Estimating the annual number of deaths among problem opioid users in Europe ([1])

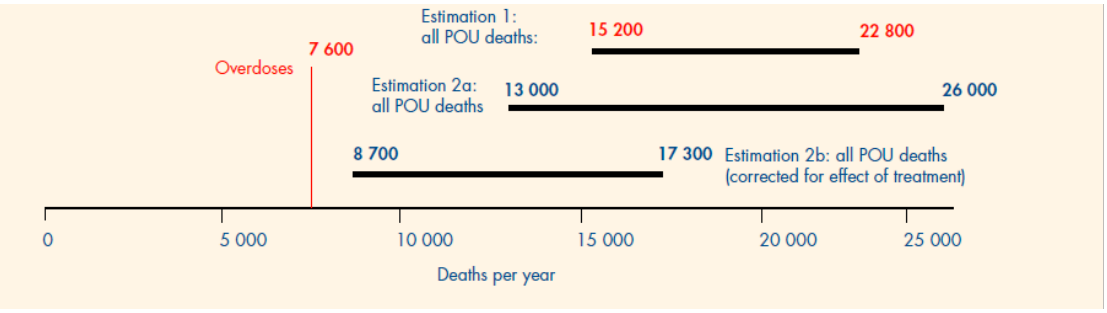
Findings from cohort studies, in combination with figures on overdose fatalities and estimates of the total number of opioid users in Europe, can be used in a number of ways to make crude estimates of the overall number of European deaths among problem opioid users.

Methods and results

Two different estimations of the total number of deaths among problem opioid users in Europe are described below.

Estimation 1
Assuming, from the results of many mortality cohort studies (for examples see Table 1 in the Selected issue), that overdose deaths account for between one-third and half of all deaths among problem drug users, the estimated 7 600 overdose deaths in Europe (EMCDDA, 2010, 2011a, b) for 2009 ([2]) implies an overall mortality of roughly between 15 200 (twice the number of reported overdoses) and 22 800 (three times the number of reported overdoses). The total could be roughly between 15 200 and 22 800 (see Figure).

Figure: Estimations of the annual number of deaths among problem opioid users (POUs) in Europe



Estimation 2a
A second approach applies the range of mortality rates of opioid users observed in most cohort studies (between 1 % and 2 %, see Appendix of the Selected issue) to the estimated number of problem opioid users in Europe (1 300 000) (EMCDDA,

([1]) This paper is a supplement to the 2011 EMCDDA Selected issue 'Mortality related to drug use in Europe: public health implications'. It presents and elaborates on the methods used to estimate the overall number of deaths from all causes among problem opioid users in Europe.

([2]) See Table DRD-2 (part ii) in the 2011 Statistical bulletin. For countries lacking 2009 data, 2008 data were used , if available, for this estimation

2011b) to obtain an estimate or range of between 13 000 and 26 000 deaths each year (Figure).

Estimation 2b

Estimation 2a could be refined by noting that opioid substitution treatment is expected to reduce the mortality rate (Bargagli et al., 2007; EMCDDA, 2011a; Brugal et al., 2005; Clausen et al., 2008; Cornish et al., 2010; Davoli et al., 2007; Kimber et al., 2010). A major Australian study, which followed more than 43 000 people entering opioid substitution treatment, estimated that the programme produced a 29 % reduction in overall mortality across the cohort (Degenhardt et al., 2009). In Norway, while in opioid substitution treatment, the risk of mortality among opioid-dependent clients was halved compared to the pre-treatment levels (Clausen et al., 2008). A systematic review of observational studies on the treatment of opioid dependence showed that the mortality rate of those in methadone treatment is approximately one-third the rate of those not in treatment (RR 0.37, 95 % confidence interval 0.29 to 0.48) (Bargagli et al., 2007). This figure of a third is incorporated into the calculation (mortality rates of between 0.33 %, or one-third of 1 %, and 0.66 %, or one-thirds of 2 %, applied to the estimated 50 % of problem opioid users that receive substitution treatment in a year – 650 000) ([3]). The mortality of those in treatment is thus estimated at 2 167 to 4 384 deaths a year. For those not in treatment, the mortality is estimated at 1 % to 2 % of 650 000, or between 6 500 and 13 000 deaths a year. Thus, the modified conservative estimate of mortality among problem opioid users in Europe is between 8 667 and 17 334 deaths a year) (Figure).

Main findings — discussion

Findings from cohort studies, in combination with figures on reported overdoses and estimates of the total number of opioid users in Europe were used to estimate the annual number of deaths related to problem opioid use. There is some agreement between the results and, given the information that is available at present, these figures suggest a credible range of between 10 000 and 20 000 deaths in Europe among problem opioid users every year.

This estimation must be considered with caution, as it relies on the one hand on broad estimates of the proportion of overdoses to all deaths among opioid users, and on the other hand on combining estimates of mortality rates and the total number of opioid users in Europe. In addition, there are other factors that limit the accuracy and precision of the estimates.

([3]) See Table HSR-3 in the 2011 statistical bulletin 2011.

Limitations

The estimates presented here are central ranges, based on lower and upper estimated values. These are not confidence intervals, and the uncertainty of the outcome is greater than the uncertainty associated with any individual number used in the calculation (reported overdoses, number of problem opioid users, and number in treatment). In addition, the calculations include a number of assumptions, which are made on the basis of information available in the literature (reduction of the risk for those treated, proportion of overdoses out of all deaths among problem opioid users). The EU range of mortality was applied to the EU estimate of the total number of problem opioid users, and mortality rates were not weighted by size of the population.

Estimation of the number of problem opioid users

The estimate of the number of problem opioid users is a combination of national estimates reported by 16 countries and figures arrived at the EMCDDA using supplementary information. Most commonly, the proportion of opioid users in treatment was applied to estimates of the number of problem drug users. For two countries, this was not possible and an estimated EU rate was applied. However, aggregating the information introduces certain weaknesses. First, the data are generated using a variety of estimation methods at national level that do not refer to the same year (2004 to 2009), and secondly, differences in reporting systems may bias the results. Nevertheless, the data used here are the best currently available on problem drug use in Europe, and the resulting estimate provides an indication of the extent of the population.

Estimation of those in treatment and outside of treatment

This is computed on the basis of the estimated number of problem opioid users and the estimate of those in opioid substitution treatment ([4]). Although the number may be closer to 700 000 than 650 000, a rough figure of half of the problem opioid users receiving some treatment in any given year is a reasonable assumption.

Proportion of deaths due to overdose

While there can be great variation between studies, a rough generalisation can be made that between one-third and half of deaths among problem drug users are due to overdose (Brugal et al., 2005; EMCDDA, 2011a). In some cohort studies, the proportion of ‘other causes’ (including ill-defined and unspecified causes) may be high. In some studies, these high proportions may be due to unspecific coding, and

([4]) See Table HSR-3 in the 2011 Statistical bulletin for national estimates.

as overdoses may make up a substantial proportion of the fatalities in this category, the full extent of overdose deaths in these cohorts may be underestimated (EMCDDA, 2011a).

Reduction of mortality risk due to treatment

It is estimated that half of the problem opioid users in Europe receive opioid substitution treatment during a year, although not necessarily all of them are on continuous treatment throughout the year. The assumed reduction in risk of mortality refers only to the time spent in treatment. It is based on a systematic review of observational studies on treatment of opioid dependence and does not reflect the whole range of reduced mortality risk, which may vary (if treatment duration is too short then it might not have any impact (Cornish et al., 2010)). Most cohort studies include people identified as in treatment at a certain point in the past, but who are not necessarily 'in treatment' over the course of the study. In order to make a conservative estimate, and take into account the reduction in mortality risk due to treatment, estimation 2b was computed. Finally, drug users in other forms of treatment may be protected to some extent, though to a lesser degree than those in substitution treatment.

In conclusion, when considering the estimated number of deaths among problem opioid users in Europe, it is necessary to bear in mind the caveats regarding the data from which it is calculated and the assumptions that have been made.

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