

Drowning-related deaths in an enlarged European Union

Maladies chroniques
et traumatismes

OBJECTIVE

The objective of this monograph is to provide producers and users of death statistics with a practical tool to help study deaths related to **drowning**.

METHODS

Mortality data produced by health authorities of 33 European countries¹ and compiled yearly by Eurostat² were used. Depending on their availability, data were used to describe time trends, geographical distributions and demographical risks.

By reviewing the literature, the international forum for mortality specialists³, the revision and update process of the International Classification of Diseases (ICD) and the answers of a questionnaire filled in by death statistics producers of 36 European countries⁴ in the framework of the ANAMORT project⁵, it has been possible to:

- describe the limits of the observed differences;
- elaborate recommendations for a better use of available data;
- elaborate recommendations for a better production of future data.

Definition of deaths related to drowning

Death from accidental drowning was considered as any death reported to Eurostat with an underlying cause of death coded W65 to W74 (table 1) in the 10th revision of ICD (ICD-10).

Deaths due to drowning whatever the intent were processed including in addition to deaths from accidental drowning, suicide by drowning (X71), homicide by drowning (X92) and drowning from undetermined intent (Y21).

Definition of indicators used

The number of deaths for each group of underlying causes of death (UCoD) was the one transmitted by the countries' national authorities to Eurostat for a given year. Aggregation of the number of deaths for the European Union (EU) was made by Eurostat, using last available data for a given year. Crude death rate (CDR) was obtained by dividing the number of deaths by the last estimate of the population available in Eurostat (for a given age group if age specific crude death rate was computed). Age-standardised death rate (SDR) was computed by direct standardisation, using the 1976 European population. The potential years of life lost before 75 years-old (PYLL75) due to a given cause were calculated for each age group by multiplying the number of deaths related to this cause by the difference between age 75 and the mean age at death in each age group. Potential years of life lost were the sum of the products obtained for each age group. Proportions of PYLL75 were calculated by dividing the PYLL75 due to a given cause by the total amount of PYLL75 due to all causes of death. Due to partial availability of detailed data, indicators were produced for variable groups of countries, estimation of a given indicator was calculated as an average of this indicator at country level weighed by the proportion of its population among the group.

SITUATION REGARDING DEATHS FROM DROWNING IN EUROPE

The number of deaths from accidental drowning was available in 26 European countries⁶. In these countries 6,156 deaths from accidental drowning were observed in 2005, which represented 3.4% of deaths due to external causes. SDR for accidental drowning was 1.8 for 100,000 inhabitants in 2005, among these 26 countries. Variations between 0.2 and 11.2/100,000/year according to the countries were observed in Europe (Figure 1).

1. Included the 25 Member States of the European Union (EU) before 2007, Albania, Bulgaria, Croatia, Iceland, Macedonia (the former Yugoslav Republic of), Norway, Romania and Switzerland. EU15 comprised the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom. EU25 comprised EU15 and the following 10 countries: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic, and Slovenia.

2. <http://epp.eurostat.ec.europa.eu>.

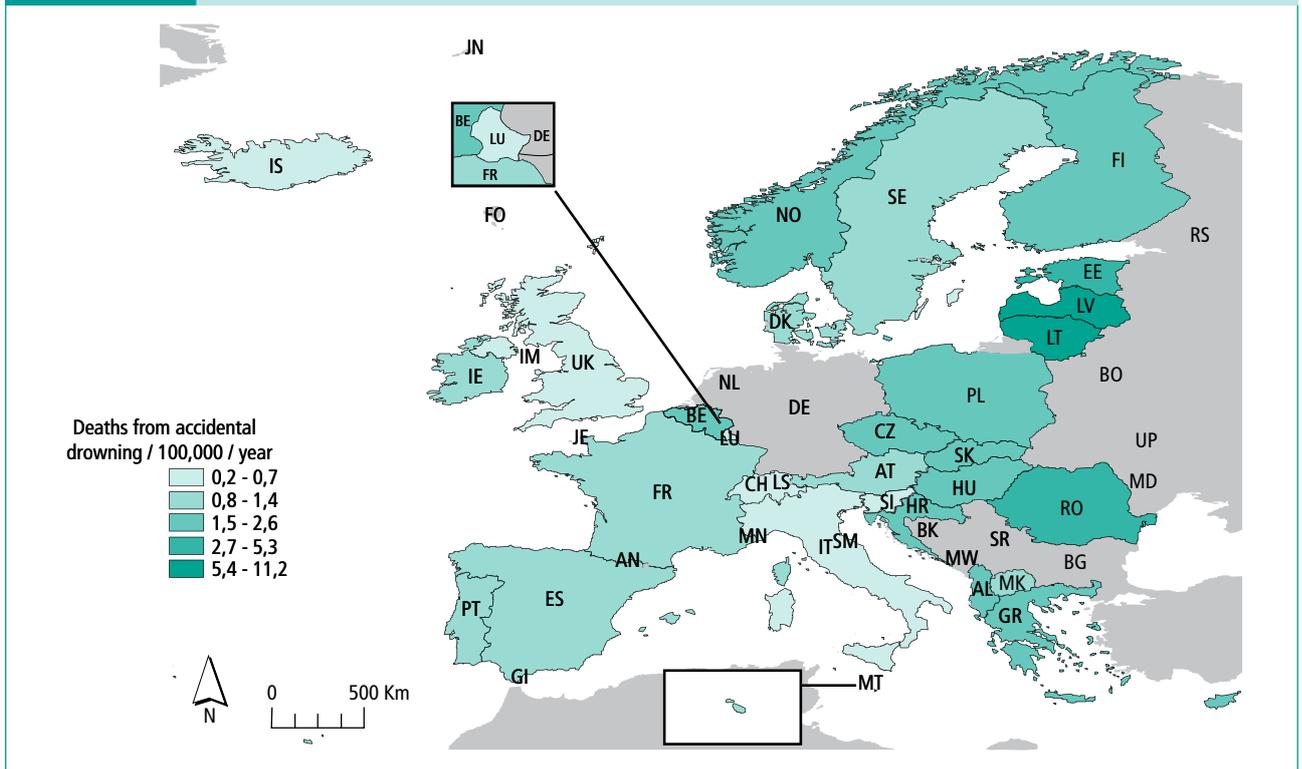
3. www.nordclass.uu.se/index_e.htm.

4. 33 above mentioned countries, Bosnia Herzegovina, Serbia and Turkey.

5. www.invs.sante.fr/surveillance/anamort.

6. Albania*; Austria; Croatia; Cyprus; Czech Republic; Estonia; Finland*; France; Greece; Hungary; Iceland*; Ireland; Latvia; Lithuania; Macedonia (the former Yugoslav Republic of); Malta; Norway*; Poland; Portugal*; Romania; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; United Kingdom * (* data for 2004).

FIGURE 1 AGE-STANDARDISED MORTALITY RATE BY ACCIDENTAL DROWNING IN EUROPE IN 2005*



* Owing to missing data for 2005, the map included 2004 data for Albania, Finland, Iceland, Norway, Portugal, United Kingdom, 2003 data for Italy, 2001 data for Denmark, 1999 data for Luxembourg and 1998 data for Belgium.

The highest SDRs by accidental drowning in 2005 were observed in the eastern European countries in Lithuania, Latvia, Romania and Estonia.

The age specific CDRs by accidental drowning for men were higher than for women (Figure 2). Regardless of age, the risk of death by accidental drowning was 3.8 times higher among men (average for all selected countries in 2005). Victims were observed among the elderly (65 years-old and more) in 25.0% of the cases. Even though figures were low, the risk of death by drowning increased with age for both men and women (Figure 2).

The SDR has remained stable between 2.0 and 1.6/100,000/year over the years between 1994 and 2005 (Figure 3). In certain countries, sharp increases in SDR by accidental drowning could be observed (France 2000, Romania 2005, Greece 2002, Portugal 2002). These sharp increases could be associated with the implementation of a rule regarding codification of drowning with no specification of intent as accidental.

FIGURE 2

CRUDE RATES OF MORTALITY BY ACCIDENTAL DROWNING BY GENDER AND AGE GROUP IN 26 EUROPEAN COUNTRIES IN 2005

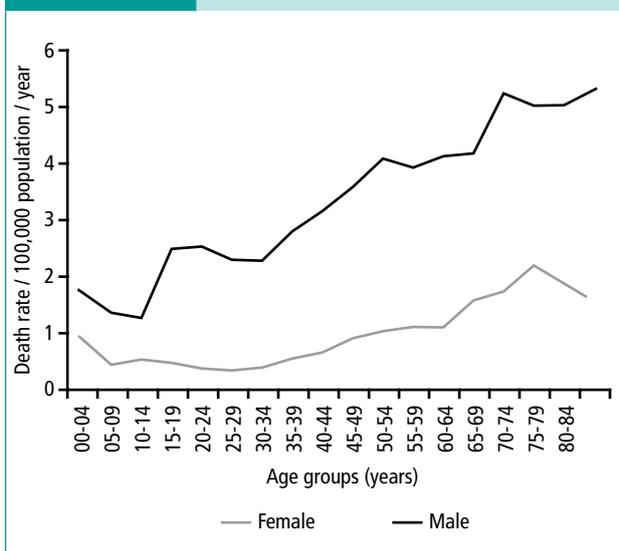
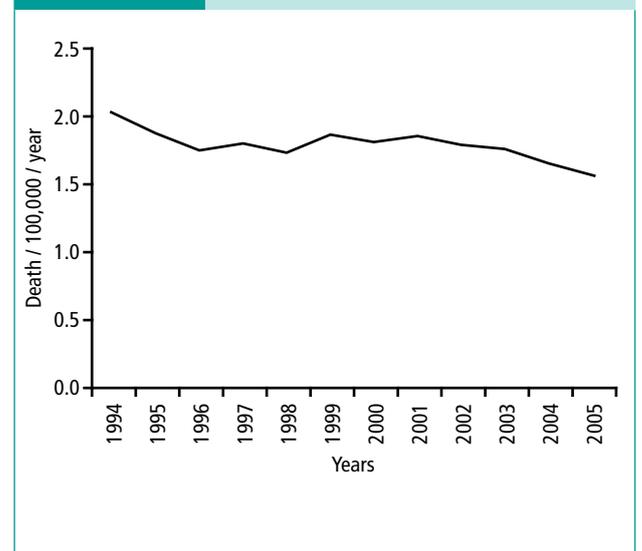


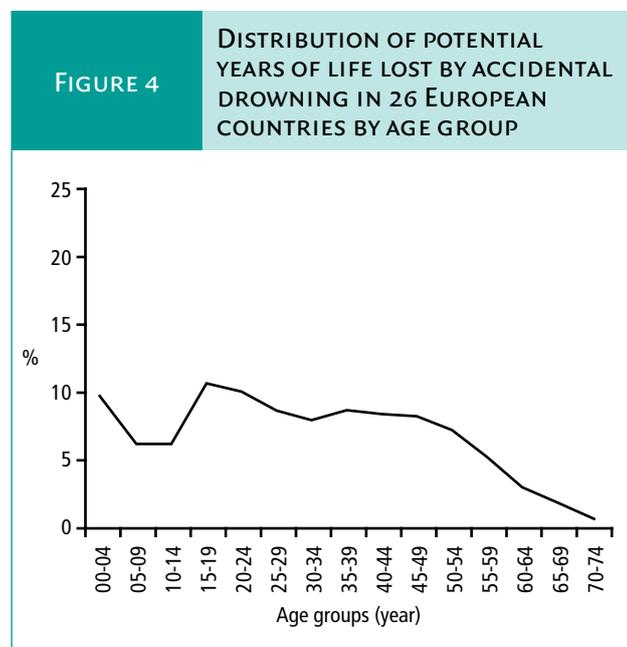
FIGURE 3

TRENDS IN AGE STANDARDISED DEATHS BY ACCIDENTAL DROWNING IN 26 EUROPEAN COUNTRIES



In these 26 countries, it was possible to obtain statistics on "all drownings" (whatever the intent was, see table 1). In 2005, non accidental drownings represented 30 to 96% of all drownings (74% on average for all these countries).

Deaths from accidental drowning were responsible for 5% of the PYLL75 by external causes of death. The impact decreased with age and was maximal among children under 5 years of age, and people between 15 and 24 years-old (Figure 4).



INTERPRETATIONS AND LIMITS OF OBSERVED DIFFERENCES IN DEATHS BY DROWNING IN EUROPE

It was not possible to study the deaths from drowning in countries which do not transmit their data in ICD codes to Eurostat, even though such analysis could be performed at national level.

Misclassifications of deaths from accidental drowning due to inappropriate selection of underlying causes of death were described by 7 out of the 36 countries questioned during the Anamort project. Combined effects of these misclassifications were considered as leading to over-estimation of the magnitude of the deaths due to accidental drowning in most of these countries, as many suicides could be coded as accidental drowning. Misclassifications have also been reported for deaths related to mental disorders, alcohol abuse, drug poisoning and digestive system issues (e.g. swimming after lunch).

Changes in codification rules between 9th and 10th revision of the ICD classification for selecting UCoD might also explain sharp increases in death rates for accidental drowning observed in some countries. A drowning without information on intent would likely be coded as accidental.

ANALYTICAL RECOMMENDATIONS TO IMPROVE COMPARABILITY OF TIME TRENDS (FOR STATISTICS USERS)

Transmission of national data to Eurostat should be done in ICD code in order to give the opportunity to ease research on specific topics not included in the Eurostat short list of CoD.

The introduction of automated coding system might help to eliminate the biases due to different applications of coding rules by coders. It could also help to take into account homogeneously and rapidly, the regular updates of the ICD classification. Nevertheless, one should take care not to attribute non-accidental drowning cases into the accidental drowning category, as this would strongly overestimate the figures.

Indicators describing drowning-related deaths, whatever the intent was, could be interesting to follow as prevention measures on accidental drowning based on safety devices should have an impact on intentional drowning also (homicide or suicide and undetermined intent).

RECOMMENDATIONS TO IMPROVE COMPARABILITY OF FUTURE DATA COLLECTED (FOR DATA PRODUCERS)

There is a need to stress on vocabulary clarifications to avoid misinterpretation regarding drowning cases: "Undetermined" should always be associated to the intent (e.g. found drowned with undetermined intent, the cause is known=drowning) and never to the cause of death (e.g. found dead without any information on the cause of death even for natural death) nor to the mechanism or place of a drowning (after falling in a swimming pool).

Production of statistics on "possible accidental drowning" may be a solution to avoid this problem. It could be obtained by grouping undetermined intent drowning (Y21) to the group of accidental drowning (W65-W74). This analysis was possible to perform at international level only for countries which transmitted information on causes of death at individual level with ICD codes.

Additional and more detailed recommendations may be found on www.invs.sante.fr/surveillance/anamort.

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TABLE 1		CORRESPONDENCE TABLE DEFINING THE GROUP OF DROWNING AND ACCIDENTAL DROWNING ACCORDING TO REVISION NUMBER OF INTERNATIONAL CLASSIFICATION OF DISEASES (ICD)		
		ICD-10	Label	ICD-9 ICD-8
All drowning	Accidental drowning	W65	Drowning and submersion while in bath-tub	E910
		W66	Drowning and submersion following fall into bath-tub	
		W67	Drowning and submersion while in swimming-pool	
		W68	Drowning and submersion following fall into swimming-pool	
		W69	Drowning and submersion while in natural water	
		W70	Drowning and submersion following fall into natural water	
		W73	Other specified drowning and submersion	
	W74	Unspecified drowning and submersion		
		X71	Intentional self-harm by drowning and submersion	E954
		X92	Assault by drowning and submersion	E964
	Y21	Drowning and submersion, undetermined intent	E984	

NB: Inclusion of E830-E832 and E843 in ICD8 and 9 and V90-V92 in ICD10 (= submersion from/in boat) could have also been added for a more complete description of drowning.

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The Anamort project team:

Belanger F, Ung A-B, Falzon A, Institut de veille sanitaire, Unité Traumatismes - DMCT, France

Members of the Anamort Project Steering Committee:

Bene M, Hungarian Central Statistical Office, Population, Health and Welfare Statistics Department, Hungary. Bruzzone S, ISTAT - National Institute of Statistics - Division for Statistics and Surveys on Social Institutions - Health and Care Section, Italy. Denissov G, The statistical office of Estonia, Estonia. England K, Department of Health Information, Malta. Frimodt-Møller B, National Institute of Public Health, Denmark. Gjertsen F, Norwegian Institute of Public Health, Division of Epidemiology, Norway. Jouglé E, Inserm-CépiDC, SC8 Inserm, France. Nectoux M, PSYTEL, France. Steiner M, Kuratorium für Verkehrssicherheit (KfV) Bereich Heim, Freizeit & Sport, Austria. Thélot B, InVS-Institut de veille sanitaire, France.

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