a cross-validation between the General and Special Registers for the 14 countries Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. For a large majority of 12 of these 14 countries cross-validity was demonstrated. Only for 2 countries, Belgium and the Netherlands, no cross-validity was found. This may be explained by the fact that in Belgium the SR may receive less priority, whereas in the Netherlands the SR captures a different population than the GMR.

Given the cross-validity that was often found at the level of a single country, it is expected that it will also be found at the aggregated level of the European Union.

Corrected index

A difficulty to compute correlations at this aggregated level over the 14 years from 1985 through 1998 arises from the missing data for some years for some countries. To solve this problem it was decided to compute the corrected indices as applied for the old standard in Figure 12 of the 2000 EMCDDA Extended Annual Report.

A corrected index was computed as follows: First the number of cases in 1985 was set at index 100. For each transition from one year to the next year it was then investigated which countries delivered comparable data for both years. For these countries the total number of cases was computed for each of both years. The corrected index for 1992, for example, was then computed as:

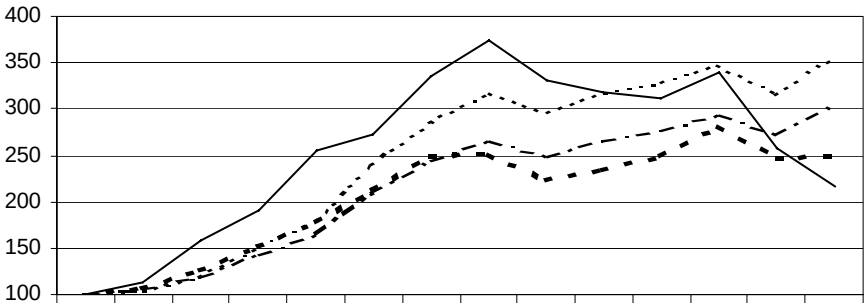
{(comparable total 1992) / (comparable total 1991)} * (corrected index 1991)

This way the corrected indices were computed for the 14 years from 1985 through 1998 for the restrictive selection A and the broad selection B from the GMRs and selection D from the SRs.

Trends

For the aggregated level of the European Union, Figure 37 shows the parallel trends in the corrected indices for the old standards, selection A (restrictive) and B (broad) from the GMRs, and selection D (overdoses excluding medicines) from the SRs.

It should be noticed that the corrected indices in Figure 37 do not represent absolute figures about drug-related deaths but represent measures of change. The overall trend is that the index for drug-related deaths increases from 1985 through 1992 and then levels off. The increase and levelling off (even a decrease in the last years) is most salient for selection D (overdoses excluding medicines) from the SRs. For selection A (restrictive) from the GMRs the index increases more than for selection B (broad). The index for the old standards increases the least. All in all, the index for drug-related deaths in 1998 ends at 216 for the SRs (selection D), 250 for the old standards, 306 for selection B (broad) from the GMRs, and 356 for selection A (restrictive) from the GMRs.



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
B	100	107	120	144	165	210	244	267	248	266	278	295	272	306
A	100	105	119	152	180	240	286	317	296	317	328	348	316	356
D	100	114	158	191	255	272	335	375	330	318	311	339	258	216
Old	100	107	126	151	178	213	248	252	222	233	249	281	247	250

Figure 37: *Corrected indices for the number of drug-related deaths at the aggregated level of the European Union according to the old standards (Old), selection A (restrictive) and B (broad) from the GMRs, and selection D (overdoses excluding medicines) from the SRs.*

Cross-validation: drugs of abuse

Similar to the level of a single country, the hypothesis is that at the aggregated level of the European Union a positive correlation will be found between the trend in the GMRs and the trend in the SRs. This hypothesis was confirmed. The correlation between selection A from the GMRs and selection D from the SRs appears .82 (N=14, p=.000, one-tailed). The correlation between selection B from the GMRs and selection D from the SRs appears .81 (N=14, p=.000, one-tailed). This result demonstrates cross-validity between the General and Special Registers at the aggregated level of the European Union.

Conclusions

At the level of the European Union cross-validity has been demonstrated between General and Special Registers in measuring the trend in drug-related deaths. The overall trend is that the corrected index in the number of drug-related deaths increases from 1985 through 1992 and then levels off.

5. Conclusions and recommendations

The analyses of data on drug-related deaths from General and Special Registers now result in some conclusions and recommendations. First, general recommendations will be given that concern all countries or a group of countries. Secondly, a review will be given for each country separately.

5.1 General recommendations

5.1.1 Install selection B from the GMRs as the DRD-Standard

In the analyses above it was found that the GMRs from 8 out of 15 countries comply fully or to a high degree with the DRD-standard. These are the countries Austria, Belgium, France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom. It is anticipated that in the near future more countries will comply with the standard.

It was also found that, in terms of age and gender distribution, selection C minus B from the GMRs (medicines) refers to a clearly different population. Selection A (restrictive) and B (broad) from the GMRs refer to similar populations and equal one another in order of magnitude. Selection B adds to selection A cases of Intentional and Undetermined poisoning by drugs of abuse. Such cases are often considered to be cases of drug-related death.

In several countries a high correlation was found between trends identified by selection B of the GMRs and selection D of the SRs. However, there are only four SRs with complete national coverage that comply with the DRD-Standard. In addition, SRs do not have a common international classification of cases like the ICD as applied by the GMRs, and do not have the same institutional basis that guarantees long-term continuity.

Given these findings, it is recommended that selection B from the GMRs be installed as the standard estimate of the number of drug-related deaths for the Member States of the European Union. Selection B includes Drugs psychoses, Drug dependence, Nondependent drug abuse, Accidental poisoning, Intentional poisoning, and Undetermined poisoning, all with regard to drugs typical of abuse.

5.1.2 Prepare for ICD-10

It is expected that in the near future all Member States of the European Union will have switched over from ICD-8 or ICD-9 to ICD-10 coded GMRs. Therefore it is recommended that in the near future the ICD-10 equivalent of selection B (broad) from the GMRs be applied as the standard estimate of the number of drug-related deaths. ICD-10 promises that more countries will comply with the DRD-Standard.

5.1.3 Co-operate with Eurostat and the WHO

To meet the future DRD-Standard, 4-character ICD-10 codes are required. Moreover, it will be required that for the underlying causes of death indicated by ICD-10 X-codes and Y-codes, the main T-code is also registered. Accidental poisoning by heroin, for example, will

have to be identified as the underlying cause of death “X42 AND T40.1”. It is therefore recommended that all Member States develop and/or consolidate a four-digit ICD-10 coded GMR in which the underlying causes of death indicated by X-codes and Y-codes are accompanied by at least one main T-code.

Concerning the improvement of death certification and coding, the Eurostat Task Force on Causes of Death has made important proposals, which extend beyond the issue of drug-related deaths. These include the following:
- to make an inventory of differences in certification and coding in the EU Member States
- to establish recommendations on the form and information presented on death certificates
- to arrive at a manual on certification and coding for a set of (difficult) causes of death (Minutes of the TF CoD meeting on 29 June 2000).

Close co-operation between the TF CoD of Eurostat and EMCDDA/Ti is important in this regard to guarantee that specific coding problems pertaining to drug-related deaths (such as combined use of drugs and alcohol) are addressed. The proposals developed at the level of the European Union can then be presented to the WHO for discussion and eventual endorsement.

5.1.4 Apply SRs as backups

For the time being, the SRs offer the best available estimate for the countries Denmark, Luxembourg, Portugal, and Spain.

It is further recommended that selection D (overdoses excluding medicines) from the SRs be applied as a backup estimate of the number of drug-related deaths (either at national or local level) for the countries Austria, Finland, France, Germany, Greece, Italy, Sweden, and the United Kingdom.

It is recommended that, in co-ordination with the GMRs, the SRs be applied to backup and validate the GMRs, and be applied as a source of information for the GMRs. As in many cases the SRs are more sensitive, their data may detect changes in trends at an earlier stage. These findings can then be confirmed by results from the GMRs.

5.1.5 Group similar countries together

It is recommended that in publications about drug-related deaths those countries be grouped together that comply with the DRD-Standard. It is further recommended that those countries be grouped together that deviate from the DRD-Standard in similar ways. It is also recommended that those countries be grouped together that show a similar trend in drug-related deaths.

5.1.6 Verify unspecified deaths

The DRD-codes 8, 11, and 19 (ICD-9 codes 304.6, 304.9, and 305.9) referring to deaths due to dependence/abuse of other, mixed and/or unspecified substances, have been added to selection A and B because several experts suggested that these codes would largely

concern deaths due to drugs of abuse (especially opiates). It is recommended that this assumption be verified in those countries where a significant proportion of deaths is counted under these codes.

5.1.7 Collect 5-year age groups

It is recommended that data be collected by 5–year age groups to facilitate more detailed analyses.

5.1.8 Collect specific information from SRs about substances

One of the characteristics of Special Registers is that they rely to a large extent on information from post-mortem examinations to certify the cause of death. This makes them especially suitable to monitor and detect trends in deaths due to specific (new) substances. However, the current classification for SR data in the DRD-Standard V1.0 is based on a relatively high level of aggregation excluding potentially relevant information on the specific substances involved. For example, the types of opiates – or more appropriately opioids - are not specifically listed.

Given the increasing reports in the literature and media about methadone deaths (e.g. in Germany), it is recommended that methadone deaths be recorded in a separate category.

It is further recommended that from each SR specific information be collected about the substances included in the different categories.

5.1.9 Deliver data directly

It is recommended that for future data collection the countries deliver the data directly according to the format of the ultimate general database. This way the elaborate intermediate step of filling in spreadsheets can be skipped and the data can be transferred directly into the general database. This will also offer the possibility to collect data by more detailed breakdowns.

5.1.10 Standardise post-mortem protocols

The DRD-Standard, version 1.0 is restricted to standardising the collection of already available data from GMRs and SRs. In order to obtain comparable data on drug-related deaths the steps prior to data recording and extraction should also be addressed. However, such activities fall beyond the scope of the current project and may be hard to deal with because death investigation procedures are often tightly bound by national and legal regulations. However, for the sake of completeness the following recommendation can be given:

It is recommended that common protocols for post-mortem examinations be developed that will standardise procedures to collect information from the moment a suspected death is signalled. These protocols should be applied with the same frequency and in the same situations in every country. It is also recommended that these protocols will standardise the

transference of information to the SRs and the GMRs. Data from different countries about drug-related deaths will not be comparable until such protocols will have been implemented.

5.1.11 Launch a project for estimating indirect causes of death

The DRD-Standard, version 1.0 restricts itself to cases in which drugs are the underlying cause of death. More specifically, these cases largely involve direct deaths or 'overdose'. In case the underlying cause of death is directly related to drug use, a drug may still be a contributing cause of death. In case a lethal traffic accident took place under the influence of a drug, for example, the accident may be registered as the underlying cause and the drug as a contributing cause. Similarly, chronic drug use may be associated with various diseases, such as AIDS, hepatitis or cardiovascular diseases, that may go unrecognised as 'drug-related' in GMRs because the 'natural' cause of death is recorded as the underlying cause. Such cases are not yet taken into account in the DRD-standard V1.0.

The GMRs of some countries contain information about drugs as contributing causes of death. This offers a possibility to estimate the number of such cases. The feasibility of this approach could be examined for those countries where the GMR is designed to record contributing causes of death. Another possibility is to estimate these cases by means of Drug Attributable Fractions (DAFs). The DAF for lethal traffic accidents, for instance, is the proportion of lethal traffic accidents that may be attributed to a drug as a contributing cause of death. Various methods to estimate indirect drug-related causes of death have been described in the literature (e.g. English et al., 1995; Single et al., 2000).

It is recommended that a separate project be launched to investigate in more detail the feasibility of collecting data on cases in which drugs are indirectly related to death with the final aim to obtain a more comprehensive picture of drug-related mortality in the EU.

5.2 Review per country

A review will now be given for each country separately. The countries will be reviewed from the perspective of the DRD-Standard for current ICD-9 coded and future ICD-10 coded GMRs.

5.2.1 Austria

Although the Austrian GMR does not allow the recording of multiple N-codes, this does not seem to invalidate the data. Therefore Austria is considered to comply with the DRD-Standard defined as selection B from the GMR.

Selection D (overdoses, excluding medicines) from the Austrian SR is recommended as a backup estimate of the number of drug-related deaths.

5.2.2 Belgium

Although the Belgian GMR does not allow the recording of multiple N-codes, this does not seem to invalidate the data. Therefore Belgium complies with the DRD-Standard defined as selection B from the GMR.

5.2.3 Denmark

For Denmark, the broad selection B from the GMR is based on ICD-8. However, these data may still be used as additional estimates to backup the trend signalled in the SR.

For the time being, selection D (overdoses excluding medicines) from the Danish SR is the best available estimate of the number of drug-related deaths until 1993.

From 1994 onwards, it is expected that Denmark will satisfy the DRD-Standard by applying the future ICD-10 equivalent of selection B.

5.2.4 Finland

Although ICD-9 coding procedures in Finland differ from those established by the WHO, it seems that the conversion did not invalidate the data to a great extent. Therefore Finland partially complies with the DRD-Standard.

Selection D (overdoses excluding medicines) from the SR is recommended as a backup estimate of the number of drug-related deaths.

Since 1996 the GMR in Finland is based on ICD-10, which promises that Finland will comply with the ICD-10 equivalent of the DRD-Standard.

5.2.5 France

France complies with the DRD-Standard defined as selection B from the GMR.

For France selection D from the SR is recommended as a backup estimate of the trend signalled in the GMR.

5.2.6 Germany

The German GMR is considered to comply with the DRD-Standard. Selection D from the SR is recommended as a backup estimate of the trend signalled in the GMR.

It is recommended to find ways to make storing the age of the deceased in the SR acceptable within German privacy regulations.

5.2.7 Greece

From the ICD-9 coded Greek GMR, only data from some E-codes were received. For Greece it is therefore recommended to improve the GMR in order to enhance compliance with the DRD-Standard.

Although no data from the SR were provided according to selection D and E, such a breakdown seems to be possible (see EMCDDA, 1998; Appendix 2). Therefore, selection D from the SR is recommended as a backup estimate for the trend signalled in the GMR. However, the validity of the data is not known since no reliable breakdown into different causes of death were made.

5.2.8 Ireland

From the ICD-9 coded Irish GMR, only data at the aggregated level of selection C were received. For Ireland it is therefore recommended that by additional analyses of the original death certificates ways be searched for to reduce the overinclusive selection C to selection B.

5.2.9 Italy

Although the Italian GMR does not allow the recording of multiple N-codes, this does not seem to invalidate the data. Therefore Italy is considered to comply with the DRD-Standard defined as selection B from the GMR.

The overdose cases from the Italian SR are recommended as a backup estimate of the number of drug-related deaths.

5.2.10 Luxembourg

The ICD-9 coded GMR of Luxembourg is aggregated at the three-digit level, whereas the DRD-Standard requires more detailed data at the four-digit level. For Luxembourg it is therefore recommended that ICD-10 codes be registered at four-digit level.

For the time being, selection D from the SR is the best available estimate of the number of drug-related deaths. The number of drug-related deaths from the GMR is recommended as a backup estimate for the trend signalled in the SR. However, the GMR data are overinclusive.

5.2.11 The Netherlands

The Netherlands complies with the DRD-Standard defined as selection B from the GMR.

It is recommended to investigate which cases are not represented in the General Mortality Register.

5.2.12 Portugal

The Portuguese ICD-9 coded GMR only contains three ICD-9 codes for information on drug-related deaths. For Portugal, for the time being, the number from the SR is the best available estimate of the number of drug-related deaths. However, it is required that trend data are delivered at a more detailed level (more breakdowns) to allow the calculation of D and E selections.

It is further recommended that, with the implementation of the ICD-10, T-codes be recorded in addition to X and Y codes.

It is also recommended to investigate which cases are not represented in the GMR, to explain the divergence between the SR and the GMR as of 1994.

5.2.13 Spain

The ICD-9 Spanish GMR has no N-codes available for combination with E-codes as required by the DRD-Standard. Selection B from the GMR, for the time being, is recommended as a backup estimate of the number of drug-related deaths.

For the time being, the number from the SR (which equals selection E) is the best available estimate of the number of drug-related deaths, because the SR seems most sensitive to detect cases despite its local/regional scope.

It is further recommended that, for ICD-10, T-codes be recorded in addition to X and Y codes.

It is also recommended to investigate which cases from the SR are not represented in the GMR.

5.2.14 Sweden

Sweden complies with the DRD-Standard defined as selection B from the GMR.

The number from the (local) SR is recommended as a backup estimate for the trend signalled in the GMR.

5.2.15 United Kingdom (England and Wales)

England and Wales comply with the DRD-Standard defined as selection B from the GMR for the period from 1993 onwards. Up to 1992 the number of cases is overinclusive.

Selection D (overdoses excluding medicines) from the SR is recommended as a backup estimate for the trend signalled in the GMR. However, the increasing scope may complicate an interpretation of trends.

List of annexes

Annex 1: The DRD-Standard, version 1.0

1. The origin of the DRD-Standard

The DRD-Standard is the Drug-Related Deaths Standard. It is the standard protocol for extracting data on drug-related deaths from registers in the Member States of the European Union.

The DRD-Standard has two parts:

- Part I standardises extracting data from the General Mortality Registers.
- Part II standardises extracting data from the Special Registers.

2. The rationale behind the DRD-Standard

There are two main sources of information on drug-related deaths: a. General Mortality Registers, which are present in all countries of the European Union, and b. Special Registers held by the police or forensic institutions, which are present in a subset of countries. Both registers have advantages and disadvantages. For comparative purposes, data are collected from both types of registers.

3. General Mortality Registers

The standard comprises a series of *underlying causes of deaths* as coded under the International Classification of Diseases, 9th edition. These codes are specified at three- or four-digit level. Broad categories include: drugs psychoses, drug dependence, nondependent drug abuse, accidental poisoning, suicide and self-inflicted poisoning, and poisoning with intent undetermined. In order to enhance the specificity of the substances causing death, a number of defined E-codes (poisoning deaths) must be extracted in combination with *nature of injury* codes (N-codes). As one E-code may have multiple N-codes, a specific procedure must be followed to exclude double-counting of persons. Contributing causes of death are not included because a significant number of countries is not able to provide the corresponding data. There are also difficulties related to the interpretation of the data. Hence the limitations and benefits of including contributory causes of death should be investigated first in a separate study.

The defined standard for data collection does not automatically imply that all causes of death will be used for calculating the overall number of drug-related deaths in the EU Member States. Causes of death related to psychoactive medicines and those related to unspecified drugs are still under discussion and may be excluded afterwards. The last category is included mainly to obtain insight into the accuracy of coding. The standard also specifies the breakdown by *gender* and *age groups.*

4. Special Registers

Information on fatal drug overdose or intoxication is common to most Special Registers. Therefore, part II of the DRD-Standard focuses on overdose cases. Moreover, it has appeared feasible to distinguish between cases in which only opiates are registered as cause of death, cases in which poly-substances including opiates have been found, cases in which (poly)substances without opiates have been found, and psychoactive medicine cases without other (poly)substances. Therefore, this distinction between substances has been chosen as the breakdown for the overdose cases together with the standard breakdown by gender and age group.

The Special Registers in some countries are also able to distinguish other causes of death than overdose. The other causes that are registered differ widely between the countries. Therefore, within the DRD-Standard, the Special Registers are given the freedom to specify their own other causes beside overdose (e.g. AIDS, long-term drug abuse, traffic accidents, or suicides). There is a maximum of five other causes, to be specified according to the own preference of the Special Register. This maximum of five other causes is also broken down by gender and the standard age breakdown.

5. Limitations of the DRD-standard

The current standard for General Mortality Registers focuses on underlying causes of death and does not take into account deaths where drug use is a contributory cause of death. The last category of deaths comprises natural causes of death (such as cardiac diseases) as well as external causes of death other than poisoning (such as accidents) where drugs are indirectly involved. Depending on the width of the definition adopted for drug-related deaths this standard may give rise to underreporting. In a similar vein, underreporting may occur under the standard for Special Registers because of its focus on harmonising direct deaths (overdose) in contrast to deaths indirectly related to drug use.

6. General guidelines to apply the DRD-Standard

The DRD-Standard is the European Union's greatest common divisor to extract data on drug-related deaths. This implies that some Member States will not be able to confirm exactly to the DRD-Standard. In all cases in which the DRD-Standard cannot be applied exactly, please act as follows:

1) Deviate from the DRD-Standard in such a way that the resulting data will approach the standard as much as possible.
2) While sending in the aggregated data, exactly report all deviations from the DRD-Standard in a separate technical report.

7. The form of the DRD-Standard

The DRD-Standard is given by the Excel-spreadsheets in which the aggregated data on drug-related deaths are to be reported.

1) For the General Mortality Registers, the format of the spreadsheet is shown in Table 1.
2) For the Special Registers, the format of the spreadsheet is shown in Table 2.

Retrieving the aggregated numbers that must be reported in the cells of the spreadsheet, may require the development of special computer programs that will select and count the appropriate cases. These new computer programs will differ between the countries, because they must fit to the specific data structure of a General Mortality Register in a given country. Therefore, the DRD-Standard for all Member States is stated in general terms.

8. Logical terminology

Beware of the fact that the DRD-Standard applies formal logical terminology, because logical terminology can be translated directly into computer languages. This counts especially for selections of cases that are defined by the terms 'AND' and 'OR'. Beware of the fact that in common language the words 'and' and 'or' have a different meaning compared to the logical meaning of 'AND' and 'OR'. Especially for the General Mortality Registers, it is recommended that professionals, who are trained to apply formal logic, extract the data on drug-related deaths.

The logical definition of 'AND'

In logical terminology, the prescription ’A AND B’ means that a case is only selected if the case satisfies condition A *as well as* condition B. If the case does not satisfy condition A, the case is not selected. If the case does not satisfy condition B, it is selected neither. Of course, the case is also not selected if it does not satisfy condition A and does not satisfy condition B as well.

The logical definition of 'OR'

In logical terminology, the prescription ’A OR B’ means that a case is selected if condition A is satisfied, if condition B is satisfied, or if both conditions A and B are satisfied. The case is not selected if both conditions A and B are not satisfied.

The mutual definitions of 'AND' and 'OR'

From the logical definitions of 'AND' and 'OR' given above, it follows that (A AND B) equals NOT (NOT A OR NOT B). Conversely, (A OR B) equals NOT (NOT A AND NOT B). This way, 'AND' and 'OR' are mutually defined by one another.

Additional terminology

The definition of 'through'

For the DRD-Standard the term 'through' means 'up to and including'. For example '1 through 10' means: '1, 2, 3, 4, 5, 6, 7, 8, 9, and 10'. Furthermore, ‘1-10’ means ‘1 through 10’, which equals ‘1 up to and including 10’ as defined above.

Part I: The protocol for the General Mortality Registers

The protocol for extracting data on drug-related deaths from the General Mortality Registers consists in taking three consecutive steps:

Step 1: Apply the spreadsheets for the General Mortality Registers

The format of the spreadsheet to report the aggregated data is given in Table 1. For each combination of registration year and gender, a spreadsheet is to be filled in. Given the fourteen reporting years from 1985 through 1998, and given the three values for gender (male, female, and gender unknown), a total of 42 spreadsheets can be filled in.

For each spreadsheet, 55 different selections of causes of drug-related deaths must be made from the General Mortality Register. These 55 selections are labelled DRD1 through DRD55. DRD1 through DRD55 are described in the explanations following Table 1. The cases that are selected are counted within five age groups. The five age groups are 0-14 years, 15-34 years, 35-64 years, 65 years and older, and age group unknown. For each combination of DRD1 through DRD55 and age group, the respective numbers of selected cases must be reported in the respective cells of the spreadsheet.

Step 2: Select the single ICD-9 codes

Cases are selected according to ICD-9 codes. (In paragraph 2 above it was mentioned that a DRD-Standard for ICD-10 coded registers is in the making.) Some DRD-codes are defined by just one ICD-9 code. Other DRD-codes are defined by combinations of ICD-9 codes. If a DRD-code is defined by only one ICD-9 code, only select a case if the *underlying* cause of death is coded to the respective ICD-9 code. This means that in case of one ICD-9 code, *contributing* causes of death are *not* taken into account and are *not* selected. The DRD-codes that are defined by only one ICD-9 code are: DRD1 through DRD20, DRD25 through DRD32, DRD37, DRD39, DRD40, DRD46, DRD48, DRD49, and DRD55. Step 3 below prescribes how to select DRD-codes that are defined by combinations of E- and N-codes.

Step 3: Select the combinations of ICD-9 codes

The DRD-codes that are defined by *combinations of E- and N-codes* are: DRD21 through DRD24, DRD33 through DRD36, DRD38, DRD41 through DRD45, DRD47, and DRD50 through DRD54. The selection criterion for these DRD-codes always starts with an E-code. These are E850.8, E858.8, E950.0, E950.3, E950.4, E980.0, E980.3, and E980.4. These E-codes refer to the underlying cause of death. Of these, codes E950.0 and E980.0 must be extracted in combination with N-code 965.0 to obtain cases related to opiates. Similarly, codes E950.3 and E980.3 must be extracted in combination with N-code 969.4 to extract cases related to benzodiazepines.

The remaining four codes (E850.8, E858.8, E950.4, E980.4) are known to be associated with multiple N-codes, at least in some countries. In order to avoid double-counting, cases should be assigned into one of four mutually exclusive categories. At a descriptive level these categories are:

1. opiates AND cocaine (regardless of other substances);
2. opiates AND NO cocaine (regardless of other substances);
3. mixed, including one or more of the following: cocaine OR stimulants OR hallucinogens AND NO opiates (regardless of other substances);
4. other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens.

The corresponding definitions can be found in table 1 under DRD21-DRD24, DRD33-DRD36, DRD42-DRD45 and DRD51-DRD54.

Important

In some countries, codes E850.8, E858.8, E950.4 or E980.4 may have one additional N-code that is non-specific, for example, code N977.8 (other drugs and medicaments) or N977.9 (unspecified drug or medicament). Information on the specific substances involved (e.g. opiates) may be contained in a series of N-codes recorded as contributing causes. In this specific situation, the N-codes recorded as *contributing* causes of death, and all other information pertaining to a case, must also be taken into account. For example, if the underlying cause of death is coded to E850.8 in combination with N965.0 and in combination with N968.5, the case counts as a DRD21. The case counts as a DRD21 if in *all* information about the case, including the contributing causes, E850.8 is found in combination somewhere with N965.0 AND somewhere with N968.5. The same logic applies to the other DRD-codes that are defined by combinations of E-codes and N-codes.

Table 1: Spreadsheet format for the General Mortality Registers

Year: [1985 through 1998]; Gender: [male, female, gender unknown]

DRD	ICD9-Code(s	Age group					Total
		0-14	15-34	35-64	>=65	? y	
1	292						
2	304.0						
3	304.1						
4	304.2						
5	304.3						
6	304.4						
7	304.5						
8	304.6						
9	304.7						
10	304.8						
11	304.9						
12	305.2						
13	305.3						
14	305.4						
15	305.5						
16	305.6						
17	305.7						
18	305.8						
19	305.9						
20	E850.0						
21	E850.8 AND N965.0 AND N968.5						
22	E850.8 AND N965.0 AND NOT N968.5						
23*)	E850.8 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0						
24*)	E850.8 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)						
25	E850.9						
26	E851						
27	E852						
28	E853.2						
29	E854.1						
30	E854.2						
31	E855.2						
32	E855.9						
33	E858.8 AND N965.0 AND N968.5						
34	E858.8 AND N965.0 AND NOT N968.5						
35*)	E858.8 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0						
36*)	E858.8 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)						
37	E858.9						

(continued)

*)For the DRD-numbers 23, 24, 35, 36, 44, 45, 53, and 54, a correction took place on the original DRD-Standard, version 1.0 which erroneously said “N969.9”, instead of the correct “N969.6”.

Table 1 *(continued)*: Spreadsheet format for the General Mortality Registers

Year: [1985 through 1998]; Gender: [male, female, gender unknown]

DRD	ICD9-Code(s)	Age group					Total
		0-14	15-34	35-64	>=65	? y	
38	E950.0 AND N965.0						
39	E950.1						
40	E950.2						
41	E950.3 AND N969.4						
42	E950.4 AND N965.0 AND N968.5						
43	E950.4 AND N965.0 AND NOT N968.5						
44*)	E950.4 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0						
45*)	E950.4 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)						
46	E950.5						
47	E980.0 AND N965.0						
48	E980.1						
49	E980.2						
50	E980.3 AND N969.4						
51	E980.4 AND N965.0 AND N968.5						
52	E980.4 AND N965.0 AND NOT N968.5						
53*)	E980.4 AND (N968.5 OR N969.7 OR N969.6) AND NOT N965.0						
54*)	E980.4 AND NOT N965.0 AND NOT (N968.5 OR N969.7 OR N969.6)						
55	E980.5						
Total [males, females, gender unknown]							

*)For the DRD-numbers 23, 24, 35, 36, 44, 45, 53, and 54, a correction took place on the original DRD-Standard, version 1.0 which erroneously said “N969.9”, instead of the correct “N969.6”.

Explanation to Table 1: DRD1 through DRD37

DRD	Explanation
1	Drug psychoses
2	Drug dependence, morphine type
3	Drug dependence, barbiturate type
4	Drug dependence, cocaine
5	Drug dependence, cannabis
6	Drug dependence, amphetamine type and other psychostimulants
7	Drug dependence, hallucinogens
8	Drug dependence, other
9	Drug dependence, combination of morphine-type drug with any other
10	Drug dependence, combination excluding morphine-type drug
11	Drug dependence, unspecified
12	Nondependent abuse of drugs, cannabis
13	Nondependent abuse of drugs, hallucinogens
14	Nondependent abuse of drugs, barbiturates and tranquillisers
15	Nondependent abuse of drugs, morphine type
16	Nondependent abuse of drugs, cocaine type
17	Nondependent abuse of drugs, amphetamine type
18	Nondependent abuse of drugs, antidepressants
19	Nondependent abuse of drugs, other, mixed, or unspecified
20	Accidental poisoning, opiates and related narcotics
21	Accidental poisoning, mixed including opiates AND cocaine
22	Accidental poisoning, mixed including opiates AND NO cocaine
23	Accidental poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
24	Accidental poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
25	Accidental poisoning, unspecified analgesics, antipyretics, antirheumatics
26	Accidental poisoning, barbiturates
27	Accidental poisoning, other sedatives and hypnotics
28	Accidental poisoning, benzodiazepines
29	Accidental poisoning, psychodysleptics (including cannabis and hallucinogens)
30	Accidental poisoning, psychostimulants (including amphetamines)
31	Accidental poisoning, local anaesthetics (including cocaine)
32	Accidental poisoning, unspecified other drugs acting on the nervous system
33	Accidental poisoning, mixed including opiates AND cocaine
34	Accidental poisoning, mixed including opiates AND NO cocaine
35	Accidental poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
36	Accidental poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
37	Accidental poisoning, unspecified other drugs

Explanation to Table 1: DRD38 through DRD55

38	Suicide and self-inflicted poisoning, opiates
39	Suicide and self-inflicted poisoning, barbiturates
40	Suicide and self-inflicted poisoning, other sedatives and hypnotics
41	Suicide and self-inflicted poisoning, benzodiazepines
42	Suicide and self-inflicted poisoning, mixed including opiates AND cocaine
43	Suicide and self-inflicted poisoning, mixed including opiates AND NO cocaine
44	Suicide and self-inflicted poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
45	Suicide and self-inflicted poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
46	Suicide and self-inflicted poisoning, other unspecified drugs or medicaments
47	Poisoning undetermined intent, opiates
48	Poisoning undetermined intent, barbiturates
49	Poisoning undetermined intent, other sedatives and hypnotics
50	Poisoning undetermined intent, benzodiazepines
51	Poisoning undetermined intent, mixed including opiates AND cocaine
52	Poisoning undetermined intent, mixed including opiates AND NO cocaine
53	Poisoning undetermined intent, including cocaine OR stimulants OR hallucinogens and NO opiates
54	Poisoning undetermined intent, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
55	Poisoning undetermined intent, other unspecified drugs or medicaments

Part II: The protocol for the Special Registers

The protocol for extracting data on drug-related deaths from the Special Registers consists in taking four consecutive steps:

Step 1: Apply the spreadsheet

The format of the spreadsheet to report the aggregated data from the Special Registers is given in Table 2. For each of the fourteen registration years from 1985 through 1998, a spreadsheet is to be filled in.

Step 2: Apply gender and age breakdowns

For each year the spreadsheet is broken down by gender, cause of death, and age group. Gender is divided into male, female, and gender unknown. The age groups are 0-14 years, 15-34 years, 35-64 years, 65 years and older, and age group unknown.

Step 3: Apply substance breakdown to overdose cases

The causes of death are divided into overdose and other causes. The protocol for the other causes is given in step 4 below. The overdose cases are further divided by the substances implicated in death.

Beware of the fact that not all substances detected or mentioned in a case are taken into account. Only those substances are taken into account that are considered an underlying or a contributing cause of death. Substances that are *not* considered an underlying or contributing cause of death are thus *not* taken into account to assign a case to a category of substances.

Each overdose case is coded to only one of the five mutually exclusive categories A1 through A5:

A1. Opiates only

A case is coded to A1 if only opiates are registered as a cause of death and no other substances are registered as a cause of death. If, for example, alcohol is also registered as a cause of death besides opiates, the case is assigned to category A2 below.

A2. Poly-substances including opiates

A case is coded to A2, if opiates are registered as a cause of death AND one or more of the following substances are also registered as a cause of death:

- amphetamines
- cocaine/crack
- cannabis
- hallucinogens (e.g. LSD, mescaline, PCP, psilocybine)
- solvents
- ‘synthetic designer drugs’ (e.g. MDMA, 2-CB, GHB and derivates)
- barbiturates
- tranquillisers and other nonbarbiturate sedatives (e.g. benzodiazepines)
- alcohol
- other substances

A3. (Poly)substances excluding opiates

A case is coded to A3 if one or more of the following substances are registered as a cause of death, but no opiates are registered as a cause of death:

- amphetamines
- cocaine/crack
- cannabis
- hallucinogens (e.g. LSD, mescaline, PCP, psilocybine)
- solvents
- 'synthetic designer drugs' (e.g. MDMA, 2-CB, GHB and derivates)

If in addition to the aforementioned substances, alcohol, barbiturates, tranquillisers or nonbarbiturate sedatives are also registered as a cause of death, the case is still coded to A3.
If on the other hand psychoactive medicines are registered as a cause of death, and none of the above substances, and no opiates are registered as a cause of death, the case is coded to A4 below.

A4. Psychoactive medicines

To be coded to A4, no opiates, no amphetamines, no cocaine/crack, no cannabis, no hallucinogens, no solvents, and no 'synthetic designer drugs' may be registered as a cause of death. A case is coded to A4 if one or more of the following psychoactive medicines are registered as a cause of death:

- barbiturates
- benzodiazepines
- other sedatives and minor tranquillizers

Antidepressants, neuroleptics and other psychoactive medicines are not taken into account.
A case is also coded to A4 if death is due to the combined use of alcohol and one or more of the psychoactive medicines listed above.

A5. Unspecified/unknown

A case is coded to A5 if it is unspecified or unknown which substances have caused death.

Step 4: Specify other causes

The five other causes of death B1 through B5, which are other causes than overdose, are optional. The coders are free to distinguish a maximum of five other causes beside overdose. These other causes must be mutually exclusive. One case may only be coded to one cause. The descriptions of the optional other causes are to be filled in after the request "specify:" in the respective cells of the spreadsheet.

Some examples of other causes than overdose are:

- AIDS and other infectious diseases
- long-term drug abuse
- fatal accidents under influence of drugs
- suicides among known drug users

Table 2: Spreadsheet format for the Special Registers

Year: [1985 through 1998]

M	Cause of death	Age group					
A	**A. Overdose**	**0-14 y**	**15-34 y**	**35-64 y**	**>=65 y**	**? y**	**Total**
L	A1. Opiates only						
E	A2. Poly-substances including opiates						
	A3. (Poly)substances excluding opiates						
	A4. Psychoactive medicines						
	A5. Unspecified/unknown						
	Subtotal A: overdose						
	B. Other causes						
	B1: specify:						
	B2: specify:						
	B3: specify						
	B4: specify:						
	B5: specify:						
	Subtotal B: other causes						
	Total A + B: overdose + other causes						
F	**Cause of death**	**Age group**					
E	**A. Overdose**	**0-14 y**	**15-34 y**	**35-64 y**	**>=65 y**	**? y**	**Total**
M	A1. Opiates only						
A	A2. Poly-substances including opiates						
L	A3. (Poly)substances excluding opiates						
E	A4. Psychoactive medicines						
	A5. Unspecified/unknown						
	Subtotal A: overdose						
	B. Other causes						
	B1: specify:						
	B2: specify:						
	B3: specify						
	B4: specify:						
	B5: specify:						
	Subtotal B: other causes						
	Total A + B: overdose + other causes						
G	**Cause of death**	**Age group**					
E	**A. Overdose**	**0-14 y**	**15-34 y**	**35-64 y**	**>=65 y**	**? y**	**Total**
N	A1. Opiates only						
D	A2. Poly-substances including opiates						
E	A3. (Poly)substances excluding opiates						
R	A4. Psychoactive medicines						
	A5. Unspecified/unknown						
U	**Subtotal A: overdose**						
N	**B. Other causes**						
K	B1: specify:						
N	B2: specify:						
O	B3: specify						
W	B4: specify:						
N	B5: specify:						
	Subtotal B: other causes						
	Total A + B: overdose + other causes						
	Total male + female + gender unknown						

?y = age group unknown

Annex 2: Standardisation of deviations from the DRD-Standard

To apply the DRD-Standard, version 1.0 completely, it is required that ICD-9 E-codes can be combined with at least *two* ICD-9 N-codes. However, for the General Mortality Registers of some countries, E-codes can only be combined with *one* N-code. The following guidelines describe what to do if E-codes can only be combined with one N-code. These guidelines standardise how to deviate from the DRD-Standard.

The following table shows how to compute DRD1 through DRD55 in case E-codes can only be combined with one N-code.

DRD-number(s)	**Computation prescription**
DRD1 through DRD20	Compute as prescribed by the DRD-Standard.
DRD21	E850.8 AND N965.0
DRD22	Do not compute but leave empty.
DRD23	• E850.8 AND N968.5 • E850.8 AND N969.7 • E850.8 AND N969.6
DRD24 through DRD32	Compute as prescribed by the DRD-Standard.
DRD33	E858.8 AND N965.0
DRD34	Do not compute but leave empty.
DRD35	• E858.8 AND N968.5 • E858.8 AND N969.7 • E858.8 AND N969.6
DRD36 through DRD41	Compute as prescribed by the DRD-Standard.
DRD42	E950.4 AND N965.0
DRD43	Do not compute but leave empty.
DRD44	• E950.4 AND N968.5 • E950.4 AND N969.7 • E950.4 AND N969.6
DRD45 through DRD50	Compute as prescribed by the DRD-Standard.
DRD51	E980.4 AND N965.0
DRD52	Do not compute but leave empty.
DRD53	• E980.4 AND N968.5 • E980.4 AND N969.7 • E980.4 AND N969.6
DRD54 through DRD55	Compute as prescribed by the DRD-Standard.

Explanation to the table

The table above prescribes the following:

1. Compute DRD1 through DRD20 as prescribed by the DRD-Standard.

2. Compute DRD21 as “E850.8 AND N965.0”, meaning “accidental poisoning, mixed including opiates”.

3. Do <u>not</u> compute DRD22, because these cases are merged with DRD21.

4. Compute DRD23 as “E850.8 AND (N968.5 OR N969.7 OR N969.6)”, meaning “accidental poisoning, including cocaine OR stimulants OR hallucinogens”.

5. Compute DRD24 through DRD32 as prescribed by the DRD-Standard.

6. Compute DRD33 as “E858.8 AND N965.0”, meaning “accidental poisoning, mixed including opiates”.

7. Do not compute DRD34, because these cases are merged with DRD33.

8. Compute DRD35 as “E858.8 AND (N968.5 OR N969.7 OR N969.6)”, meaning “accidental poisoning, including cocaine OR stimulants OR hallucinogens”.

9. Compute DRD36 through DRD41 as prescribed by the DRD-Standard.

10. Compute DRD42 as “E950.4 AND N965.0”, meaning “suicide and self-inflicted poisoning, mixed including opiates”.

11. Do not compute DRD43, because these cases are merged with DRD42.

12. Compute DRD44 as “E950.4 AND (N968.5 OR N969.7 OR N969.6)”, meaning “suicide and self-inflicted poisoning, including cocaine OR stimulants OR hallucinogens”.

13. Compute DRD45 through DRD50 as prescribed by the DRD-Standard.

14. Compute DRD51 as “E980.4 AND N965.0”, meaning “poisoning undetermined intent, mixed including opiates”.

15. Do not compute DRD52, because these cases are merged with DRD51.

16. Compute DRD53 as “E980.4 AND (N968.5 OR N969.7 OR N969.6)”, meaning “poisoning undetermined intent, including cocaine OR stimulants OR hallucinogens”.

17. Compute DRD54 through DRD55 as prescribed by the DRD-Standard.

Consequences

Following the guidelines above will have the following consequences for data delivery:

1. DRD21 merges with DRD22 into DRD21.

2. DRD33 merges with DRD34 into DRD33.

3. DRD42 merges with DRD43 into DRD42.

4. DRD51 merges with DRD52 into DRD51.

Annex 3: Revised A, B, and C selections

A = Restrictive estimate, B = Broad estimate, C = All-Inclusive estimate

DRD	A	B	C	Explanation
1	+	+	+	Drug psychoses
2	+	+	+	Drug dependence, morphine type
3	-	-	+	Drug dependence, barbiturate type
4	+	+	+	Drug dependence, cocaine
5	+	+	+	Drug dependence, cannabis
6	+	+	+	Drug dependence, amphetamine type and other psychostimulants
7	+	+	+	Drug dependence, hallucinogens
8	+	+	+	Drug dependence, other
9	+	+	+	Drug dependence, combination of morphine-type drug with any other
10	+	+	+	Drug dependence, combination excluding morphine-type drug
11	+	+	+	Drug dependence, unspecified
12	+	+	+	Nondependent abuse of drugs, cannabis
13	+	+	+	Nondependent abuse of drugs, hallucinogens
14	-	-	+	Nondependent abuse of drugs, barbiturates and tranquillisers
15	+	+	+	Nondependent abuse of drugs, morphine type
16	+	+	+	Nondependent abuse of drugs, cocaine type
17	+	+	+	Nondependent abuse of drugs, amphetamine type
18	-	-	+	Nondependent abuse of drugs, antidepressants
19	+	+	+	Nondependent abuse of drugs, other, mixed, or unspecified
20	+	+	+	Accidental poisoning, opiates and related narcotics
21	+	+	+	Accidental poisoning, mixed including opiates AND cocaine
22	+	+	+	Accidental poisoning, mixed including opiates AND NO cocaine
23	+	+	+	Accidental poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
24	-	-	-	Accidental poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
25	-	-	-	Accidental poisoning, unspecified analgesics, antipyretics, antirheumatics
26	-	-	+	Accidental poisoning, barbiturates
27	-	-	+	Accidental poisoning, other sedatives and hypnotics
28	-	-	+	Accidental poisoning, benzodiazepines
29	+	+	+	Accidental poisoning, psychodysleptics (including cannabis and hallucinogens)
30	+	+	+	Accidental poisoning, psychostimulants (including amphetamines)
31	+	+	+	Accidental poisoning, local anaesthetics (including cocaine)
32	-	-	-	Accidental poisoning, unspecified other drugs acting on the nervous system
33	+	+	+	Accidental poisoning, mixed including opiates AND cocaine
34	+	+	+	Accidental poisoning, mixed including opiates AND NO cocaine
35	+	+	+	Accidental poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
36	-	-	-	Accidental poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
37	-	-	-	Accidental poisoning, unspecified other drugs

DRD	A	B	C	Explanation
38	-	+	+	Suicide and self-inflicted poisoning, opiates
39	-	-	+	Suicide and self-inflicted poisoning, barbiturates
40	-	-	+	Suicide and self-inflicted poisoning, other sedatives and hypnotics
41	-	-	+	Suicide and self-inflicted poisoning, benzodiazepines
42	-	+	+	Suicide and self-inflicted poisoning, mixed including opiates AND cocaine
43	-	+	+	Suicide and self-inflicted poisoning, mixed including opiates AND NO cocaine
44	-	+	+	Suicide and self-inflicted poisoning, including cocaine OR stimulants OR hallucinogens and NO opiates
45	-	-	-	Suicide and self-inflicted poisoning, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
46	-	-	-	Suicide and self-inflicted poisoning, other unspecified drugs or medicaments
47	-	+	+	Poisoning undetermined intent, opiates
48	-	-	+	Poisoning undetermined intent, barbiturates
49	-	-	+	Poisoning undetermined intent, other sedatives and hypnotics
50	-	-	+	Poisoning undetermined intent, benzodiazepines
51	-	+	+	Poisoning undetermined intent, mixed including opiates AND cocaine
52	-	+	+	Poisoning undetermined intent, mixed including opiates AND NO cocaine
53	-	+	+	Poisoning undetermined intent, including cocaine OR stimulants OR hallucinogens and NO opiates
54	-	-	-	Poisoning undetermined intent, other, NO opiates, NO cocaine, NO stimulants, NO hallucinogens
55	-	-	-	Poisoning undetermined intent, other unspecified drugs or medicaments

A “+” in Annex 4 indicates that a DRD-code is selected for selection A, B, or C and a “-“ indicates that a DRD-code is not selected.

Annex 4: Review of received data

Country	GMR or SR	Registration year for which data were received													
		85	86	87	88	89	90	91	92	93	94	95	96	97	98
Austria	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	SR					+	+	+	+	+	+	+	+	+	+
Belgium	GMR				+	+	+	+	+	+	+				
	SR														
Denmark	GMR	+	+	+	+	+	+	+	+	+					
	SR	+	+	+	+	+	+	+	+	+	+				
Finland	GMR			+	+	+	+	+	+	+	+	+			
	SR				+	+	+	+	+	+	+	+	+	+	
France	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	
	SR												+	+	+
Germany	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	
	SR											+	+	+	+
Greece	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	
	SR														
Ireland	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Italy	GMR	+	+	+	+	+	+	+	+	+	+	+	+		
	SR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Luxembourg	GMR						+	+	+	+	+	+	+	+	
	SR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Netherlands	GMR	+	+	+	+	+	+	+	+	+	+	+			
	SR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Portugal	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	SR											+	+	+	
Spain	GMR	+	+	+	+	+	+	+	+	+	+	+	+		
	SR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sweden	GMR			+	+	+	+	+	+	+	+	+	+		
	SR	+	+	+	+	+	+	+	+	+	+	+	+		
England & Wales	GMR	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Northern Ireland	GMR		+	+	+	+	+	+	+	+	+	+	+	+	
United Kingdom	SR					+	+	+	+	+				+	+

GMR = General Mortality Register (ICD-9 data)
SR = Special Register
+ = data received

Annex 5: Overview of data stored in the SPSS database GMR_01.sav

An overview of the data stored in the SPSS-database GMR_01.sav is given by the following table that consists of two parts. Where cells have merged, data are (possibly) delivered overinclusively according to the merged DRD-codes. In such a case data are stored under the first code of the merged cells. Deviations are described after part 2 of this table.

+ = data are delivered according to the DRD-Standard, version 1.0
- = data are not delivered
o/u = data are delivered overinclusively/underinclusively, eventually within merged cells

Part 1: Austria through Italy

DRD	Au	Be	Dk	Fi	Fr	Ge	Gr	Ir	It
DRD1	+	+	+	+	+	+	+	o	+
DRD2	+	+	+	+	+	+	+		+
DRD3	+	+	+	+	+	+	+		+
DRD4	+	+	+	+	+	+	+		+
DRD5	+	+	+	+	+	+	+		+
DRD6	+	+	+	+	+	+	+		+
DRD7	+	+	+	+	+	+	+		+
DRD8	+	+	+	+	+	+	+		+
DRD9	+	+	+	+	+	+	+		+
DRD10	+	+	+	+	+	+	+		+
DRD11	+	+	+	+	+	+	+		+
DRD12	+	+	+	+	+	+	+		+
DRD13	+	+	+	+	+	+	+		+
DRD14	+	+	+	+	+	+	+		+
DRD15	+	+	+	+	+	+	+		+
DRD16	+	+	+	+	+	+	+		+
DRD17	+	+	+	+	+	+	+		+
DRD18	+	+	+	+	+	+	+		+
DRD19	+	+	+	+	+	+	+		+
DRD20	+	+	o	+	+	+	+		+
DRD21	o	o		o	+	-	+		o
DRD22	o	o	-	o	+	-	+		-
DRD23	u/o	u/o	-	o	+	-	+		-
DRD24	-	o	+	o	+	-	+		-
DRD25	+	+	+	+	+	+	+		+
DRD26	+	+	+	+	+	+	+		+
DRD27	+	+	o	o	+	+	u		+
DRD28	+	+		+	+	+	+		+
DRD29	+	+	+	+	+	+	+		+
DRD30	+	+	+	+	+	+	+		+
DRD31	+	+	+	+	+	+	+		+
DRD32	+	+	+	+	+	+	+		+

DRD	Au	Be	Dk	Fi	Fr	Ge	Gr	Ir	It
DRD33	o	o	+	o	+	-	+		o
DRD34	o	o	+	o	+	-	o		-
DRD35	u/o	u/o	+	o	+	-	+		-
DRD36	-	o	+	o	+	-	+		-
DRD37	+	+	+	+	+	+	+		+
DRD38	+	+	+	o	+	+	o		+
DRD39	+	+	+	+	+	+	+		+
DRD40	+	+	+	+	+	+	+		+
DRD41	+	+	+	o	+	+	o		+
DRD42	o	o	+	o	+	-	o		o
DRD43	o	o	+	o	+	-	o		-
DRD44	u/o	u/o	+	o	+	-	+		-
DRD45	-	o	+	u/o	+	-	+		-
DRD46	+	+	+	+	+	+	+		+
DRD47	+	+	+	o	+	+	o		+
DRD48	+	+	+	+	+	+	+		+
DRD49	+	+	+	+	+	+	+		+
DRD50	+	+	+	o	+	+	o		+
DRD51	o	o	+	o	+	-	+		o
DRD52	o	o	+	o	+	-	o		-
DRD53	u/o	u/o	+	o	+	-	+		-
DRD54	-	o	+	o	+	-	+		-
DRD55	+	+	+	+	+	+	+		+

Part 2: Luxembourg through United Kingdom/Scotland

DRD	Lu	NL	Pt	Sp	Sw	UK/ EW[1)]	UK/ NI	UK/ Sc
DRD1	+	+	+	+	+	+	+	-
DRD2	o	+	-	+	+	+	+	-
DRD3		+	-	+	+	+	+	-
DRD4		+	-	+	+	+	+	-
DRD5		+	-	+	+	+	+	-
DRD6		+	-	+	+	+	+	-
DRD7		+	-	+	+	+	+	-
DRD8		+	-	+	+	+	+	-
DRD9		+	-	+	+	+	+	-
DRD10		+	-	+	+	+	+	-
DRD11		+	-	+	+	+	+	-
DRD12	-	+	-	+	+	+	+	-
DRD13	-	+	-	+	+	+	+	-
DRD14	-	+	-	+	+	+	+	-
DRD15	-	+	-	+	+	+	+	-
DRD16	-	+	-	+	+	+	+	-
DRD17	-	+	-	+	+	+	+	-
DRD18	-	+	-	+	+	+	+	-
DRD19	-	+	-	+	+	+	+	-

DRD	Lu	NL	Pt	Sp	Sw	UK/ EW[1)]	UK/ NI	UK/ Sc
DRD20	o	+	+	+	+	+	+	-
DRD21		+	-	-	+	o	+	-
DRD22		+	-	-	+		+	-
DRD23		+	-	-	+		+	-
DRD24		+	-	-	+		+	-
DRD25		+	-	+	+	+	+	-
DRD26	+	+	-	+	+	+	+	-
DRD27	+	+	-	+	+	+	+	-
DRD28	+	+	-	+	+	+	+	-
DRD29	+	+	+	+	+	+	+	-
DRD30	+	+	-	+	+	+	+	-
DRD31	+	+	-	+	+	+	+	-
DRD32	+	+	-	+	+	+	+	-
DRD33		+	-	-	+	o	+	-
DRD34		+	-	-	+		+	-
DRD35		+	-	-	+		+	-
DRD36		+	-	-	+		+	-
DRD37	o	+	-	+	+	+	+	-
DRD38		+	-	-	+	+	+	-
DRD39	o	+	-	+	+	+	+	-
DRD40		+	-	+	+	+	+	-
DRD41		+	-	-	+	+	+	-
DRD42		+	-	-	+	o	+	-
DRD43		+	-	-	+		+	-
DRD44		+	-	-	+		+	-
DRD45		+	-	-	+		+	-
DRD46		+	-	+	+	+	+	-
DRD47		+	-	-	+	+	+	-
DRD48	o	+	-	+	+	+	+	-
DRD49		+	-	+	+	+	+	-
DRD50		+	-	-	+	+	+	-
DRD51		+	-	-	+	o	+	-
DRD52		+	-	-	+		+	-
DRD53		+	-	-	+		+	-
DRD54		+	-	-	+		+	-
DRD55		+	-	+	+	+	+	-

[1)]Deviations from the DRD-Standard, version 1.0 for UK/EW only refer to the years 1987-1992.

Explanations of DRD-codes deviating from DRD-Standard V1.0

Explanations of DRD-codes deviating from DRD-Standard V1.0 as shown in the table above have been listed below for each country (if applicable). Data have been stored in the SPSS database GMR_01.sav. Information is given only for countries that did not show full compliance.

Austria (Country = 1)

DRD21 means: E850.8 AND N968.5 (overinclusive)
DRD22 means: E850.8 AND N965.0 (overinclusive)
DRD23 means: E850.8 AND N969.9 (under- and overinclusive)
DRD33 means: E858.8 AND N968.5 (overinclusive) und
DRD34 means: E858.8 AND N965.0 (overinclusive)
DRD35 means: E858.8 AND N969.9 (under- and overinclusive)
DRD42 means: N968.5 AND E950.4(overinclusive).
DRD43 means: N965.0 AND E950.4(overinclusive).
DRD44 means: E950.4 AND N969.9 (under- and overinclusive)
DRD51 means: E980.4 AND N968.5 (overinclusive)
DRD52 means: E980.4 AND N965.0 (overinclusive)
DRD53 means: N969.9 AND E980.4 (under- and overinclusive).

Belgium (Country = 2)

DRD21 means: E850.8 AND N968.5 (overinclusive)
DRD22 means: E850.8 AND N965.0 (overinclusive)
DRD23 means: E850.8 AND (N969.7 OR N969.9) (under- and overinclusive)
DRD24 means: E850.8 AND NOT (N965.0 OR N968.5 OR N969.7 OR N969.9) (overinclusive, based on one N-code)
DRD33 means: E858.8 AND N968.5 (overinclusive)
DRD34 means: E858.8 AND N965.0 (overinclusive)
DRD35 means: E858.8 AND (N969.7 OR N969.9) (under- and overinclusive)
DRD36 means: E858.8 AND NOT (N965.0 OR N968.5 OR N969.7 OR N969.9) (overinclusive, based on one N-code)
DRD42 means: E950.4 AND N968.5 (overinclusive)
DRD43 means: E950.4 AND N965.0 (overinclusive)
DRD44 means: E950.4 AND (N969.7 OR N969.9) (under- and overinclusive)
DRD45 means: E950.4 AND NOT (N965.0 OR N968.5 OR N969.7 OR N969.9) (overinclusive, based on one N-code)
DRD51 means: E980.4 AND N968.5 (overinclusive)
DRD52 means: E980.4 AND N965.0 (overinclusive)
DRD53 means: E980.4 AND (N969.7 OR N969.9) (under- and overinclusive)
DRD54 means: E980.4 AND NOT (N965.0 OR N968.5 OR N969.7 OR N969.9) (overinclusive, based on one N-code)

Denmark (Country = 3)

DRD20 means: DRD20 OR DRD21.
DRD22 is missing.
DRD23 is missing.
DRD27 means: DRD27 OR DRD28.

Finland (Country = 4)

For DRD23, DRD24, DRD35, DRD36, DRD44, DRD45, DRD53, and DRD54, the erroneous “N969.9” has been replaced by the correct “N969.6”.

For DRD21 through DRD24 and for DRD33 through DRD36, E840 is used in combination with the required N-codes (overinclusive).

For DRD38 and DRD41 through DRD45, E950 is used in combination with the required N-codes (overinclusive).

For DRD47, and DRD50 through DRD54, E970 is used in combination with the required N-codes (overinclusive).

DRD27 includes poisonings from alcohol and benzodiazepines (overinclusive).

DRD45 excludes N972 (digoxin e.g., underinclusive).

Germany (Country = 6)

DRD21 through DRD24 are missing.
DRD33 through DRD36 are missing.
DRD42 through DRD45 are missing.
DRD51 through DRD54 are missing.

Greece (Country = 7)

DRD27 means ICD-9 code E852.9 (underinclusive).
DRD34 means ICD-9 code E858.8 (overinclusive).
DRD38 means ICD-9 code E950.0 (overinclusive).
DRD41 means ICD-9 code E950.3 (overinclusive).
DRD42 means ICD-9 code E950.4 (overinclusive).
DRD43 means ICD-9 code E950.4 (overinclusive).
DRD47 means ICD-9 code E980.0 (overinclusive).
DRD50 means ICD-9 code E980.3 (overinclusive).
DRD52 means ICD-9 code E980.4 (overinclusive).

Ireland (Country = 8)

DRD1 means DRD1 through DRD55.

Luxembourg (Country = 10)

DRD2 means DRD2 through DRD11.
DRD12 through DRD19 are missing.
DRD20 means DRD20 through DRD25.
DRD37 means DRD33 through DRD37.
DRD39 means DRD38 through DRD46.
DRD48 means DRD47 through DRD55.

Portugal (Country = 12)

DRD2 through DRD19 are missing.
DRD21 through DRD28 are missing.
DRD30 through DRD55 are missing.

Spain (Country = 13)

DRD21 through DRD24 are missing.
DRD33 through DRD36 are missing.
DRD38 is missing.
DRD41 through DRD45 are missing.
DRD47 is missing.
DRD50 through DRD54 are missing.

United Kingdom, England and Wales (Country = 151)

'Year' means the year of registration of the death and not the year of occurrence.

The years 1987 through 1992 cannot be compared to the other years, because for the years 1987 through 1992:

DRD21 means DRD21 through DRD24 (only underlying cause, overinclusive).
DRD33 means DRD33 through DRD36 (only underlying cause, overinclusive).
DRD42 means DRD42 through DRD45 (only underlying cause, overinclusive).
DRD51 means DRD51 through DRD54 (only underlying cause, overinclusive).

United Kingdom, Northern Ireland (Country = 152)

'Year' means the year of registration of the death and not the year of occurrence.

Annex 6: Overview of data stored in the SPSS database SR_01.sav

CAUSE OF DEATH	Au	Dk*)	Fi	Fr	Ge	It	Lu	NL	Pt	Sp	Sw	UK
Overdose												
01. overdose opiates only	+	+	+	+	-	-	+	-	+	-	+	+
02. overdose poly incl. opiates	+	+	+	+	-	-	+	-	+	-	+	+
03. overdose poly excl. opiates	+	+	+	+	-	-	+	-	+	-	+	+
04. overdose medicines	+	+*)	+	+	-	-	+	-		-		+
05. overdose unsp./unknown	+	+		+	-	+	+	+		+		+
Other causes												
06. road/traffic accident	+		+		-		+				+	+
07. other/cause unknown	+		+		+		+				+	
08. suicide(violent/nonpoisoning e.g. hanging)	+		+				+				+	+
09. train accident	+						+					
10. domestic accident							+					
11. natural death							+					
12. drowning							+					+
13. disease	+						+				+	+
14. sport accident							+					
15. homicide	+		+				+				+	
16. carbon monoxide accident			+									
17. multiple injury/fracture/stabbing												+

+ = data are delivered according to this breakdown
- = data cannot be delivered according to this breakdown
*)For Denmark “overdose medicines” (04) includes “suicide” (08).

Explanations to the SPSS database SR_01.sav

Austria (Country = 1)

Cause of death no. 6 “road/traffic accident” includes homicides etc.

The cases refer to all cases of drug-related deaths of persons (Austrians as well as foreigners) who are resident in Austria. All deaths are covered confirmed to be directly drug related (like overdoses) by post mortem examination and, in addition, not directly drug related casualties (like accidents) of “known“ (= registered) drug users.

Denmark (Country = 3)

Cause of death no. 4 “overdose by psychoactive medicines” includes suicides (cause no. 4). Age breakdowns are not available. Gender breakdowns are not available in combination with breakdown by cause of death and are therefore not included in the database.

Finland (Country = 4)

The data from Finland cover the whole of Finland. The data refer to all cases which have been found positive on drugs of abuse when investigating post mortem samples. This also includes cases of suicide or accidental death that have been found positive on cannabis.

France (Country = 5)

The “opiates” include heroin as well as opiate-based substitute medicines like methadone, Subutex, Skenan, and Moscontin.

Germany (Country = 6)

The data refer to some cases from all Bundesländer. The following cases are included:

Overdoses
1. heroin only
2. overdose poly including heroin
3. cocaine only
4. overdose poly including cocaine
5. amphetamines only
6. overdose poly including amphetamines
7. ecstasy poly including others
8. medicines/ substitutes
9. narcotics and substitutes/ alcohol
10. other narcotics/ unknown drugs

Others
11. suicide
12. long-term disease
13. accident/ others

Italy (Country = 9)

The data refer to unspecified overdose cases.

The Netherlands (Country = 11)

The data refer to unspecified overdose cases for the city of Amsterdam.

Portugal (Country = 12)

The data from Portugal are delivered by only one of the three Portuguese institutes and therefore only refer to Coimbra, Central Region.

The data contain no distinction between overdose and other causes.

Spain (Country = 13)

The data refer to unspecified overdose cases for the six major cities Barcelona, Bilbao, Madrid, Sevilla, Valencia, and Zaragoza, which cover 39% of the total Spanish population.

United Kingdom (Country = 15)

For the years 1989 to 1993 the data are based on the Dead Addicts Database (DAD). The DAD covers Notified Addicts in the United Kingdom but has no comprehensive coverage.

For 1997 to 1998 the data are based on the National Programme for Substance Abuse Deaths (NP-SAD). The NP-SAD covers the general population of England and Wales but has no comprehensive coverage.

The data for 1997 only refer to the six months from July to December.

Annex 7: Number of drug-related deaths broken down in 8 clusters computed on GMR data for the most recent year

Table 1: Belgium 1994

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	24	65	17	16	*58%* 122
Medicines[*)]	1	9	71	6	*42%* 87
Total	*12%* 25	*35%* 74	*42%* 88	*11%* 22	*100%* 209

[*)]For explanation see Table 5 in main text; A = 89, B = 122, C = 209

Table 2: France 1997

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	178	9	13	4	*48%* 204
Medicines[*)]	3	16	172	30	*52%* 221
Total	*43%* 181	*6%* 25	*44%* 185	*8%* 34	*100%* 425

[*)]For explanation see Table 5 in main text; A = 187, B = 204, C = 425

Table 3: the Netherlands 1995

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	7	31	26	6	*59%* 70
Medicines[*)]	0	0	47	1	*41%* 48
Total	*6%* 7	*26%* 31	*62%*73	*6%* 7	*100%* 118

[*)]For explanation see Table 5 in main text; A = 38, B = 70, C = 118

Table 4: Sweden 1996

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	124	6	18	21	*59%* 169
Medicines[*)]	2	5	93	48	*41%* 148
Total	*40%* 126	*3%* 11	*35%*111	*22%* 69	*100%* 317

[*)]For explanation see Table 5 in main text; A = 130, B = 169, C = 317

Table 5: United Kingdom/England and Wales 1998

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	704	461	93	131	*92%* 1389
Medicines[*)]	9	42	46	28	*8%* 125
Total	*47%* 713	*33%* 503	*9%*139	*11%* 159	*100%* 1514

[*)]For explanation see Table 5 in main text; A = 1165, B = 1389, C = 1514

Table 6: Possible impact of deviations from the DRD-Standard on different selections

Country	Selections				
	A	B-A	C-B	B	C
Austria	overinclusive in theory, minor deviation in practice		no impact	overinclusive in theory, minor deviation in practice	
Finland	overinclusive	overinclusive	overinclusive	overinclusive	overinclusive
UK/England & Wales 1987-92	overinclusive	overinclusive	no impact	overinclusive	overinclusive
Germany	underinclusive in theory, minor deviation in practice		no impact	underinclusive in theory, minor deviation in practice	
Spain	underinclusive	underinclusive	underinclusive	underinclusive	underinclusive
Denmark	unknown	no impact	overinclusive	unknown	unknown
Greece	overinclusive	overinclusive	unknown	overinclusive	unknown
Ireland	not computable	not computable	not computable	not computable	not computable
Luxembourg	not computable	not computable	not computable	not computable	not computable

Table 7: Austria 1998 (possible overinclusion)

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	50	62	2	4	*93%* 118
Medicines[*)]	0	0	7	2	*7%* 9
Total	*39%* 50	*49%* 62	*7%* 9	*5%* 6	*100%* 127

[*)]For explanation see Table 5 in main text; A = 112, B = 118, C = 127

Table 8: Finland 1995 (possible overinclusion)

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	14	9	9	4	*14%* 36
Medicines[*)]	5	82	107	21	*86%* 215
Total	*8%* 19	*36%* 91	*46%* 116	*10%* 25	*100%* 251

[*)]For explanation see Table 5 in main text; A = 23, B = 36, C = 251

Table 9: United Kingdom/England & Wales 1992 (possible overinclusion)

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	315	251	192	149	*79%* 907
Medicines[*)]	10	58	102	72	*21%* 242
Total	*28%* 325	*27%* 309	*26%* 294	*19%* 221	*100%* 1149

[*)]For explanation see Table 5 in main text; A = 566, B = 907, C = 1149

Table 10: Germany 1997 (theoretical underinclusion; practical consequence negligible)

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	1012	13	31	32	*81%* 1088
Medicines[*)]	15	10	212	23	*19%* 260
Total	*76%* 1027	*2%* 23	*18%* 243	*4%* 55	*100%* 1348

[*)]For explanation see Table 5 in main text; A = 1025, B = 1088, C = 1348

Table 11: Spain 1996 (possible underinclusion)

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	55	336	0	0	*93%* 391
Medicines[*)]	0	15	13	2	*7%* 30
Total	*13%* 55	*83%* 351	*3%* 13	*0.5%* 2	*100%* 421

[*)]For explanation see Table 5 in main text; A = 391, B = 391, C = 421

Table 12: Denmark 1993 (possible unknown deviation)

Substance	Manner of death				
		Poisoning			
	Unspecified[*)]	Accidental	Intentional	Undetermined	Total
Drugs of abuse[*)]	4	123	21	39	*85%* 187
Medicines[*)]	0	6	54	9	*15%* 69
Total	*54%* 4	*19%* 129	*16%* 75	*11%* 48	*100%* 256

[*)]For explanation see Table 5 in main text; A = 127, B = 187, C = 256

Table 13: Greece 1997 (possible unknown deviation)

Substance	Manner of death				Total
	Unspecified[*)]	Poisoning			
		Accidental	Intentional	Undetermined	
Drugs of abuse[*)]	0	254	0	0	*100%* 254
Medicines[*)]	0	0	0	0	*0%* 0
Total	*0%* 0	*100%* 254	*0%* 0	*0%* 0	*100%* 254

[*)]For explanation see Table 5 in main text; A = 254, B = 254, C = 254

Annex 8: Minutes of the Annual Expert Meeting on Drug-Related Deaths 23/24 November 2000, EMCDDA, Lisbon

Participants: Austria: Martin Busch and Rainer Eigner, Denmark: Lene Haastrup and Henrik Sælan, Finland: Ari Virtanen, France: Hélène Martineau, Greece: Chara Spiliopoulou, Ireland: Mary O'Brien and Mary Heanue, Italy: Teodora Macchia, The Netherlands/co-ordination: Margriet van Laar and Guus Cruts, Portugal: Maria Moreira, Estela Pinho Marques, and Victor Garcia, Spain: Teresa Brugal, Sweden: Anna Fugelstad, United Kingdom: John Corkery, Eurostat: Mary Heanue, EMCDDA: Richard Hartnoll, Julian Vicente, and Norbert Frost.

Excused: Belgium: Ann DeSmet, Germany: Axel Heinemann, Luxembourg: Alain Origer, Sweden/Eurostat: Lars Age Johansson.

From Ann DeSmet and Lars Age Johansson written comments were received and presented to the meeting.

For more detailed information see the List of participants in the annex.

Presentations and discussions

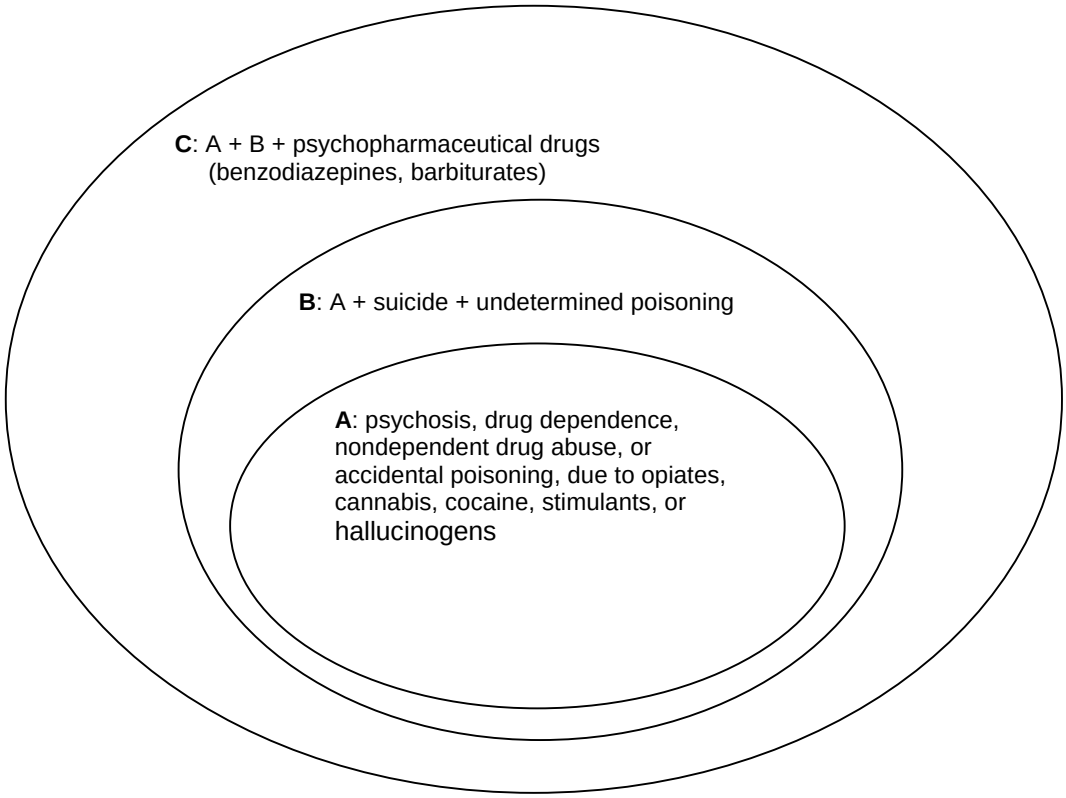
In chronological order, the following issues were presented and discussed:

- Julian Vicente: The drug-related deaths indicator from the perspective of the EMCDDA.
- Margriet van Laar: From the final draft report "Co-ordination of the implementation of the EMCDDA standard guidelines on the drug-related deaths in the EU Member States, and the collection and analysis of information on drug-related deaths": field trial, analyses, results, and recommendations.
- Each national expert: Reaction to the report especially with regard to the results from the expert's own country.
- Mary Heanue: Eurostat Task Force on Causes of Death.
- Norbert Frost: Technical possibilities to give access to databases and restrictions given by privacy regulations.
- Guus Cruts: Forthcoming ICD-10 standard as stipulated in "The DRD-Standard, Version 2.0; Draft version".
- Martin Busch and Rainer Eigner: Special topic 1: "Drug Related Deaths in Austria 1996 to 1997; Case Finding Study Special Register and General Mortality Register".
- John Corkery: Methadone deaths in the United Kingdom.
- Teresa Brugal: Mortality related to opiate consumption; Analysis of tendencies and associated factors in a cohort of herion users of Barcelona".
- Continuation of the discussion of ICD-10 codes.

Definition of drug-related death

Margriet van Laar reviewed that, with regard to General Mortality Registers, three definitions of "drug-related death" have been analysed during the ongoing project (CT.99.RTX.04)[2].

These three definitions are presented in the draft report that was distributed among the experts as background documentation for the meeting. The three definitions are: the restrictive selection A, the broad selection B, and the all-inclusive selection C, as shown in the figure below.



As a result of the analyses carried out with data collected by the DRD field trial, selection B was recommended by the project co-ordinator and the EMCDDA. Although some experts pointed out personal preferences for different selections, all participants agreed that selection B was to be chosen as the most appropriate definition of drug-related death for the purposes of the current EMCDDA-project. A consensus was herewith reached that "drug-related death" be defined as deaths due to drugs of abuse and caused by "drug psychosis", "drug dependence", "nondependent drug abuse", "accidental poisoning", "intentional poisoning", or "poisoning undetermined intent".

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[2] "Co-ordination of the implementation of the EMCDDA Standard Guidelines on the Drug-Related Deaths indicator in the EU Member States, and the collection and analysis of information on drug-related deaths"

Selection B: for ICD-9, the ninth version of ICD, the proposed European Union standard selects the following codes as underlying cause of death.

Category of drug-related death	Selected ICD-9 code(s)
Drug psychoses	292
Drug dependence	304.0, 304.2-9
Nondependent drug abuse	305.2-3, 305.5-7, 305.9
Accidental drug poisoning	E850.0, E850.8[1)], E854.1-2, E855.2, and E858.8[1)]
Suicide and self-inflicted drug poisoning	E950.0[1)] , E950.4[1)]
Drug poisoning undetermined intent	E980.0[1)], E980.4[1)]

[1)]In combination with N-codes (N965.0, and/or N968.5, and/or N969.6, and/or N969.7). For the full technical explanation about the combination with N-codes see the DRD-Standard, Version 1.0.

For the Special Registers (forensic or police registers), selection D (Overdoses by drugs of abuse) should be considered as the recommended standard to estimate the number of drug-related deaths. If available in a country, this selection will count as a backup estimate of selection B from the General Mortality Registers.

Editorial modifications of the report

Recommendations were put forward to improve the report as follows:

- Highlight in the "Executive Summary" and in the "Introduction" that the current project only standardises the extraction of codes and not yet the forensic and toxicological inquiries and not yet the classification of cases. Be more clear about the concept of "drug-related death" that is taken issue with.
- Highlight in Figure 3 (page 29) that the figures for Denmark are overinclusive or use corrected figures. (Lene Haastrup and Henrik Sælan will submit an explanatory text or corrected figures.)
- Exclude the misleading breach of trend in Figure 34 (page 70) for England and Wales and highlight that the data refer to England and Wales and not the United Kingdom as a whole.
- In Annex 5, part 2 (page 99), the + an - signs must be corrected for Portugal.
- In Annex 6 (page 104), the + an - signs must be corrected for Portugal and Sweden.

ICD-10 in co-operation with Eurostat and the WHO

The change to ICD-10 took place, or is expected to take place, as follows: Austria in 2001 or 2002, Denmark in 1994, France in 1998, Greece in 2002, Ireland in 2002, the Netherlands in 1996, Portugal in 2001, Spain in 1999, Sweden in 1997, the United Kingdom in 2000 for Scotland, and in 2001 for England and Wales as well as Northern Ireland.

Guus Cruts presented a draft version of the DRD-Standard for collecting ICD-10 codes. To select drug-related deaths by ICD-10 codes, it is required that X-codes and Y-codes can be selected in combination with substance specific T-codes. Lars Age Johansson has reported that although this is not obliged, it is indeed possible and even recommended to add specific T-codes. As is already done in the United Kingdom, John Corkery advised to establish

specific databases for drug-related deaths in case a General Mortality Register does not offer enough facilities.

In case more than one specific T-code is registered, it may not be clear which specific substance was the major cause of death. For such cases, a general hierarchy among substances may be applied, like for example the hierarchy used by Scandinavian forensics.

A problem is that in some countries drug-related deaths may become unretrievable among broad ICD-10 codes like W-codes ("Other external causes of accidental injury"), X49 ("Accidental poisoning by and exposure to other and unspecified chemicals and noxious substances"), possibly in combination with T50.9 ("Poisoning by other and unspecified drugs, medicaments and biological substances"). Denmark, for example, follows the WHO-recommendation to code ecstasy to T40.6 ("Poisoning by other and unspecified narcotics").

Mary Heanue announced to the meeting that Eurostat has planned to advise its members that deaths due to combinations of substances be coded to the unspecified ICD-10 code T50.9. However, as explained above, to distinguish drugs of abuse from other substances, it is required that specific T-codes are also registered. Mary Heanue will inform Eurostat that it is in the interest of the EMCDDA project on drug-related deaths that specific T-codes be registered. In case the substances are not clear, it is preferred that in stead of T50.9 the code T40.9 be applied ("Poisoning by other and unspecified psychodysleptics"). Eurostat, the WHO Mortality Reference Group, and the EMCDDA will meet to discuss these issues and make common proposals to the WHO.

Terminology for Special Registers

The spreadsheet format for Special Registers is given in Table 4 of the Draft version of The DRD-Standard, Version 2. Anna Fugelstad, Chara Spiliopoulou, and other national experts noticed that in this spreadsheet format the classification of causes of death deviates from the prevailing forensic classification system. The terminology for the causes of death will have to be harmonised with prevailing forensic terminology.

The current forensic classification system as memorised at the meeting is given in the table below.

Forensic classifiction system of causes of death

Natural/internal (B1)	Violent/external	
	homicide	poisoning (A)
		non-poisoning (B4)
	suicide	poisoning (A)
		non-poisoning (B3)
	accidental	poisoning (A)
		non-poisoning (B2)
	undetermined	poisoning (A)
		non-poisoning (B5)

(A), (B1), (B2), (B3), and (B4) are classifications according to the draft EMCDDA DRD-Standard, part II for Special Registers.

The forensic classification system implies the following terminology for the new version of Table 4 of the Draft version of The DRD-Standard:
"A. Overdose" should read: "Poisoning (homicide, suicide, accidental, or undetermined)".
"B. Other causes" should read: "Natural and non-poisoning causes".
"B1. Disease" should read: "Natural/internal".
"B2. Accidents" should read: "Non-poisoning accident", for example traffic accident.
"B3. Violent suicide" should read: "Non-poisoning suicide".
"B4. Homicide" should read: "Non-poisoning homicide".
"B5. Other/unknown" shluld read "Non-poisoning undetermined intent".

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