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# LETTER TO THE EDITOR

## DIFFICULTIES IN RECORDING MORTALITY RESULTING FROM DRUG ABUSE

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### SUMMARY

It is considered, according to statements from different sources, that data on the number of deaths in the population of a certain country or region are accurate and correct, but determining causes of death is, for different reasons, often incorrect. There is, therefore, a justified doubt that there are more inaccurately registered drug abuse-related deaths in state registries. Hence, this paper tends to show the most frequent difficulties encountered when recording mortality resulting from drug abuse.

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*Key words:* mortality, drug abuse, death certificates, terminology, classification, toxicology

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### INTRODUCTION

Data on mortality resulting from drug abuse and on mortality among drug addicts are used for different purposes. They are a valuable indicator of dimensions of the drug abuse problem in a country or a region, especially when interpreted along with other indicators (1, 2). Studies have shown that, similarly to other mortality causes (3–5), certification of drug abuse deaths presents a significant problem in the world, whether they are overdose related deaths or other deaths resulting from drugs misuse (6, 7). The difference in the number of the deceased provided by various information sources, according to some studies, constitutes an information support to the hypothesis on inaccuracy of this mortality registries (8).

### DISCUSSION

#### Death Certificates and Completion Thereof

Death certificates represent an important source of information in mortality statistics worldwide. Nevertheless, accuracy and comprehensiveness of data received when surveying death certificates have been questioned all over the world (9–12). According to literature sources, data on the number of deaths in the population of a certain country or region are accurate and correct, but the determination of death causes is often incorrect (10, 13, 14). This is also confirmed by the study carried out in Croatia, in which the search of various data sources on persons who

died of overdose showed numbers which were varying among individual data sources. The total number of deaths registered by state exceeded the total number derived from the individual data sources (15).

The standard death certificate in Europe follows the recommendations of the World Health Organization (WHO), which recommends that the underlying cause of death should be used for statistical analysis of mortality (10, 13). The underlying cause of death should be as etiologically specific as possible. Non-specific conditions (e.g. sepsis, haemorrhage, respiratory failure, renal failure) are not acceptable as an underlying cause of death (10, 16). Despite that, listing “respiratory arrest or cardio-respiratory arrest” as the underlying cause of death is one of the most common mistakes in death certificates (17). This is also confirmed by the study carried out in Croatia mentioned above (15).

Another potential problem when completing a death certificate is the fact that the process of registering data itself is determined by the medical examiner’s evaluation and depends on his/her level of education and on the process of registering the fatal event. To decide which data are necessary to include is a demanding task (11). Sometimes, it is not possible to reliably determine events leading to death, and despite the adequate knowledge and experience, it may happen that a medical examiner, when deciding on the cause of death, does not have sufficient information at his/her disposal. This is confirmed by literature data, whereas some researches show that in more than 50% of the cases the cause of death obtained in this way does not correspond to the real cause of death determined by a subsequent autopsy (18).

It is also necessary to mention that death certificates are not unified and that they differ from a country to country in certain specific characteristics. For example, the certificates used in Croatia until recently differed from those recommended by WHO. In the report on the cause of death there were no boxes envisaged for describing violent deaths (19), which could potentially lead to inaccurate recording of certain fatal events, including drug-related deaths.

One of the following possible reasons for the inaccurate/incomplete filling in of death certificates is that upon patient’s death the family usually wants the death certificate to be issued without delay so as to organise the funeral as soon as possible, while the results of toxicological and other analyses have not been finished yet (3, 20). Such death certificates are therefore subsequently updated by all means.

## Definition of Drug-related Mortality

Problems pertaining to the definition of drug-related deaths were spotted several decades ago. Some information sources include only deaths from overdose, whereas others include drug-related deaths in a wider context (17). So, for example, in some countries a traffic accident in which a person with skin tracks or with presence of drugs in the blood took part is registered as a drug-related death, while in some other countries a person, under the influence of opioids, falling under a train is registered as a traffic accident (21). Also, people addicted to psychoactive drugs often use a wide range of substances, in particular huge amounts of alcohol, which complicates the attribution of death to certain substances, and this differs significantly across countries (21). The consequence of the existence of differences in defining drug-related mortality among individual countries in the world lies

in the fact that some countries report lower or higher mortality rates than the actual ones (17). Hence, it was vital to define the epidemiological indicator of this mortality, which was shown by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), in cooperation with national experts, through two components: deaths that are directly caused by the pharmacological action of one or several substances (drug-induced deaths) and deaths that are indirectly caused by drug use, often with other concurrent factors (e.g. accidents) (17).

Appropriate implementation of these components requires the existence of high-quality information sources: general mortality registries and/or special mortality registries.

## Correlation between the Use of General Terminology and/or Classification

It has been noticed that the correlation between the use of general terminology and/or classification is a major problem in the international comparison of drug-related deaths (22).

An international study conducted in nine European cities may serve as an example (22). In this study “overdoses” are registered as “mental disorders”, “injuries and poisonings”, “ill-defined conditions” or as “other causes”. Such recording is understandable since at that time the Ninth Revision of the International Classification of Diseases (ICD-9) was used, which did not facilitate more accurate recording of fatal events due to the lack of specific codes (23).

An additional example showing the complexity of this problem is the one pointing out discrepancies even within individual countries, i.e. among institutions dealing with the same issues. So, in the study conducted by Pollock et al., it was established that 75% more cocaine-related deaths were reported to the National Institute of Drug Abuse (NIDA) instead of submitting the report to the National Center for Health Statistics (NCHC) in the United States. This discrepancy was caused by the use of unspecific codes in the Ninth Revision of the International Classification of Diseases (24).

The use of the Tenth Revision of the International Classification of Diseases and Related Health Problems improved registering of these fatal events (25), which enabled recording and differentiating of these deaths, whether for people registered as drug addicts (within the category Mental and behavioural disorders F00–F99), with a possibility to use the fourth character in coding for defining drugs responsible for overdose (e.g. F11.0 Mental and behavioural disorders due to use of opioids – acute intoxication), or for those who are not registered drug addicts. For people who are not registered within the category Mental and behavioural disorders F00–F99, the Tenth Revision makes it possible for these deaths to be registered in the categories: T40 Poisoning by narcotics and psychodysleptics (hallucinogens), X40–X49 Accidental poisoning by and exposure to noxious substances, X60–X69 Intentional self-harm, and Y10–Y19 Event of undetermined intent.

Despite improvements achieved by the use of the Tenth Revision, Lahti et al. argue that, in order to have a better specification of causes related to certain drugs, it will be necessary to introduce changes in the next ICD revision. According to their opinion, each drug should have a code of its own comparable to ATC (Anatomical Therapeutic Chemical Classification Index) (26). In addition, for classification and description of trends related to drug abuse, equal and specific definitions for drug-related deaths would be needed (26).

## Toxicological Analysis and Forensic Examination

One more problem related to registration of deaths from overdose exists in countries worldwide, and it is caused by the fact that toxicological analyses and forensic examinations are not always undertaken to assess the part that drug abuse plays in causing the death. As a consequence, Preti et al. found that drug-related deaths are often under-reported in national registers (27). However, countries have different guidelines when such fatalities become an object of toxicological and forensic examinations. In the United States, only 20% out of the total number of all deaths are subject to analyses by medical professionals or medical examiners, and there are significant differences among individual states (28). In certain countries, even when toxicological and forensic analysis has been carried out, the results are not used when registering death. Countries differ in their endeavours and traditions of using ICD, acts and other pieces of subordinate legislation which refer to registering fatalities, and to the scope of information being transferred from death certificates to national registries (29). Certain differences exist even within individual countries. So, for example, in the United States, the examination practice varies widely by level of jurisdiction (state, county, municipality, city or town). In some jurisdictions, examination procedures are carried out by licensed physicians, expert forensic pathologists, whereas in others it is not necessary to have a medical degree for this job (28).

Regardless of certain limitations, most researchers agree that toxicological analysis and forensic examination represent the gold standard for the confirmation of pre-mortem diagnosis, so as to better identify causes of death resulting from overdose and enables improvement of preventive strategies (30, 31). The results of a study conducted in Norway support this opinion (31). The study shows that the number of overdose deaths, entered in the police registry, is considerably higher than the one confirmed by toxicological analysis. This means that a considerable number of deaths are counted as overdose deaths although there was no evidence of the use of psychoactive drugs in these deaths (31).

## CONCLUSION

Difficulties in recording mortality resulting from drug abuse are most often a consequence of different methodologies, discrepancies in the coding of different conditions and diseases between the Ninth and Tenth Revision of the International Classification of Diseases, definition of death causes due to the use of different protocols, education of medical examiners, etc. These difficulties require to undertake measures as follows: standardisation of definitions, standardisation of procedures when recording fatalities, the existence of high-quality information sources, execution of toxicological analyses and forensic examinations and continuous education of physicians, in order to upgrade the data and make them comparable worldwide.

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