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Chain of care for patients with intentional self-harm:

An effective strategy to reduce suicide rates?

Ingeborg Rossow [1,2], Lars Mehlum[1], Finn Gjertsen[1,3] & Bjørn Møller[4]

1 National Centre for Suicide Research and Prevention, University of Oslo
2 Norwegian Institute for Alcohol and Drug Research, Oslo
3 Division of Mental Health, Norwegian Institute of Public Health
4 Cancer Registry of Norway

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Correspondence to:
Ingeborg Rossow, research director

Norwegian Institute for Alcohol and Drug Research,
POB 565 Sentrum, 0105 Oslo, Norway
Phone: +47 2234 0263
Fax: + 47 22340401
E-mail: ir@sirus.no or ingeborg.rossow@medisin.uio.no

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Abstract

Chain of care for patients with intentional self-harm was important in the Norwegian national action plan to prevent suicide. This study had two aims; - to calculate the potential effects of chain of care on reducing suicide rates, and - to assess whether suicide rates decreased more in areas where chain of care had been implemented than in other areas. We observed no differences in changes in suicide rates between areas with and without the intervention. The calculated potential effects of chain of care on national suicide rates were very small, even under unrealistically favourable conditions.

Key words: suicide, prevention, intentional self-harm, effectiveness

Introduction

Worldwide, approximately one million people commit suicide every year (WHO, 2003). Over 50% of these occur in the age group 15-44 years (Krug et al, 2002) and suicide is, next to accidents, the most common cause of death among young people (under 24 years) in many European countries (Jamison & Hawton, 2005). A number of countries have initiated national suicide prevention strategies. A few countries (Finland, Norway and Sweden) did so already in the 1990s, whereas others have done so more recently (Beautrais, 2006; Taylor et al, 1997). These national strategies are often developed in the absence of clear international leadership and guidelines (Beautrais, 2006) and despite knowledge deficits about the effectiveness of key components (Beautrais, 2006; Mann et al, 2005). So far very few national suicide prevention strategies have, however, been evaluated with the purpose of providing guidelines for optimal development and implementation of such plans (Beautrais, 2006). Hence, there is a need for evaluation of national suicide prevention strategies to guide development or revision of national suicide prevention strategies in other countries. Yet, the question remains how to evaluate national suicide prevention programmes (Kerkhof & Clark, 1998). The general decrease in suicide rates in a number of western countries, irrespective of implementation of national suicide prevention strategies or not (DeLeo, 2002) points to the difficulties of attributing a decrease in national suicide rates to a national prevention strategy.

In Norway a national action plan to prevent suicide was proposed in 1993 (Norwegian Health Directorate, 1993) and initiated in 1994, and the suicide rates have been fairly stable since then. The action plan was primarily aimed at providing better services for groups with high risk of suicidal behaviour, and particularly so patients who had been in contact with the health services after intentional self-harm (Mehlum & Reinholdt, 2001). It is well established that attempted suicide is a significant risk factor for suicide (Goldney, 2000). However, adequate follow-up of these patients could reduce the risk of subsequent repeated intentional

self-harm and suicide attempts and rapid re-hospitalisation, according to promising results from monitoring studies (Dieserud et al, 2000) and clinical studies (Greenfield et al, 2002). Emergency care units at hospitals in Norway have traditionally used very limited resources on the clinical follow-up of patients after intentional self-harm (Mehlum & Reinholdt, 2001). On this background substantial efforts and funding were invested to establish a chain of care in the psychosocial follow-up of intentional self-harm patients after hospital discharge (Mork et al, 2001). Guidelines were made defining and describing what tasks each part of the chain was expected to fulfil (Mehlum & Reinholdt, 2001). These guidelines were implemented in about half of all general hospitals in Norway by the end of the 1990s, covering 55% of the total population (Mork et al, 2001).

Even though the implementation of a chain of care for follow-up of a high risk group may have the potential of reducing the *individual risk* of subsequent suicide within this risk group, it may not necessarily have effect on the overall national suicide rates or even on the suicide rates in the regions where the chain of care was implemented. There are several reasons for this. Firstly, even in a high risk group such as suicide attempters, only a minor fraction will eventually commit suicide (Cooper et al, 2005; DeMore & Robertson, 1996; Hall, et al, 1998; Hawton et al, 2003; Zahl & Hawton, 2004). Secondly, among those who do commit suicide, only a fraction will have had previous suicide attempts that have been treated in hospitals (Goldney, 2000; Rossow et al, 1999). The question then is not only whether such an intervention had a significant impact on overall suicide rates, but also whether - or to what extent - this intervention had the *potential* to affect the suicide rates.

The potential of national prevention strategies to affect the suicide rates is to some extent addressed in the literature (Goldney, 2000). Gunnell and Frankel (1994) reviewed the literature on suicide prevention strategies and found little support for the aspiration of a 15% reduction in suicide rates in UK (by the year 2000) could be achieved on the basis of current

knowledge and policy. A review of the effectiveness of suicide prevention strategies (Mann et al, 2005) suggests that although a number of strategies may prove effective in terms of reductions of suicide attempt rates and/or suicide rates within specific areas or target groups, it seems mainly to be restrictions of access to suicide means that have a significant impact on suicide rates in the total population. The authors further noted that a chain of care after suicide attempt may improve compliance with treatment and decrease new attempts. Essential elements of post-suicide attempt interventions are yet to be identified, and there are no estimates of the impact of chain of care on total suicide rates (Mann et al, 2005).

The aim of this study was to assess the potential of effects of chains of care for patients with intentional self-harm on reducing suicide rates by addressing two questions; Firstly, can we *observe* differences in relative changes in suicide rates in areas with and without implementation of routines for chains of care for patients with intentional self-harm? Secondly, what effects of chains of care on suicide rates can theoretically be *expected* under various conditions?

Data and methods

The empirical analyses are based on aggregated figures from the Norwegian Cause of Death Registry, and Official Population Statistics from Statistics Norway. All Norwegian municipalities (430) were grouped in two aggregated areas. One for municipalities covered by general hospitals that reported to have implemented chains of care in a 1999 survey (Mork et al, 2001). The other group comprised hospital areas without chains of care. There were missing data from four general hospitals; hence the municipalities covered by these four hospitals were excluded from the analyses. For the remaining municipalities data on age-standardized (world standard) gender specific suicide rates were calculated on an annual basis for the years 1973-2002 and aggregated to hospital areas with and without chains of care. The

empirical analyses are based on five-year age groups (≤14, 15-19, ..., 75-79, 80 +) and categorization of four time intervals in the latter half of the time series; two five-year periods prior to implementation of chains of care (1982-1987 and 1988-1992), the five-year period of implementation of chains of care (1993-1997) and the five-year period following implementation of chains of care (1998-2002). Relative changes in gender specific suicide rates from the pre-implementation period (1988-1992) to the implementation period (1993-1997) and to the post-implementation period (1998-2002), respectively, were compared between intervention and non-intervention regions by estimating Poisson regression models (Clayton & Schifflers, 1987).

Estimates of the potential effect of implementing chains of care on suicide rates were based on the following assumptions. First, figures of intentional self-harm were estimated indirectly because morbidity data on external cause of injuries and poisoning from general hospitals in Norway has poor quality. We used figures from a study that roughly indicates 4,300 intentional self-harms treated in hospitals in Norway on an annual basis (Kopjar et al, 2005), and the national rates correspond fairly well with reported rates of parasuicide/attempted suicide in Mid part of Norway (Hjelmeland, 2001; Bjerke et al, 1995).

Second, we assumed that as hospitals that have implemented a chain of care cover 55% of the Norwegian general population, this proportion also applies to the target population for the intervention. Third, follow-up studies from the Nordic countries in areas without chains of care, suggest that the risk of suicide among intentional self-harm patients is in the range of 3-6% over a five year observation period, and the suicide risk is highest in the 12 month period following intentional self-harm (Hjelmeland & Bjerke, 1996; Hjelmeland, 1996; Nordentoft et al, 1993; Ostamo & Lönnqvist, 2001; Skogman, 2004; Nordström et al, 1995). We therefore assumed that the average risk of suicide among patients hospitalized with intentional self-harm is approximately 1.5% in the first year after hospital admission, and that

the risk is approximately 4.5% over the entire 5 year period after hospital admission under non-intervention or 'treatment as usual' conditions. Few studies have addressed the effectiveness of chains of care on the risk of subsequent completed suicide. Dieserud et al (2000) found in a study from one Norwegian region where chains of care were implemented, that 2.4% of the intentional self-harm patients committed suicide over an average follow-up period of approximately six years[1]. On this background we assumed that a probable effectiveness of chains of care on suicides would likely be less than a 50% reduction in risk of subsequent suicide over a five year period. When implementing prevention strategies on a broad basis and in many and diverse institutions, it is also likely that not all patients in the target group are reached by the intervention. Dieserud et al's study (2000) comprised data from an intervention in one fairly small region with one hospital, yet 88% of the target patients were referred to aftercare. It is therefore likely that implementation of chains of care in communities which comprise several municipalities implies a more complex organization of chains of care so that only a fraction of the target group is not reached by the intervention.

Expected immediate (1 year) change in the number of suicides will therefore depend on both the assumed reduction in suicide risk among exposed individuals as well as the fraction of the target group that is actually exposed to the intervention, i.e.;

$$CS = - [sai * sr_1 * rr * ct],$$

where *CS* is the change in number of suicides, *sai* is the annual number of suicide attempts in intervention area, sr_1 is the suicide risk in the 1st year after hospital discharge, *rr* is the assumed relative reduction in suicide risk due to the intervention, and *ct* is the coverage rate of the target group by the intervention program.

Attempting to project accumulated reductions in number of suicides over years required some additional assumptions. A significant fraction of patients repeat suicide

[1] The average follow-up period is not reported in the article but suggested as a fair approximation (Dieserud, personal communication, Aug 2006).

attempts once or several times over an observation period (Hawton et al, 1998), and the number of persons attempting suicide constitute some 70% of the number of hospital admissions for suicide attempt (Dieserud et al, 2000). In the case of a lasting effect the accumulated change in number of suicides will in the exposed group be a function of different annual risks of suicide after hospital discharge. We have assumed a 1.5% risk of suicide in the first year after hospital discharge and thereafter an annual suicide risk of 0.75%, adding to a total of 4.5% over a five year period. This implies that if we assume a lasting effect of the intervention over five years for each individual exposed, irrespective of repeated attempts and repeated intervention exposure, and furthermore that the program has been implemented for at least five years, the expected reduction in number of suicides will be

$$CS = -[5 * sai * 0.7 * asr * rr * ct];$$

where *asr* is the accumulated suicide risk over the five year period after hospital discharge (i.e. 4.5%).

In our experience, only a minor fraction of intentional self-harm patients receive follow-up treatment or care for more than a year after discharge from their index hospitalisation. We could therefore alternatively assume that an effect of after care is limited to a reduction in suicide risk only at the time of intervention exposure and thus the first year after hospital discharge. If we also assume that the suicide risk thereafter is the same for exposed and unexposed persons, the expected reduction in number of suicides over a five year period will be

$$CS = -[5 * sai * 0.7 * sr_1 * rr * ct].$$

Hence, estimates of expected reductions in suicides are presented for 27 (3 by 3 by 3) possible scenarios; immediate (1 year) change, accumulated change over 5 years given stable and lasting effects or accumulated change over 5 years given only immediate (1 year) effects; a 30%, 20% or 10% reduction in suicide risk due to the intervention; and 100%, 75% or 50% coverage of the target group by the intervention.

Results

Both male and female suicide rates decreased significantly from 1988 to 1994, after which the suicide rates have been fairly stable (Figure 1). The change in suicide rates was, however, not larger in areas with implementation of chains of care compared to areas without such implementation. When comparing relative changes in suicide rates between areas with implementation of chains of care and areas without, these relative changes were of the same magnitude for both male and female suicide rates. Thus, no statistically significant differences in changes were found, neither for the change from the pre-implementation (1988-1992) to the implementation (1993-1997) period, nor for the change from the pre-implementation to the post-implementation (1998-2002) period (Table 1). As intentional self-harm is more frequent in the younger age groups, it could be hypothesised that a possible effect would appear among young people. Analyses of changes in suicide rates in the age group 15-29 years showed, however, no differences in changes between areas with implementation of chains of care and areas without such implementation.

Figure 1 and Table 1 about here

Table 2 presents a set of scenarios of expected immediate and accumulated changes in numbers of suicides as well as relative changes in suicide rates under various conditions with respect to effectiveness of intervention on suicide risk and coverage of the target group. The expected relative changes in suicide rates were, even under quite optimistic conditions, rather small.

Table 2 about here

Discussion

In the period 1994 to 2002 the suicide rate in Norway was approximately 25% lower compared to the rate in the late 1980s (Gjertsen, 2003; Gjertsen, 2005). If the implementation of chains of care, - as part of the national strategy for suicide prevention – had had an impact on completed suicides, we could have expected a relative decline in suicide rates in the intervention areas compared to the non-intervention areas. Such a difference was not observed.

However, one cannot infer from this result that implementation of chains of care for patients with intentional self-harm had no effect on the suicide rates. There are several reasons for this. It is possible that other factors that may increase suicide rates have occurred in the same period and the same areas as the implementation of chains of care and thereby *countered* a possible effect of the intervention. It is also possible that implementation of chains of care has differed significantly over time from what was surveyed in 1999, so that the categorization of intervention area and non-intervention area would be a poor indicator of exposure to intervention. Moreover, it is likely that the content of the intervention (for instance how, by whom and for how long the patients were followed up) varied significantly, both within the intervention area as well as over time.

Consequently, the empirical analyses of possible differential changes in suicide rates in areas with and without implementation of chain of care first and foremost serve to illustrate

a number of the difficulties encountered when evaluating possible impact of a national suicide prevention strategy on suicide rates.

Turning to the scenarios of *expected* changes in suicide rates under various conditions for effectiveness and coverage of target groups, we found, however, that even under unrealistically favourable conditions, the expected changes in suicide rates were quite small. For instance, even in the case of a 100% coverage rate of the target group within the intervention area; a 30% reduction rate in suicide risk among exposed individuals and a stable and lasting intervention effect over five years, this would still only imply an accumulated 4.1% reduction in average suicide rates over a five year period. The scenarios of expected changes in suicide rates due to the intervention are therefore in line with the empirical observations and suggest that the effect of chains of care on rates of completed suicide is at best very small.

This is in line with earlier works on the rather limited potential of high risk strategies to have significant impact at the general population level on rare events of complex aetiology such as suicide (DeLeo, 2002; Gunnell & Frankel, 1994). Yet, there are examples of decreases in suicide rates that may be attributed to policy measures or prevention strategies (Mann et al, 2005). For instance, restrictions of lethal means such as the domestic gas detoxification in England and Wales may reduce suicide rates (Kreitman, 1976), as did the restrictions on pesticides in Western Samoa (Bowles, 1995). Moreover, a huge increase in alcohol taxation in Denmark in 1917 was followed by a significant decrease in alcohol consumption and a 19% decrease in suicide rates (Skog, 1993). Correspondingly, Gorbatchev's anti-alcohol campaign in the mid 1980s implied a significant net reduction in alcohol consumption and alcohol related mortality and a 39% reduction in suicide rates (Wasserman et al, 1998; Nemtsov, 2003). Nevertheless, the present study may still serve as a reminder of the necessity of exhibiting due cautiousness when attributing decreases in

population suicide rates to possible effects of prevention strategies targeted at high risk groups.

Some aspects of the preventive paradox[2] are relevant in this respect. Rose (1985) noted that "a large number of people at a small risk may give rise to more cases of disease than the small number who are at high risk. This situation seems to be common, and it limits the utility of the 'high-risk' approach to prevention". In the case of suicide we also find that although intentional self-harm leading to hospital admission is a significant risk factor for subsequent suicide, the majority of cases of suicide do not appear to occur among individuals in this high risk group. A 25 year follow-up study of Swedish conscripts (Rossow et al, 1999) showed that only 19 % of those who committed suicide during the observation period had ever been admitted to hospital due to intentional self-harm. In line with Rose's notion (1985) the present study illustrates the limited potential of a high risk strategy to have a significant effect on suicide rates at the population level. In a similar vein Knox et al (2004) discussed the potential of population strategies to prevent suicide and emphasized the US Air Force as a model of suicide prevention in a 'community'. The above discussion on examples of successful strategies to reduce suicide rates may serve to illustrate the same point.

Although the present analyses suggest that such a strategy may at best have only a very small impact on suicide rates, chains of care may still have beneficial effects for individuals in the target group, for instance in terms of lowered risk of repeated intentional self-harm (Dieserud et al, 2000). Hence, the goal of suicide prevention strategies may not only be limited to reduce the suicide rate in a population, but also include prevention of intentional self-harm, and improvement of quality of life in high risk groups. From this point of view high risk strategies such as chains of care may well be effective and recommendable from a public health point of view.

[2] "A preventive measure which brings much benefit to the population offers little to each participating individual" (Rose, 1981).

A broader empirical evidence of effectiveness and efficacy of chains of care is, however, warranted. Although we cannot – as we have shown in the present study – expect any significant impact of chain of care on suicides at the aggregate level, there may well be beneficial effects at the individual level and for other outcome measures such as repetition of intentional self harm and quality of life. Thus, future studies addressing possible effectiveness of chains of care could be undertaken by prospective follow-up studies of intentional self harm patients admitted to hospitals with and without a chain of care structure and compare incidence rates of re-admissions for intentional self harm during a follow-up period. Correspondingly, a possible impact of chain of care on quality of life measures could be assessed by interviews of patients who have and have not been exposed to chain of care during a follow-up period after hospital admission. A thorough assessment of the content and the continuity of the chain of care structure would be of utter importance in such studies.

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References:

BEAUTRAIS, A. (2006) Suicide prevention strategies 2006. Guest editorial. *Australian e-Journal for the Advancement of Mental Health*, 5, 1-6.

BJERKE, T. & HJELMELAND, H., JORGENSEN, P. ET AL. (1995) Parasuicide in the county of Sor-Trondelag 1989-92. (Parasuicid i Sør-Trøndelag 1989 – 92). *Norwegian Medical Journal*, 115, 1221-1224.

BOWLES, J. (1995) Suicide in Western Samoa: an example of a suicide prevention program in a developing country. In: DIEKSTRA, R., GULBINAT, R., DE LEO, D. & KIENHORST, I. (Eds) Preventive strategies on suicide. Leiden, the Netherlands: Brill.

CLAYTON, D. & SCHIFFLERS, E. (1987) Models for temporal variation in cancer rates. I: Age-period and age-cohort models. *Statistics in Medicine,* 6, 449-467.

COOPER, J., KAPUR, N., WEBB, R., ET AL. (2005) Suicide after deliberate self-harm: a 4-year cohort study. *American Journal of Psychiatry*, 162, 297-303.

DE MORE, G.M. & ROBERTSON, A.R. (1996) Suicide in the 18 years after deliberate self-harm: a prospective study. *British Journal of Psychiatry*, 169, 489-494.

DELEO, D. (2002) Why are we not getting any closer to prevent suicide*? British Journal of Psychiatry,* 181, 372-374.

DIESERUD, G., LOEB, M. & EKEBERG, Ø. (2000) Suicidal behavior in the municipality of Baerum, Norway: a 12-year prospective study of parasuicide and suicide. *Suicide & Life-Threatening Behavior*, 30, 61-73.

GJERTSEN, F. (2003) Trends in suicide. Data basis, quality and comparability. (Utviklingstendenser i selvmord. Datagrunnlag, kvalitet og sammenliknbarhet.) Master of Public Health thesis. Gothenburg: Nordic School of Public Health.

GJERTSEN, F. (2005) Suicide methods in Norway – potential for prevention? (Selvmordsmetoder i Norge – potensial for forebygging?) *Suicidologi* 2005;10: 8-10.

GOLDNEY, R.D. (2000) Prediction of suicide and attempted suicide. In: Hawton K, van Heeringen K (Eds) The international handbook of suicide and attempted suicide. Chisester: Wiley, 2000.

GREENFIELD, B., LARSON, C., HECHTMAN, L., ET AL. (2002) A rapid-response outpatient model for reducing hospitalization rates among suicidal adolescents. *Psychiatric Services*, 53, 1574-1579.

GUNNELL, D. & FRANKEL, S. (1994) Prevention of suicide: aspirations and evidence. *British Medical Journal,* 308, 1227-33.

HALL, D.J., O'BRIEN, F. & STARK, C. (1998) Thirteen-year follow-up of deliberate self-harm, using linked data. *British Journal of Psychiatry*, 172, 239-242.

HAWTON, K., ARENSMAN, E., TOWNSEND, E. ET AL. (1998) Deliberate self-harm: systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition. *British Medical Journal,* 317, 441-447.

HAWTON, K., ZAHL, D. & WEATHERALL, R. (2003) Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *British Journal of Psychiatry*, 182, 537-542.

HJELMELAND, H. & BJERKE, T. (1996) Parasuicide in the county of Sor-Trondelag. General epidemiology and psychological factors. *Social Psychiatry and Psychiatric Epidemiology*, 31, 272-283.

HJELMELAND, H. (1996) Repetition of parasuicide: a predictive study. *Suicide & Life-Threatening Behavior,* 26: 395-404.

HJELMELAND, H. (2001) WHO-study in the county of Sor-Trondelag: the parasuicide rate for young women is increasing (WHO-undersøkelsen i Sør-Trøndelag: Parasuicidraten øker for unge kvinner). *Suicidologi* 2001; 6: 12-13.

JAMISON, K.R. & HAWTON, K. (2005) The burden of suicide and clinical suggestions. In: Hawton, K. (Ed) Prevention and treatment of suicidal behaviour. From science to practice. Oxford: Oxford University Press, pp. 183-96.

KERKHOF, J.F. & CLARK, D.C. (1998) How to evaluate national suicide programs? *Crisis*, 19, 2-3.

KNOX, K.L., CONWELL, Y. & CAINE, E.D. (2004) If suicide is a public health problem, what are we doing to prevent it? *American Journal of Public Health*, 94, 37-45.

KOPJAR, B., DIESERUD, G. & WIIK, J. (2005) Deliberate selfpoisonings treated in hospitals (Selvpåførte forgiftninger behandlet i sykehus). *Norwegian Medical Journal,* 125, 1798-1800.

KREITMAN, N. (1976) The coal gas story: United Kingdom suicide rates 1960-71. *British Journal of Preventive and Social Medicine* , 30, 86-93.

KRUG, E.G., DAHLBERG, L.L., MERCY, J.A., ET AL. (2002) World report on violence and health. Geneva, Switzerland: World Health Organization, 2002. Available at: http://www.who.int/violence_injury_prevention/violence/world_report/en/full_en.pdf

MANN, J.J., APTER, A., BERTOLOTE, J. ET AL. (2005) Suicide prevention strategies. A systematic review. *JAMA*, 294, 2064-2074.

MEHLUM, L. & REINHOLDT, N.P. (2001) Action plan against suicide. Beneficial experiences are to be continued (Handlingsplan mot selvmord: Gode erfaringer skal føres videre.) *Suicidologi,* 6, 16-18.

MORK, E., EKEID, G., YSTGAARD, M., ET AL. (2001) Psychosocial follow-up after parasuicide at medical hospital wards in Norway (Psykososial oppfølging etter parasuicid ved medisinske sykehusavdelinger i Norge). *Norwegian Medical Journal*, 121, 1038-1043.

NEMTSOV, A. (2003) Suicides and alcohol consumption in Russia 1965-1999. *Drug and Alcohol Dependence,* 71, 161-168.

NORDENTOFT, M., BREUM, L,. MUNCK, L.K., ET AL. (1993) High mortality by natural and unnatural causes: a 10 year follow up study of patients admitted to a poisoning treatment centre after suicide attempts. *British Medical Journal,* 306, 1637-1641.

NORDSTRÖM, P., SAMUELSSON, M. & ASBERG, M. (1995) Survival analysis of suicide risk after attempted suicide. *Acta Psychiatrica Scandinavica,* 91, 336-340.

NORWEGIAN HEALTH DIRECTORATE (1993). National program to prevent suicide in Norway (Nasjonalt program for forebygging av selvmord i Norge.) Oslo:.Norwegian Health Directorate's report series, 1-93.

OSTAMO, A. & LÖNNQVIST, J. (2001) Excess mortality of suicide attempters. *Social Psychiatry and Psychiatric Epidemiology,* 36, 29-35.

ROSE, G. (1981) Strategy of prevention: lessons from cardiovascular disease. *British Medical Journal,* 282, 1847-1851.

ROSE, G. (1985) Sick individuals and sick populations. *International Journal of Epidemiology,* 14, 32-38.

ROSSOW, I., ROMELSJÖ, A. & LEIFMAN, H. (1999) Alcohol abuse and suicidal behaviour in young and middle aged men: differentiating between attempted and completed suicide. *Addiction*, 94, 1199-1207.

SKOG O-J. (1993) Alcohol and suicide in Denmark 1911-24 - experiences from a "natural experiment". *Addiction*, 88, 1189-1193.

SKOGMAN, K., ALSEN, M. & ÖJEHAGEN, A. (2004) Sex differences in risk factors for suicide after attempted suicide – a follow-up study of 1052 suicide attempters. *Social Psychiatry and Psychiatric Epidemiology,* 39, 113-120.

TAYLOR, S.J., KINGDOM, D. & JENKINS, R. (1997) How are nations trying to prevent suicide? An analysis of national suicide prevention strategies. *Acta Psychiatrica Scandinavica,* 95, 457-463.

WASSERMAN, D., VÄRNIK, A. & EKLUND, G. (1998) Female suicides and alcohol consumption during perestroika in the former USSR. *Acta Psychiatrica Scandinavica* (Suppl), 394, 26-33.

WORLD HEALTH ORGANIZATION (2003). World Health Report 2003: Shaping the future. Geneva, Switzerland: World Health Organization. Available at: http://www.who.int/whr/2003/en/whr03_en.pdf

ZAHL, D.L. & HAWTON, K. (2004) Repetition of deliberate self-harm and subsequent suicide risk: long-term follow-up study of 11,583 patients. *British Journal of Psychiatry*, 185, 70-75.