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ORIGINAL ARTICLE

Disease Burden Attributed to Drug use in the Nordic Countries: a Systematic Analysis for the Global Burden of Diseases, Injuries, and Risk Factors Study 2019

GBD 2019 Nordic Drug Use Collaborators · Emilie E. Agardh[1] · Peter Allebeck[1] · Ann Kristin Skrindo Knudsen[2,3] · Amanda E. Aronsson[4] · Pär Flodin[1] · Terje A. Eikemo[4] · Paul R. Bangah[1] · Jens Christoffer Skogen[5,6,7] · Mika Gissler[8,9,10] · Sanna Rönkä[8] · John J. McGrath[11,12,13] · Rannveig Sigurvinsdóttir[14] · Omid Dadras[15,16] · Keshab Deuba[1,17] · Khedidja Hedna[18,19] · Alexios-Fotios A. Mentis[20] · Dominic Sagoe[21] · Rahman Shiri[22] · Nanna Weye[2,3,23] · Simon I. Hay[24,25] · Christopher J. L. Murray[24,25] · Mohsen Naghavi[24,25] · Maja Pasovic[24] · Theo Vos[24,25] · Peter Wennberg[1,2,26] · Anna-Karin Danielsson[1]

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Abstract

The Nordic countries share similarities in many social and welfare domains, but drug policies have varied over time and between countries. We wanted to compare differences in mortality and disease burden attributed to drug use over time. Using results from the Global Burden of Disease (GBD) study, we extracted age-standardized estimates of deaths, DALYs, YLLs and YLDs per 100 000 population for Denmark, Finland, Iceland, Norway, and Sweden during the years 1990 to 2019. Among males, DALY rates in 2019 were highest in Finland and lowest in Iceland. Among females, DALY rates in 2019 were highest in Iceland and lowest in Sweden. Sweden have had the highest increase in burden since 1990, from 252 DALYs to 694 among males, and from 111 to 193 among females. Norway had a peak with highest level of all countries in 2001–2004 and thereafter a strong decline. Denmark have had the most constant burden over time, 566–600 DALYs among males from 1990 to 2010 and 210–240 DALYs among females. Strict drug policies in Nordic countries have not prevented an increase in some countries, so policies need to be reviewed.

Keywords Drug use · Disease burden · Nordic countries · Global Burden of Disease Study · Disability Adjusted Life Years

The Nordic countries of Denmark, Finland, Iceland, Norway, and Sweden have among the highest overdose death rates in Europe (Institute for Health Metrics & Evaluation, 2022; United Nations, 2019). One explanation has been variations in reporting practices (EMCDDA, 2020) where the Nordic countries in general have high-quality data based on forensic and toxicological investigation (Simonsen et al., 2020). At the same time, Finland,

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Sweden, and Iceland have higher death rates compared to Denmark and Norway. Various opioids are the main cause of fatal poisoning in all five countries but discrepancies in deaths between countries may to some extent be explained by differences in the drugs that are used, and how they are used (Simonsen et al., 2020).

Variations could also be related to how these countries have responded to drugs and drug use (Waal & Gossop, 2014). The Nordic countries share many similarities in social and welfare policy (Moeller, 2019; Tham, 2021) but have had different approaches to drug policy over time (Gedeon et al., 2019; Wiessing et al., 2017). Drug policy covers many domains and are commonly referred to as enforcement as well as harm reduction, prevention, and treatment (Moeller, 2019). Denmark is traditionally the most liberal of the Nordic countries when applying harm reduction policies aiming at reducing overdose deaths. Sweden, Finland, Iceland, and Norway have, to varying extent, had the goal of drug-free societies and the predominant approaches have been on restriction of availability and treatment, but also rehabilitation (Tham, 2021). At the same time, over the past 30 years treatment and harm reduction services such as needle exchange and maintenance opioid substitution treatment programs have been available in all countries through local initiatives and national guidelines (Tham, 2021), but in varying degrees and with varying accessibility over the years. A general trend has been that harm reduction services have been more accessible in Denmark, Finland, Iceland, and Norway compared to Sweden, and access to treatment is suggested to be better in Norway and Denmark compared to Finland and Sweden, where access to services generally have been more restrictive over the years (Gedeon et al., 2019). This may have created country wise differences in overdose deaths.

Until now, overdose death rates have been a frequently used measure when comparing trends in harm from drug use in the Nordic countries (Steentoft et al., 1989, 1996, 2001, 2006; Simonsen et al., 2011; Simonsen et al., 2020). However, deaths do not capture the full picture of adverse effects on health, since the burden of premature death and disability attributed to drug use is not captured. Examining the temporal and geographical patterns of disease burden attributed to drug use when taking both premature death and disability into account, can provide a better understanding of drug trends, the magnitude of the problem, and the potential impact of harm reduction services in the area. Whether premature death and disability from drug use follow similar or different trends across countries is also important, since drug control policies aiming at reducing availability of drugs, such as for example, monitoring internet drug traffic, drug seizures (Moeller, 2019; The Swedish Police Authority, 2018; Tollin et al., 2021) and prescription patterns of pain killers (Muller et al., 2019) could also create differences between countries, not only in premature deaths but also in levels of disability.

In this study we use estimates of death, years of life lost (YLL), years lived with disability (YLD) and disability adjusted life years (DALYs) attributed to drug use, from the Global Burden of Disease and Injuries study (GBD) 2019 (Murray et al., 2020) to explore trends in the Nordic countries between 1990 and 2019. We also present case fatality rates as an indication of reach of services aimed at preventing overdose deaths. Since males have higher rates of overdose deaths in these countries (Simonsen et al., 2020) we compare disease burden attributed to drug use in males and females separately. More specifically we aim to:

1 Assess the magnitude of total DALYs attributed to drug use over time in each country.

2 Compare deaths, DALYs, and the distribution of DALYs by YLLs and YLDs over time and between countries.
3 Compare cause specific DALYs over time and between countries.
4 Compare case-fatality rates over time and between countries.

This manuscript was produced as part of the GBD Collaborator Network and in accordance with the GBD Protocol.

Methods

DALY, YLL and YLD

The Global Burden of Disease (GBD) Study 2019 estimates disease burden attributed to 87 risk factors, including drug use, in a comparative risk assessment framework by age, sex, and location from 1990 to 2019 (Murray et al., 2020). The GBD uses disability adjusted life years (DALYs) as the main measure of disease burden. The DALY adds together two components: Years of Life Lost (YLL), or premature death, and Years Lived with Disability (YLD). The GBD gathers all available data sources on cause prevalence and incidence through systematic reviews of published and unpublished data and health registers. There is, however, very little if any incidence data going into the drug models. Data on mortality and causes of death are, in the Nordic countries, based on cause of death registers. Deaths with an unspecified or inaccurate diagnosis or death code "garbage codes" are redistributed into valid death codes according to algorithms developed within the GBD. Thus, the cause of death data in the GBD system has been adjusted to account for different classification systems over time and is thus more comparable over time and between countries than national official records alone. All sources are stored and available in the GBD Global Health Data Exchange (GHDx) platform hosted by the Institute for Health Metrics and Evaluation (GHDx Health Data, 2022).

YLLs are estimated by multiplying the number of deaths from each cause of death in each age-group by a reference life expectancy at that age. YLDs are estimated by multiplying the prevalence of a disease or injury and the health loss associated with the disease, using a disability weight (DW) (Murray et al., 2020). The DW quantifies health loss associated with non-fatal health states and is a number ranging from 0 (no health loss) to 1 (health loss equivalent to death). To generate internally consistent estimates of prevalence, incidence, remission, duration and excess mortality from each non-fatal health condition, all data are modelled in a Bayesian meta-regression tool, DisMod-MR 2.1 (Disease Modeling-Metaregression). Uncertainty intervals (UIs) are calculated, by repeating the process 1000 times, for all estimates and reflect uncertainty from underlying data sources, model specification, stochastic variation, and measurement bias.

Burden of Disease Attributed to Drug Use

The burden of disease attributed to drug use is estimated by comparing the burden due to the current risk factor distribution with a theoretical level of risk exposure that minimizes health loss, i.e., the absence of drug use in the population (Castaldelli-Maia et al., 2023).

The calculation of drug use as a risk factor includes different dimensions of exposure. First, it includes drug use disorders, i.e., opioid, amphetamine, cocaine, cannabis, and a residual category of other drug use disorders that are 100 percent attributed to drug use. Second, the prevalence of opioid, amphetamine, and cocaine disorder as risk factors for suicide. Relative risks were estimated using meta-analyses of published literature. Drug use disorders are defined according to Diagnostic and Statistical Manual of Mental Disorders (DSM) and International Classification of Diseases (ICD) diagnostic criteria. Third, direct population attributable fractions (PAFs) estimate of HIV due to injecting drug use and a cohort analysis of the risk of having contracted hepatitis B or C from current and past injection drug use were calculated.

Analytical Strategy

First, we use GBD results to assess the percentage of total DALYs attributed to drug use to reflect the magnitude of the problem in each of the five Nordic countries between 1990 and 2019. We also present the European and Global mean of DALYs to assess the comparable proportion of the problem in the Nordic countries. As the GBD estimates are calculated within a framework, changes in other risk factors or diseases will also influence the percentage of the disease burden attributed to drug use and does thus not necessarily solely reflect an increase in drug use. Second, we compare age-standardized death rates, DALYs, and the distribution of YLLs and YLDs attributed to drug use per 100 000 population with 95% UIs over time and between countries. Age-standardized rates adjust for differences in total population and changes in age-specific population sizes over time. Third, we compare the cause-specific burden for DALYs which includes the following causes: drug use disorder, self-harm, HIV/ADIS, cirrhosis and liver cancer. All these estimates are extracted from the GBD GHDx platform (GHDx Health Data, 2022). Fourth, we calculate case fatality rates from all types of drug use disorder, and by type of drug use disorder, by dividing the number of deaths each year by the number of estimated prevalent cases with the disease during that same year and finally multiplying by 100 to yield a percentage.

Results

The Magnitude of Total DALYs Attributed to Drug Use

The percent of total DALYs attributed to drug use increased for both males and females in all Nordic countries, as well as at the European and Global mean level between 1990 and 2019 (Fig. 1). Males in all Nordic countries, and females in Finland, Norway and Iceland had a higher percentage of total DALYs attributed to drug use, than the European and Global mean. In 2019, Finnish and Swedish males had the highest share of total DALYs attributed to drug use (3.99 and 3.79 percent, respectively) and Denmark had the lowest (2.92 percent). Among females, Iceland had the highest share of DALYS attributed to drug use (1.97 percent) and Sweden the lowest (1.08 percent).

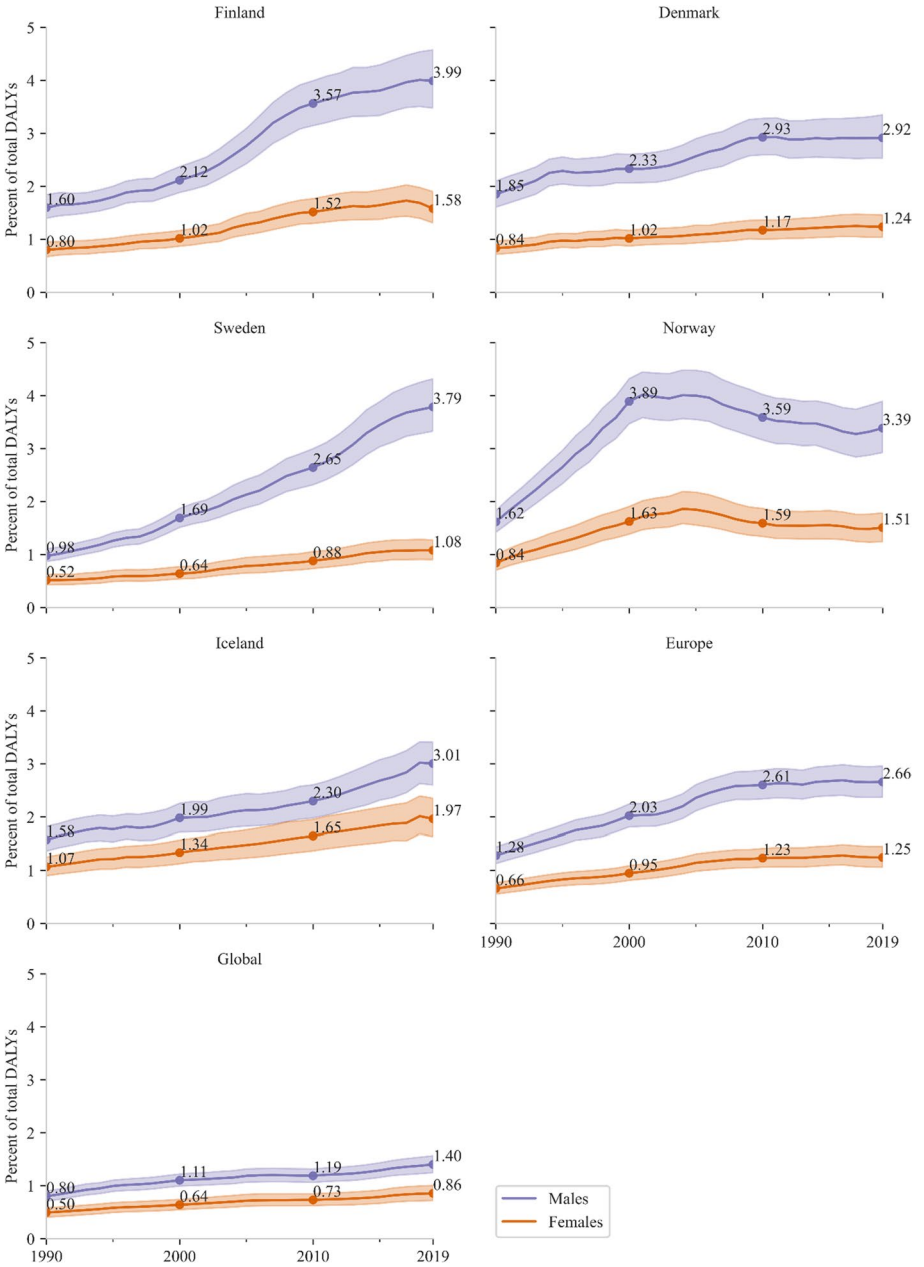

Fig. 1 Percent of total disease burden [age-standardized disability-adjusted life years (DALYs)] attributed to drug use in males and females in Finland, Denmark, Sweden, Norway, Iceland, European and Global mean in 1990 to 2019

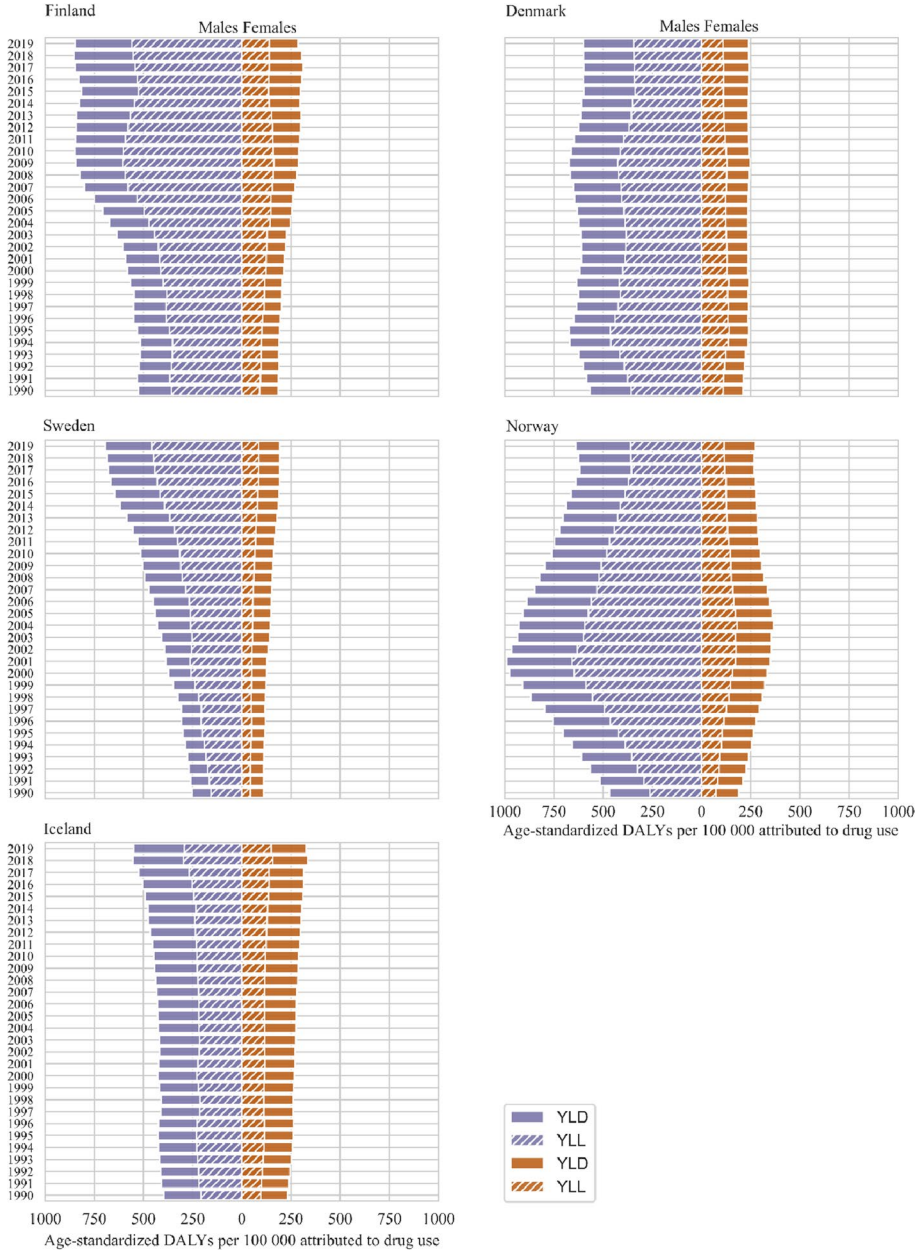

Fig. 2 Disease burden attributed to drug use [age-standardized disability adjusted life years (DALYs) per 100 000 population, by years of Life lost (YLLs) and years lived with disability (YLDs)] in males and females in the Nordic countries 1990 to 2019

Deaths Attributed to Drug Use

The death rates attributed to drug use has been relatively stable in Denmark between 1990 and 2019, but increased among males and females in Finland, Sweden, Iceland, and Norway (Appendix Table 1). The death rate among males and females in Norway was at its highest level in 2001 and 2004, respectively, compared to earlier and later years, and also compared to the other countries.

DALYs Attributed to Drug Use

Figure 2 illustrates disease burden (DALYs) attributed to drug use by YLLs and YLDs per 100 000 population in the five countries. Males and females in Denmark stand out as having the most constant burden over time with 566 DALYs (UIs; 479–660) in 1990 and 600 (UIs; 508–702) in males in 2019, corresponding to a 6 percent increase, and 210 (UIs; 177–253) in 1990, to 240 (UIs; 197–287) in females, i.e., a 14 percent increase (for numbers see Appendix Table 2).

On the contrary, among males and females in Sweden, where the highest increase over time has been observed, DALYs increased by 176 percent from 252 (UIs; 218–291) in 1990 to 694 (UIs; 508–702) in 2019 in males, and by 74 percent in females, from 111 (UIs; 88–138) in 1990 to 193 (UIs; 157–232) in 2019.

Among males in Norway, the DALY burden was 469 (UIs; 403–545) in 1990, with a peak in the burden in 2001 with 989 (UIs; 877–1 111) DALYs in 2001, corresponding to a 111 percent increase, and thereafter a 35 percent decrease to 639 (UIs; 543–754) in 2019. This trend appeared also in females, having a 98 percent increase from 1990 with 189 (UIs; 153–230) to 366 (UIs; 307–430) DALYs in 2004, and thereafter a 25 decrease to 273 (UIs; 224–327) DALYs in 2019.

In Finland, DALYs increased by 61 percent in males between 1990 and 2019, i.e., from 525 (UIs; 450–610) to 847 (UIs; 735–976) DALYs, and 55 percent in females, from 184 (UIs; 150–226) to 285 (UIs; 234–343) DALYs. In Iceland, DALYs increased with 39 percent in males from 395 (UIs; 330–470) to 549 (UIs; 463–650) DALYs, and 40 percent in females from 233 (UIs; 188–281) to 327 (UIs; 268–292) DALYs over the 10-year-period.

Distribution of DALYs by YLLs and YLDs

More than half of the total number of DALYs among males were due to YLLs in all countries over the study period, ranging from approximately 52 percent in Iceland to 68 percent in Finland in 1990 and 53 percent in Iceland to 65 percent in Finland in 2019 (Appendix Table 3). In contrast, approximately half, or more than half of the total DALYs among females were due to YLDs in all countries over the study period, ranging from 48 percent in Denmark to 65 percent in Finland in 1990, and 54 percent in Iceland to 63 percent in Finland in 2019.

The increase in DALYs between 1990 and 2019 in Finnish and Danish males and Danish females was, however, driven by YLDs to a larger extent than YLLs, while in

Swedish males and females, and Icelandic females the increase was driven by YLLs to a larger extent compared to YLDs (Appendix Table 2). Interestingly, the decrease in DALYs between the peak year in 2001 and 2019 in Norwegian males was driven by YLLs to a larger extent (-45 percent) than by YLDs (-16 percent). A similar trend was observed in females between the peak year in 2004 and 2019, with a 36 percent decrease in YLLs compared to a 15 percent decrease in YLDs.

Cause-specific Drug Attributed Disease Burden (DALYs)

Figure 3 shows the cause specific disease burden attributed to drug use in males and females over time in all countries. Drug use disorder, mainly driven by opioid use disorders (Appendix Table 4), accounted for a majority of DALYs for both sexes in all countries. Liver cancer, cirrhosis and other chronic liver diseases were also important, especially in Finnish and Danish males, while suicide and HIV/AIDS did not contribute significantly to the disease burden in these countries.

Case-fatality Rates

Opioid use disorder was the main type of drug use responsible for the drug-attributed disease burden in all five countries over time (Appendix Table 4). The case fatality rate, e.g., the number of deaths divided by number of prevalent cases has increased the most over time among males and females in Sweden, followed by males and females in Finland (Fig. 4). In Norway there was a decrease in case fatality rates among males since 2001 and among females since 2004. Case fatality rates increased in Iceland and in Denmark case fatality rates was rather stable over time. Opioid use disorder was the main driver in case-fatality rates in all countries (Appendix Table 5).

Discussion

Our study shows that the magnitude of the total burden of DALYs attributed to drug use was higher among males in all Nordic countries, and among females in Finland, Norway, and Iceland, compared to both the European and Global mean. The largest increase since 1990 in DALYs among males was observed in Sweden and Finland and the smallest in Denmark. Among females, the increase was the highest in Sweden, and the lowest in Denmark. Norway stands out given the sharp increase in disease burden attributed to drug use between 1990 and 2001 in males, and 2004 in females, followed by a decrease. More than half of the total number of DALYs among males were due to YLLs in all countries between 1990 and 2019, while in females, half or more than half were due to YLDs.

Comparative studies on deaths attributed to drug use show results similar to ours, e.g., a burden that is increasing in Sweden, Finland and Iceland since the 1990s, a rather stable burden in Denmark, and a decreasing burden in Norway since peak years in the early 2000s (Steentoft et al., 1989, 1996, 2001, 2006; Simonsen et al., 2011; Simonsen et al., 2020). Comparative studies assessing the non-fatal morbidity in

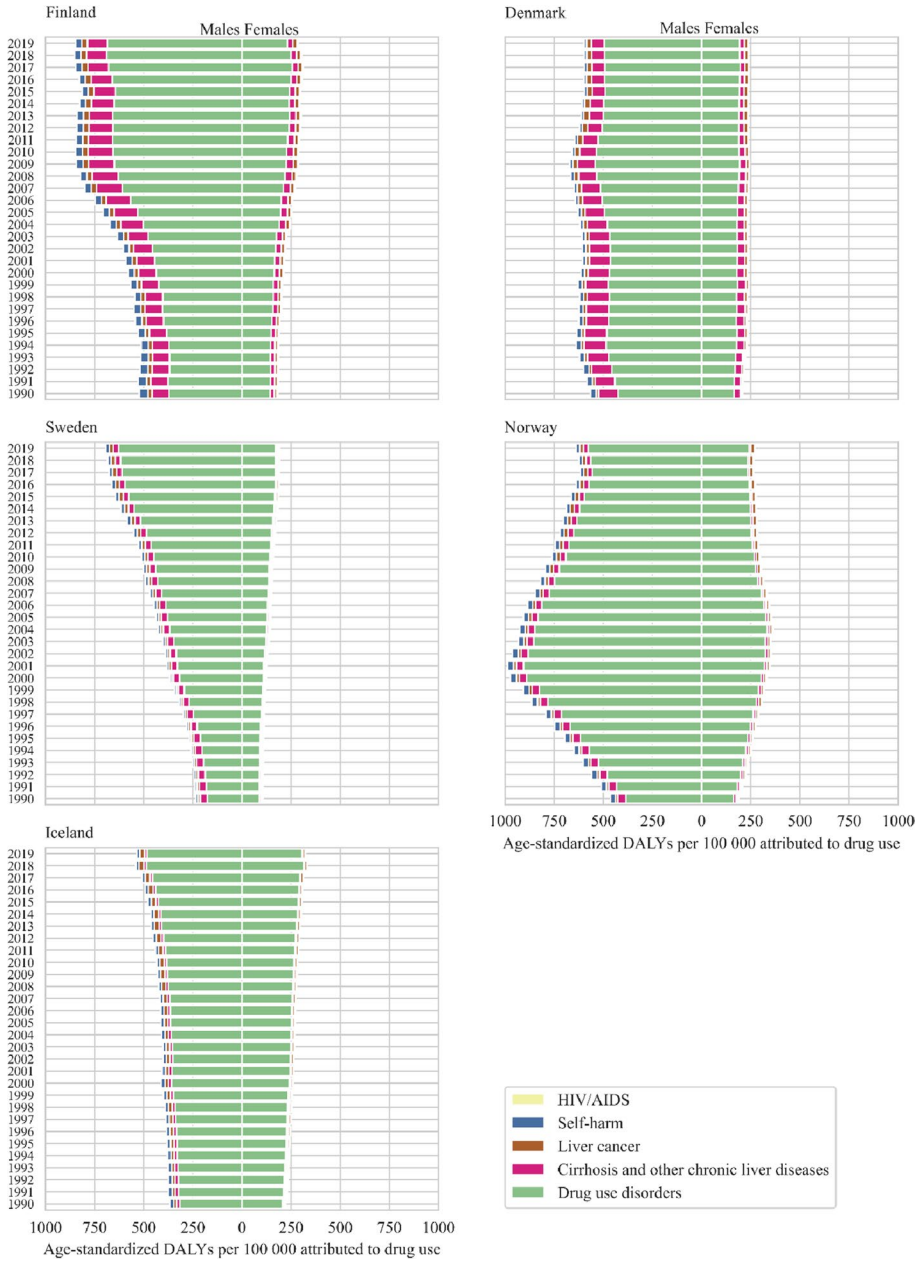

Fig. 3 Cause-specific drug-attributed burden [age-standardized disability-adjusted life years (DALYs) per 100 000] in males and females in the Nordic countries 1990 to 2019

the Nordic countries are, however, lacking. We observed that YLDs accounted for a higher proportion of DALYs in females compared to males. Moreover, the increase in DALYs between 1990 and 2019 in Finnish and Danish males and Danish females was

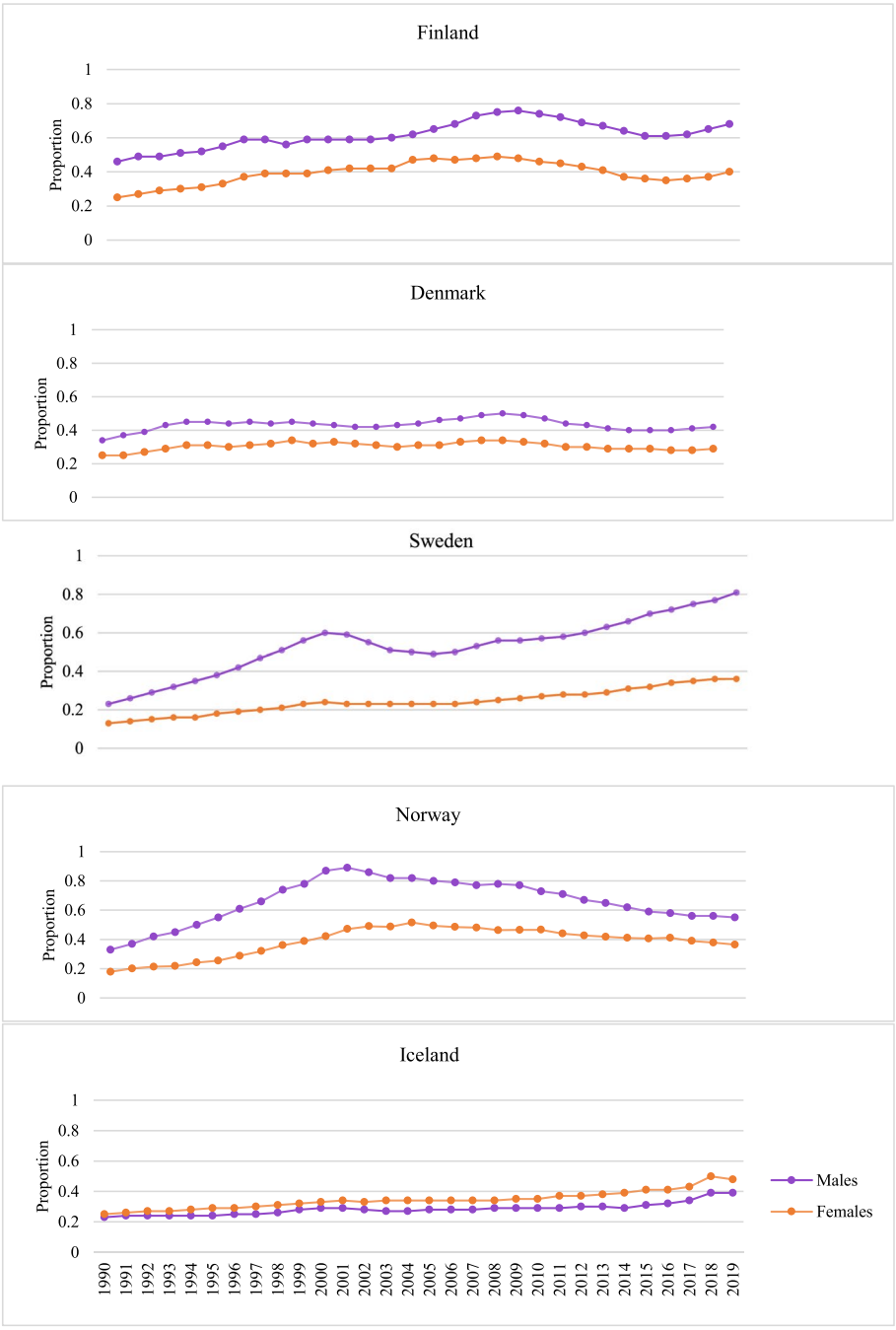

Fig. 4 Case-fatality rates [number of deaths from drug use disorders by number of prevalent cases with drug use disorders] in males and females in the Nordic countries 1990 to 2019

driven by YLDs to a larger extent than YLLs. On the contrary, the increase in Swedish males and females, and Icelandic females was driven by YLLs to a larger extent than YLDs. This may be due to differences in treatment practices and higher survival rates from drug use, or differences in underlying data. Leifman has for example described increased detection rate through improved methods for forensic chemistry in Sweden (Leifman, 2016). It may, however, also be due to the late national implementation of take-home naloxone which have shown to improve survival rates from drug overdose events (McDonald & Strang, 2016).

Traditionally, and for obvious reasons, drug related harm is very much focused on death. Our findings show the importance of also including non-fatal harm in the monitoring of effects of drug use, that the GBD data enable. The fact that females have a higher proportion of YLDs may be due to them having less violent behavior than males. Men are more likely than women to use almost all types of illicit drugs, and engage in binge drinking, with a higher likelihood of overdose deaths and use of emergency care (NIDA, 2022). Less attention may inappropriately be paid to drug use in females.

There has been a strong interest to follow and compare overdose death in the Nordic countries as well as drug policy. For one thing, the Nordic countries are of interest since social security is at the core of their welfare systems, but they have generally been less active with their harm reduction policies compared to some other countries that have dealt with high overdose death rates, such as for example Canada and Portugal (Giertsen & Gunnlaugsson, 2015). Therefore, the assessment and comparison of policy differences between the Nordic countries over time could provide valuable insights to the variation in disease burden.

Harm reduction programs, such as needle and syringe exchange programs and maintenance opioid substitution treatment programs have shown to reduce opioid use, injecting risk behaviors and transmission of bloodborne viruses, overdose deaths, as well as to improve physical and mental well-being (Lawrinson et al., 2008; Santo et al., 2021). These tools are in place, although to a varying degree over the years in the Nordic countries. For example, opioid substitution was only introduced in Finland in 1997 and Norway in 1998, whereas Sweden and Denmark have longstanding programs. To a certain extent our results may reflect the level of implementation and access to such programs over time. Even if males and females in Norway, Finland, Denmark, and Iceland have had a higher drug-related burden than Sweden in 1990, there has since then been a remarkable increase in drug-related deaths in Sweden. Sweden has had the most restrictive policy, aspiring to a drug-free society, while Denmark with a relatively more stable burden over time, has had a more liberal attitude towards use of cannabis, and a more active harm reduction policy, regarding use of opioids, in terms of access to harm reduction programs and treatment (Tham, 2021).

It should be noted, that while Denmark started out with the highest burden attributed to drug use, the other Nordic countries are now at the same or at higher levels compared to Denmark. The fact that case-fatality rates are lowest in Danish males and females over time and now the highest in Swedish males may also be an indication of reach of services aimed at preventing overdose deaths. Take-home naloxone programs have been available in Denmark since 2010, but the most significant development in drug policy in Denmark was the introduction of the maintenance treatment for heroin in 2008 and drug consumption rooms in 2012 (EMCDDA, 2019), and there was a decrease in YLLs

among both males and females between 2009 and 2015, and thereafter the burden stabilized. Sweden was one of the first countries in the world to start out a methadone program in 1977, but the access was extremely limited during the first 10 years (Svefors & Thomsen, 2006). Also in Finland, the access to opioid agonist treatment has remained a challenge with long waiting times, and the coverage among high-risk opioid uses has constantly been low, approximately 20 percent (Selin et al., 2015). In Norway, reasons for the increase in drug-related deaths since 1990, have partly been explained by the late implementation of opioid maintenance treatment programs. However, other reasons may be the increase in the use of deadlier drugs, such as heroin and other opioids that are usually injected, which increases the risk of overdose (Waal, 2015; Waal & Gossop, 2014). Subsequent and steady decreases in drug deaths following the peak in 2001 may in addition to opioid maintenance programs also to some extent be attributed to changes in drug policy that saw increasing availability to enter the opioid substitution treatment centers in 2003, the addition of drug consumption rooms in 2004 (Skretting, 2006), and take-home naloxone in 2014 (Helsedirektoratet, 2014).

The Nordic countries also differ in the control measures aimed at reducing the availability of drugs. Denmark is relatively more liberal in terms of penal sanctions compared to the other countries, while Sweden has the severest sanctions and most intrusive police practice (Balvig et al, 2015; Olaussen, 2013). A recent study showed that Sweden and Norway have greater drug seizures by law enforcement agencies than Denmark and Finland. However, temporal trends also showed that Finland has markedly increased its number of seizures, e.g., with 176 percent from 1985–1992 to 2000–2016, while Sweden has decreased theirs by 57 percent during these years (Moeller, 2019). The way these control measures have reduced availability of drugs and consequently the disease burden attributed to drugs remains unclear. Another control measure is to control prescription of legal drugs, that tend to leak from health services (Humphreys et al., 2022). More drugs are prescribed in Iceland compared to any other Nordic country, and in 2018 regulations regarding prescribed drugs were tightened. This has resulted in fewer opioid prescriptions, although the Icelandic rate is still the highest (Nomesco, 2017), and the outcome of these regulations remains to be seen during the coming years.

GBD estimates by demographic composition, such as immigration status and socioeconomic level, are not available for the Nordic countries. How differences in the proportion of immigrants over time and socioeconomic inequalities relate to drug-attributed disease burden and drug policy could therefore not be investigated in our study. Sweden has the highest proportion of foreign born (20%) which is closely followed by Iceland and Norway, while Finland stands out with the lowest proportion (8%). Denmark is in between (Nordic Welfare Centre, 2022). Studies from Sweden suggest that lower rates of substance use disorders in migrants and refugees reflect behaviors in the migrant's country of origin, and that effect tends to diminish or converge over time (Harris et al., 2019; Wallace, 2022). Drug use is present in all social groups (Centralförbundet för alkohol- och narkotikaupplysning, 2021), although drug use and substance use disorders are higher in lower socioeconomic groups (Centralförbundet för alkohol- och narkotikaupplysning, 2021; Li et al., 2023; Manhica et al., 2021). While children of immigrants often have lower socioeconomic status as compared to native Swedes

(Gustafsson & Österberg, 2018), the extent to which immigration and socioeconomic level could explain the increase in drug burden since 1990 remains unknown.

Limitations and Strengths

Limitations of the GBD measurements of drug attributed disease burden are mainly related to the underlying data. The quality of both disease and mortality data in each country will affect the estimated disease burden attributed to drugs since estimates rely on this data. Fatal outcomes, for example, are based on the cause of death registries that are of high-quality in the Nordic countries, in overall. However, coding of drug-attributed deaths has found to be heterogenous across the Nordic countries (Marcussen, 2017) and over time (Leifman, 2016). While the GBD uses a standardized approach to assess causes of death for all countries, redistributing unspecified ICD codes, into valid causes of death. The level of forensic investigation, and methods for chemical detection of substances postmortem, will nevertheless affect level of drug related deaths recorded.

With regards to non-fatal health outcomes, drug use is a risk factor for drug use disorder, self-harm, cirrhosis, and neoplasms and HIV/AIDS, although the majority is drug use disorders in the Nordic countries. The underlying data in these registries with regards to non-fatal health outcomes is sparser and can be incomplete and untimely since coding practices differ across the countries (Marcussen, 2017). For drug use disorders, for example, the GBD requires surveys with representative samples that apply DMS or ICD diagnoses since health registers only capture those who seek and receive health care. To date, there is no such survey in the Nordic countries, and the GBD uses many different sources, such as estimations from death data, also from other countries to reflect country prevalence of disease and exposure. Hence, estimates should be interpreted with caution.

Despite these limitations, the GBD study offers the most comprehensive and comparative framework that refines its estimates as new data and methods become available. It is therefore well designed to be used as a monitoring tool to follow and compare disease burden attributed to drug use in relation to changes in drug policy and treatment services.

Conclusions

We observed that in 2019, the disease burden attributed to drug use was highest among males in Finland followed by males in Sweden, and then lowest among males in Denmark. Among females, Iceland had the highest burden of DALYs and Sweden the lowest. Sweden has had the highest increase in burden, and Denmark the most constant burden over time. Norway had a peak in 2001 in males and 2004 in females and thereafter a decrease. For each of the five countries, the majority of DALYs among males were due to YLLs, while for females most of the DALYs were due to YLDs. Findings indicate that despite stricter drug policies in Norway, Finland, Iceland, and Sweden compared to Denmark over time, they do not seem to have been successful in reducing the disease burden from drug use during this period, and they are now at the same level, or higher than Denmark.

Appendix 1

Table 1 Death rates attributed to drug use [age-standardized deaths per 100 000 population] in males and females in the Nordic countries 1990 to 2019

	Finland		Denmark		Sweden		Norway		Iceland	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
1990	4.15	1.16	4.14	1.42	1.58	0.49	3.31	0.94	2.43	1.57
1991	4.30	1.24	4.45	1.44	1.68	0.48	3.86	1.11	2.53	1.65
1992	4.20	1.29	4.73	1.53	1.80	0.50	4.44	1.22	2.53	1.69
1993	4.24	1.29	5.07	1.59	1.95	0.53	4.98	1.28	2.55	1.73
1994	4.28	1.33	5.31	1.69	2.09	0.52	5.63	1.45	2.59	1.79
1995	4.52	1.40	5.23	1.73	2.25	0.56	6.30	1.55	2.59	1.82
1996	4.84	1.51	5.07	1.64	2.53	0.60	7.09	1.75	2.64	1.84
1997	4.91	1.63	5.05	1.69	2.83	0.64	7.74	1.96	2.68	1.88
1998	4.81	1.65	4.94	1.65	3.14	0.67	8.82	2.21	2.75	1.93
1999	5.12	1.63	4.99	1.75	3.52	0.73	9.48	2.39	2.89	1.96
2000	5.27	1.71	4.86	1.64	3.88	0.77	10.59	2.59	3.05	2.04
2001	5.33	1.74	4.72	1.65	3.94	0.75	10.87	2.91	3.00	2.09
2002	5.39	1.78	4.66	1.62	3.79	0.76	10.44	3.00	2.90	2.07
2003	5.62	1.78	4.63	1.57	3.71	0.79	9.97	2.97	2.88	2.09
2004	5.96	2.02	4.77	1.53	3.81	0.80	9.90	3.14	2.95	2.08
2005	6.35	2.08	4.99	1.57	3.84	0.81	9.63	2.99	2.98	2.08
2006	6.85	2.07	5.20	1.56	3.95	0.83	9.40	2.88	2.99	2.09
2007	7.52	2.18	5.30	1.63	4.26	0.86	8.99	2.77	3.02	2.09
2008	7.79	2.25	5.60	1.70	4.59	0.91	8.81	2.60	3.12	2.12
2009	8.01	2.28	5.76	1.74	4.71	0.95	8.58	2.54	3.18	2.15
2010	7.96	2.21	5.64	1.64	4.81	1.00	8.09	2.50	3.20	2.18
2011	7.85	2.18	5.46	1.60	4.99	1.05	7.83	2.34	3.24	2.27
2012	7.66	2.15	5.06	1.54	5.27	1.10	7.41	2.24	3.32	2.30
2013	7.51	2.06	4.91	1.51	5.68	1.15	7.12	2.19	3.37	2.35
2014	7.20	1.86	4.83	1.48	6.16	1.25	6.87	2.14	3.34	2.41
2015	6.97	1.82	4.66	1.48	6.59	1.28	6.46	2.11	3.50	2.50
2016	7.10	1.83	4.72	1.49	6.88	1.35	6.16	2.11	3.69	2.52
2017	7.36	1.88	4.72	1.49	7.15	1.38	5.90	1.98	3.92	2.62
2018	7.60	1.90	4.77	1.46	7.30	1.40	5.94	1.93	4.51	3.03
2019	7.78	1.93	4.82	1.45	7.52	1.39	5.95	1.91	4.44	2.85

Table 2 Disease burden attributed to drug use in age-standardized DALYs, YLLs, YLDs per 100 000 population in five Nordic countries 1990 and 2019, and percentage change 1990–2019 by all cause disease burden

	Males			Females		
	Age-standardized DALYs, YLLs, YLDs per 100 000 population with 95% uncertainty intervals		Percent change in age-standardized DALYs, YLLs, YLDs per 100 000 population	Age-standardized DALYs, YLLs, YLDs per 100 000 population with 95% uncertainty intervals		Percent change in age-standardized DALYs, YLLS, YLDs per 100 000 population
Finland	1990	2019	1990–2019	1990	2019	1990–2019
DALYs	525 (450–610)	847 (735–976)	61%	184 (150–226)	285 (234–343)	55%
YLLs	357 (309–408)	559 (495–637)	57%	51 (46–57)	87 (76–100)	70%
YLDs	168 (113–231)	288 (200–391)	71%	93 (63–131)	146 (99–198)	57%
Denmark	1990	2019	1990–2019	1990	2019	1990–2019
DALYs	566 (479–660)	600 (508–702)	6%	210 (177–253)	240 (197–287)	14%
YLLs	357 (302–412)	345 (300–399)	-3%	110 (96–127)	109 (96–124)	-1%
YLDs	209 (144–281)	255 (179–342)	22%	100 (69–137)	131 (91–176)	30%
Sweden	1990	2019	1990–2019	1990	2019	1990–2019
DALYs	252 (218–291)	694 (605–786)	176%	111 (88–138)	193 (157–232)	74%
YLLs	157 (141–172)	458 (421–509)	193%	43 (36–52)	85 (76–96)	97%
YLDs	95 (67–129)	235 (160–318)	147%	67 (46–93)	107 (73–146)	60%
Norway	1990	2019	1990–2019	1990	2019	1990–2019
DALYs	469 (403–545)	639 (543–754)	36%	189 (153–230)	273 (224–327)	44%
YLLs	262 (244–282)	360 (330–426)	37%	73 (68–79)	115 (105–126)	57%
YLDs	207 (142–278)	279 (194–371)	35%	116 (81–155)	158 (111–210)	36%
Norway	2001 (peak)	2019	2001–2019	2004 (peak)	2019	2004–2019
DALYs	*989 (877–1111)*	*639 (543–754)*	*-35%*	*366 (307–430)*	*273 (224–327)*	*-25%*
YLLs	*658 (628–689)*	*360 (330–420)*	*-45%*	*180 (171–190)*	*115 (105–126)*	*-36%*
YLDs	*331 (227–444)*	*279 (194–371)*	*-16%*	*185 (130–250)*	*158 (110–210)*	*-15%*
Iceland	1990	2019	1990–2019	1990	2019	1990–2019
DALYs	395 (330–470)	549 (463–650)	39%	233 (188–281)	327 (268–292)	40%
YLLs	207 (180–236)	292 (256–332)	41%	96 (86–107)	149 (130–171)	56%
YLDs	188 (130–256)	257 (179–350)	37%	138 (95–186)	178 (121–241)	29%

Table 3 The percentage of the disease burden attributed to drug use (DALYs) by YLL and YLD in five Nordic countries 1990 and 2019

	Males		Females	
	1990	2019	1990	2019
Finland				
YLL	68%	65%	35%	38%
YLD	32%	35%	65%	63%
Denmark				
YLL	63%	58%	52%	45%
YLD	37%	42%	48%	55%
Sweden				
YLL	62%	66%	40%	45%
YLD	38%	34%	60%	55%
Norway				
YLL	56%	56%	39%	42%
YLD	44%	44%	61%	58%
Iceland				
YLL	52%	53%	41%	46%
YLD	48%	47%	59%	54%

Table 4 Disease burden attributed to drug use in age-standardized DALYs per 100 000 in five Nordic countries 1990 and 2019, and percentage change 1990–2019 by all cause and cause-specific disease burden

	Males			Females		
	Age-standardized DALYs per 100.000 with 95% uncertainty intervals		Percent change in age-standardized DALYs per 100.000	Age-standardized DALYs per 100.000 with 95% uncertainty intervals		Percent change in age-standardized DALYs per 100.000
Finland	1990	2019	1990–2019	1990	2019	1990–2019
All drug-attributed causes	525 (450–610)	848 (735–976)	61%	184 (150–226)	285 (234–343)	55%
Drug use disorders	371 (32–440)	685 (580–804)	85%	143 (112–182)	231 (185–286)	61%
Opioid use disorders	201 (175–231)	458 (390–527)	128%	71 (59–86)	144 (115–177)	102%
Cocaine use disorders	20 (15–27)	31 (23–39)	54%	7 (4–10)	8 (6–12)	26%
Amphetamine use disorders	55 (36–81)	72 (50–102)	31%	28 (16–45)	34 (21–51)	21%
Cannabis use disorders	12 (7–20)	13 (7–19)	0,9%	7 (4–12)	6 (4–10)	-13%
Other drug use disorders	82 (61–107)	112 (88–142)	36%	31 (21–45)	40 (28–55)	28%
Liver cancer	20 (13–28)	29 (20–41)	46%	13 (8–18)	21 (16–27)	65%
Cirrhosis and other chronic diseases	87 (62–118)	100 (72–141)	16%	21 (15–30)	28 (19–39)	31%
Self-harm	45 (22–82)	30 (16–51)	-33%	6 (3–10)	5 (2–8)	-12%
HIV/AIDS	2 (1–3)	1 (0.6–0.9)	-53%	1 (0.6–1.7)	0.3 (0.2–0.5)	-67%
Denmark	1990	2019	1990–2019	1990	2019	1990–2019
All drug-attributed causes	566 (479–660)	600 (508–702)	6%	210 (177–253)	240 (197–287)	14%
Drug use disorders	425 (348–503)	495 (408–595)	17%	165 (134–203)	194 (153–239)	17%
Opioid use disorders	220 (184–258)	299 (247–356)	36%	88 (72–107)	121 (95–151)	38%
Cocaine use disorders	39 (27–57)	41 (28–56)	14%	13 (8–19)	12 (7–18)	-3%
Amphetamine use disorders	48 (33–68)	47 (33–67)	-0,93%	21 (13–32)	21 (13–33)	-1%
Cannabis use disorders	17 (10–27)	14 (8–21)	-20%	10 (5–15)	7 (4–11)	-24%
Other drug use disorders	100 (77–126)	94 (72–120)	-6	34 (25–47)	33 (23–45)	-5%
Liver cancer	13 (9–18)	25 (17–35)	92%	8 (5–12)	18 (13–23)	114%
Cirrhosis and other chronic diseases	99 (71–134)	65 (47–92)	-34%	31 (21–44)	24 (17–34)	-22%
Self-harm	28 (15–48)	13 (7–21)	-54%	5 (3–9)	2 (1–4)	-60%

Table 4 (continued)

	Males			Females		
	Age-standardized DALYs per 100.000 with 95% uncertainty intervals		Percent change in age-standardized DALYs per 100.000	Age-standardized DALYs per 100.000 with 95% uncertainty intervals		Percent change in age-standardized DALYs per 100.000
HIV/AIDS	1 (0.6–1.8)	2 (1.6–2)	88%	0.3 (0.2–0.5)	1.5 (1.0–2.1)	439%
Sweden	1990	2019	1990–2019	1990	2019	1990–2019
All drug-attributed causes	252 (218–291)	694 (605–786)	176%	111 (88–138)	193 (157–232)	74%
Drug use disorders	176 (146–212)	627 (539–719)	256%	89 (68–115)	171 (137–209)	91%
Opioid use disorders	94 (81–109)	420 (362–487)	348%	32 (24–40)	98 (78–120)	206%
Cocaine use disorders	10 (6–15)	31 (26–38)	217%	10 (6–15)	12 (8–18)	28%
Amphetamine use disorders	24 (16–36)	62 (48–81)	157%	16 (9–25)	23 (14–34)	45%
Cannabis use disorders	12 (7–20)	9 (5–15)	-24%	7 (4–11)	5 (3–8)	-30%
Other drug use disorders	36 (28–47)	104 (88–125)	188%	25 (18–34)	33 (24–44)	31%
Liver cancer	11 (7–16)	20 (15–27)	84%	7 (4–11)	9 (6–13)	23%
Cirrhosis and other chronic diseases	35 (28–44)	27 (21–34)	-24%	8 (5–13)	8 (5–12)	-6%
Self-harm	11 (6–20)	17 (9–27)	47%	4 (2–6)	4 (2–6)	2%
HIV/AIDS	17 (13–23)	2 (1–3)	-88%	2 (2–3)	1 (0,8–2)	-33%
Norway	1990	2019	1990–2019	1990	2019	1990–2019
All drug-attributed causes	469 (403–545)	639 (543–754)	36%	189 (153–230)	273 (224–327)	44%
Drug use disorders	385 (322–456)	577 (482–686)	50%	162 (128–201)	243 (194–296)	50%
Opioid use disorders	298 (252–353)	407 (340–488)	37%	121 (94–154)	184 (146–226)	52%
Cocaine use disorders	13 (8–20)	29 (22–38)	128%	5 (3–8)	7 (5–10)	47%
Amphetamine use disorders	22 (14–35)	43 (31–60)	95%	11 (6–18)	17 (11–26)	60%
Cannabis use disorders	13 (7–21)	12 (7–19)	-8%	7 (4–11)	6 (3–9)	-15%
Other drug use disorders	39 (30–51)	86 (69–108)	117%	19 (14–26)	29 (22–37)	49%
Liver cancer	12 (10–14)	19 (15–23)	6%	9 (7–11)	17 (14–19)	93%

Table 4 (continued)

	Males			Females		
	Age-standardized DALYs per 100.000 with 95% uncertainty intervals		Percent change in age-standardized DALYs per 100.000	Age-standardized DALYs per 100.000 with 95% uncertainty intervals		Percent change in age-standardized DALYs per 100.000
Cirrhosis and other chronic diseases	42 (36–49)	24 (20–29)	-43%	13 (11–16)	9 (7–11)	-33%
Self-harm	25 (14–41)	18 (10–29)	-28%	5 (2–7)	4 (2–6)	-16%
HIV/AIDS	5 (3–8)	1.5 (1–2)	-71%	0.3 (0.2–0.5)	0.8 (0.5–1.3)	160%
Iceland	1990	2019	1990–2019	1990	2019	1990–2019
All drug-attributed causes	395 (330–470)	549 (463–650)	39%	233 (188–281)	327 (268–292)	40%
Drug use disorders	316 (253–385)	482 (399–580)	53%	206 (161–253)	306 (248–370)	48%
Opioid use disorders	185 (152–221)	288 (236–342)	56%	132 (103–170)	210 (168–258)	58%
Cocaine use disorders	29 (19–48)	43 (30–59)	46%	12 (7–18)	15 (10–21)	24%
Amphetamine use disorders	31 (19–47)	47 (33–68)	54%	20 (13–30)	29 (20–40)	46%
Cannabis use disorders	14 (7–22)	13 (7–20)	-8%	7 (4–12)	6 (4–10)	-9%
Other drug use disorders	58 (43–79)	92 (72–117)	58%	35 (26–45)	46 (36–59)	32%
Liver cancer	7 (4–10)	11 (8–15)	67%	14 (9–20)	24 (16–34)	69%
Cirrhosis and other chronic diseases	16 (11–23)	13 (9–19)	-21%	8 (5–11)	4 (3–6)	-42%
Self-harm	20 (11–34)	16 (9–26)	-21%	4 (2–7)	2 (1–4)	-40%
HIV/AIDS	28 (22–35)	13 (11–16)	-53%	9 (7–11)	3 (2–4)	-66%

Table 5 Case fatality rates (number of deaths by number of prevalent cases) for all types of drug use disorders and by type of drug use disorder in males and females between 1990 and 2019

Finland											
Males	All drug use disorders	Opioid	Amfetamin	Cocaine	Other	Females	All drug use disorders	Opioid	Amfetamin	Cocaine	Other
1990	0.46	2.12	0.08	0.27	1.21	1990	0.25	1.44	0.04	0.09	1.21
1991	0.49	2.17	0.09	0.28	1.22	1991	0.27	1.56	0.04	0.1	1.22
1992	0.49	2.13	0.09	0.27	1.14	1992	0.29	1.66	0.05	0.1	1.14
1993	0.51	2.17	0.09	0.27	1.1	1993	0.3	1.69	0.05	0.11	1.1
1994	0.52	2.21	0.09	0.27	1.08	1994	0.31	1.79	0.05	0.11	1.08
1995	0.55	2.35	0.1	0.28	1.13	1995	0.33	1.93	0.05	0.12	1.13
1996	0.59	2.56	0.1	0.31	1.19	1996	0.37	2.2	0.05	0.13	1.19
1997	0.59	2.68	0.1	0.32	1.15	1997	0.39	2.46	0.06	0.15	1.15
1998	0.56	2.68	0.1	0.31	1.08	1998	0.39	2.57	0.07	0.16	1.08
1999	0.59	2.88	0.11	0.34	1.11	1999	0.39	2.57	0.07	0.19	1.11
2000	0.59	2.92	0.11	0.35	1.13	2000	0.41	2.72	0.08	0.18	1.13
2001	0.59	2.83	0.11	0.36	1.14	2001	0.42	2.74	0.08	0.17	1.14
2002	0.59	2.62	0.11	0.37	1.12	2002	0.42	2.59	0.08	0.17	1.12
2003	0.6	2.44	0.11	0.38	1.16	2003	0.42	2.34	0.07	0.17	1.16
2004	0.62	2.34	0.12	0.4	1.21	2004	0.47	2.4	0.08	0.17	1.21
2005	0.65	2.31	0.12	0.43	1.28	2005	0.48	2.27	0.08	0.17	1.28
2006	0.68	2.32	0.14	0.45	1.35	2006	0.47	2.07	0.07	0.17	1.35
2007	0.73	2.37	0.15	0.48	1.48	2007	0.48	1.95	0.08	0.17	1.48
2008	0.75	2.31	0.16	0.48	1.54	2008	0.49	1.83	0.08	0.17	1.54
2009	0.76	2.24	0.16	0.48	1.58	2009	0.48	1.69	0.09	0.17	1.58
2010	0.74	2.09	0.16	0.46	1.57	2010	0.46	1.49	0.09	0.18	1.57
2011	0.72	1.93	0.16	0.46	1.54	2011	0.45	1.34	0.09	0.17	1.54
2012	0.69	1.76	0.15	0.45	1.5	2012	0.43	1.18	0.09	0.18	1.5

Table 5 (continued)

2013	0.67	1.6	0.16	0.44	1.48	2013	0.41	1.04	0.09	0.17	1.48
2014	0.64	1.45	0.15	0.42	1.39	2014	0.37	0.87	0.09	0.17	1.39
2015	0.61	1.36	0.14	0.41	1.33	2015	0.36	0.82	0.09	0.16	1.33
2016	0.61	1.34	0.14	0.42	1.34	2016	0.35	0.79	0.08	0.17	1.34
2017	0.62	1.37	0.14	0.44	1.37	2017	0.36	0.81	0.08	0.17	1.37
2018	0.65	1.45	0.15	0.45	1.41	2018	0.37	0.87	0.08	0.18	1.41
2019	0.68	1.58	0.15	0.46	1.45	2019	0.4	1.05	0.08	0.18	1.45
Denmark											
Males	All drug use disorders	Opioid	Amfetamin	Cocaine	Other	Females	All drug use disorders	Opioid	Amfetamin	Cocaine	Other
1990	0.34	1.53	0.11	0.09	1.14	1990	0.25	1.23	0.08	0.07	0.32
1991	0.37	1.64	0.12	0.1	1.19	1991	0.25	1.25	0.08	0.07	0.32
1992	0.39	1.73	0.13	0.11	1.23	1992	0.27	1.31	0.09	0.08	0.34
1993	0.43	1.82	0.14	0.12	1.3	1993	0.29	1.37	0.1	0.09	0.36
1994	0.45	1.81	0.15	0.13	1.35	1994	0.31	1.46	0.1	0.09	0.37
1995	0.45	1.79	0.15	0.13	1.26	1995	0.31	1.46	0.11	0.09	0.39
1996	0.44	1.77	0.15	0.13	1.24	1996	0.3	1.34	0.11	0.09	0.4
1997	0.45	1.74	0.14	0.12	1.24	1997	0.31	1.38	0.11	0.09	0.4
1998	0.44	1.72	0.14	0.12	1.19	1998	0.32	1.39	0.1	0.08	0.35
1999	0.45	1.69	0.15	0.12	1.24	1999	0.34	1.46	0.1	0.08	0.34
2000	0.44	1.66	0.14	0.12	1.13	2000	0.32	1.35	0.09	0.08	0.32
2001	0.43	1.62	0.14	0.11	1.06	2001	0.33	1.36	0.09	0.08	0.3
2002	0.42	1.59	0.14	0.11	1	2002	0.32	1.24	0.1	0.08	0.34
2003	0.42	1.56	0.14	0.1	0.94	2003	0.31	1.18	0.1	0.08	0.32
2004	0.43	1.53	0.15	0.11	0.93	2004	0.3	1.1	0.1	0.08	0.33
2005	0.44	1.5	0.15	0.12	0.96	2005	0.31	1.14	0.1	0.08	0.32

Table 5 (continued)

2006	0.46	1.48	0.16	0.12	1.03	2006	0.31	1.11	0.11	0.08	0.32
2007	0.47	1.46	0.17	0.12	1.06	2007	0.33	1.13	0.12	0.09	0.34
2008	0.49	1.45	0.18	0.13	1.1	2008	0.34	1.16	0.12	0.09	0.35
2009	0.5	1.43	0.18	0.13	1.13	2009	0.34	1.18	0.13	0.08	0.34
2010	0.49	1.42	0.18	0.12	1.12	2010	0.33	1.09	0.13	0.08	0.35
2011	0.47	1.39	0.16	0.12	1.09	2011	0.32	1.06	0.11	0.07	0.32
2012	0.44	1.37	0.15	0.11	1.02	2012	0.3	0.98	0.11	0.07	0.32
2013	0.43	1.33	0.14	0.11	0.99	2013	0.3	0.93	0.1	0.07	0.29
2014	0.41	1.32	0.14	0.11	0.98	2014	0.29	0.89	0.1	0.06	0.28
2015	0.4	1.3	0.14	0.1	0.94	2015	0.29	0.86	0.09	0.06	0.29
2016	0.4	1.35	0.14	0.11	0.95	2016	0.29	0.86	0.09	0.06	0.29
2017	0.4	1.35	0.14	0.11	0.96	2017	0.28	0.86	0.09	0.06	0.29
2018	0.41	1.37	0.14	0.11	0.98	2018	0.28	0.85	0.08	0.06	0.28
2019	0.42	1.37	0.14	0.11	1	2019	0.29	0.84	0.07	0.06	0.27
Sweden											
Males	All drug use disorders	Opioid	Amfetamin	Cocaine	Other	Females	All drug use disorders	Opioid	Amfetamin	Cocaine	Other
1990	0.23	1.49	0.10	0.04	0.62	1990	0.13	0.71	0.04	0.03	0.48
1991	0.26	1.59	0.13	0.04	0.60	1991	0.14	0.75	0.03	0.03	0.43
1992	0.29	1.74	0.14	0.04	0.56	1992	0.15	0.79	0.03	0.03	0.43
1993	0.32	1.91	0.13	0.04	0.58	1993	0.16	0.90	0.03	0.02	0.37
1994	0.35	1.99	0.15	0.05	0.60	1994	0.16	0.88	0.04	0.03	0.34
1995	0.38	2.12	0.15	0.06	0.61	1995	0.18	1.00	0.04	0.02	0.30
1996	0.42	2.34	0.17	0.07	0.62	1996	0.19	1.05	0.04	0.03	0.32
1997	0.47	2.52	0.18	0.10	0.66	1997	0.20	1.14	0.04	0.02	0.27
1998	0.51	2.64	0.18	0.11	0.74	1998	0.21	1.14	0.05	0.03	0.28

Table 5 (continued)

1999	0.56	2.74	0.21	0.14	0.84	1999	0.23	1.20	0.05	0.03	0.28
2000	0.60	2.77	0.22	0.17	0.96	2000	0.24	1.22	0.06	0.03	0.28
2001	0.59	2.34	0.23	0.20	1.08	2001	0.23	1.09	0.06	0.03	0.29
2002	0.55	1.79	0.23	0.20	1.05	2002	0.23	0.95	0.06	0.03	0.31
2003	0.51	1.42	0.23	0.21	1.02	2003	0.23	0.86	0.06	0.04	0.31
2004	0.50	1.23	0.24	0.22	1.04	2004	0.23	0.78	0.07	0.04	0.33
2005	0.49	1.15	0.23	0.23	1.04	2005	0.23	0.78	0.06	0.04	0.31
2006	0.50	1.15	0.23	0.25	1.06	2006	0.23	0.77	0.07	0.04	0.33
2007	0.53	1.20	0.24	0.27	1.17	2007	0.24	0.78	0.07	0.04	0.35
2008	0.56	1.26	0.24	0.30	1.25	2008	0.25	0.82	0.07	0.04	0.36
2009	0.56	1.27	0.23	0.31	1.29	2009	0.26	0.84	0.07	0.05	0.37
2010	0.57	1.27	0.23	0.32	1.31	2010	0.27	0.88	0.07	0.05	0.37
2011	0.58	1.27	0.22	0.34	1.35	2011	0.28	0.88	0.07	0.06	0.40
2012	0.60	1.29	0.22	0.35	1.39	2012	0.28	0.89	0.07	0.06	0.41
2013	0.63	1.34	0.22	0.37	1.47	2013	0.29	0.90	0.07	0.06	0.43
2014	0.66	1.40	0.23	0.37	1.56	2014	0.31	0.96	0.07	0.06	0.43
2015	0.70	1.46	0.25	0.39	1.61	2015	0.32	0.97	0.07	0.06	0.44
2016	0.72	1.50	0.25	0.41	1.61	2016	0.34	1.02	0.08	0.07	0.46
2017	0.75	1.54	0.26	0.43	1.62	2017	0.35	1.03	0.08	0.07	0.47
2018	0.77	1.59	0.27	0.44	1.60	2018	0.36	1.03	0.09	0.08	0.50
2019	0.81	1.66	0.28	0.45	1.62	2019	0.36	1.03	0.09	0.08	0.50
Norway											
Males	All drug use disorders	Opioid	Amfetamin	Cocaine	Other	Females	All drug use disorders	Opioid	Amfetamin	Cocaine	Other
1990	0.33	0.94	0.04	0.02	0.43	1990	0.18	0.46	0.02	0.03	0.17
1991	0.37	0.98	0.04	0.03	0.45	1991	0.2	0.48	0.02	0.03	0.18

Table 5 (continued)

1992	0.42	1.03	0.05	0.04	0.47	1992	0.21	0.48	0.03	0.03	0.16
1993	0.45	1.07	0.06	0.04	0.48	1993	0.22	0.46	0.04	0.03	0.17
1994	0.5	1.14	0.07	0.1	0.48	1994	0.24	0.5	0.03	0.03	0.18
1995	0.55	1.22	0.09	0.05	0.49	1995	0.26	0.52	0.03	0.03	0.17
1996	0.61	1.31	0.09	0.12	0.6	1996	0.29	0.57	0.04	0.04	0.17
1997	0.66	1.37	0.1	0.15	0.66	1997	0.32	0.62	0.05	0.05	0.2
1998	0.74	1.5	0.13	0.24	0.76	1998	0.36	0.7	0.06	0.06	0.19
1999	0.78	1.57	0.14	0.19	0.85	1999	0.39	0.74	0.07	0.07	0.21
2000	0.87	1.7	0.19	0.26	1.08	2000	0.42	0.79	0.09	0.09	0.25
2001	0.89	1.72	0.22	0.35	1.23	2001	0.47	0.88	0.12	0.1	0.28
2002	0.86	1.63	0.23	0.3	1.34	2002	0.49	0.9	0.15	0.13	0.32
2003	0.82	1.52	0.25	0.36	1.46	2003	0.49	0.87	0.18	0.16	0.38
2004	0.82	1.51	0.27	0.38	1.52	2004	0.52	0.91	0.2	0.19	0.42
2005	0.8	1.47	0.27	0.39	1.52	2005	0.49	0.86	0.21	0.2	0.45
2006	0.79	1.46	0.28	0.02	1.54	2006	0.48	0.86	0.2	0.2	0.42
2007	0.77	1.48	0.26	0.37	1.51	2007	0.48	0.88	0.19	0.19	0.41
2008	0.78	1.54	0.27	0.35	1.55	2008	0.46	0.89	0.18	0.18	0.39
2009	0.77	1.58	0.26	0.33	1.56	2009	0.46	0.94	0.16	0.17	0.38
2010	0.73	1.54	0.25	0.05	1.48	2010	0.47	0.97	0.15	0.16	0.36
2011	0.71	1.49	0.24	0.32	1.46	2011	0.44	0.91	0.15	0.16	0.37
2012	0.67	1.43	0.22	0.3	1.34	2012	0.43	0.9	0.13	0.14	0.33
2013	0.65	1.37	0.22	0.27	1.3	2013	0.42	0.87	0.13	0.15	0.34
2014	0.62	1.33	0.2	0.25	1.22	2014	0.41	0.86	0.12	0.13	0.31
2015	0.59	1.27	0.18	0.27	1.12	2015	0.41	0.86	0.11	0.13	0.29
2016	0.58	1.25	0.18	0.24	1.07	2016	0.41	0.88	0.11	0.13	0.28
2017	0.56	1.22	0.18	0.24	0.99	2017	0.39	0.84	0.11	0.12	0.27
2018	0.56	1.19	0.18	0.25	0.99	2018	0.38	0.81	0.1	0.12	0.25

Table 5 (continued)

2019	0.55	1.11	0.18	0.28	0.99	2019	0.36	0.74	0.1	0.11	0.24
Iceland											
Males	All drug use disorders	Opioid	Amfetamin	Cocaine	Other	Females	All drug use disorders	Opioid	Amfetamin	Cocaine	Other
1990	0.23	0.89	0.06	0.05	0.83	1990	0.25	0.59	0.08	0.07	0.61
1991	0.24	0.93	0.06	0.05	0.84	1991	0.26	0.62	0.09	0.07	0.6
1992	0.24	0.93	0.05	0.05	0.8	1992	0.27	0.64	0.09	0.07	0.58
1993	0.24	0.94	0.05	0.05	0.79	1993	0.27	0.65	0.09	0.07	0.58
1994	0.24	0.95	0.05	0.05	0.79	1994	0.28	0.67	0.09	0.08	0.56
1995	0.24	0.95	0.05	0.05	0.75	1995	0.29	0.69	0.09	0.08	0.54
1996	0.25	0.97	0.05	0.05	0.76	1996	0.29	0.69	0.09	0.08	0.55
1997	0.25	0.97	0.05	0.06	0.77	1997	0.3	0.71	0.09	0.08	0.54
1998	0.26	0.98	0.06	0.07	0.8	1998	0.31	0.73	0.09	0.1	0.55
1999	0.28	1	0.07	0.08	0.87	1999	0.32	0.74	0.1	0.09	0.54
2000	0.29	1.02	0.08	0.08	0.94	2000	0.33	0.77	0.1	0.1	0.54
2001	0.29	0.99	0.08	0.09	0.9	2001	0.34	0.78	0.11	0.1	0.55
2002	0.28	0.95	0.08	0.08	0.81	2002	0.33	0.75	0.11	0.1	0.55
2003	0.27	0.94	0.08	0.08	0.76	2003	0.34	0.76	0.11	0.1	0.53
2004	0.27	0.95	0.08	0.09	0.74	2004	0.34	0.75	0.11	0.1	0.52
2005	0.28	0.94	0.08	0.09	0.74	2005	0.34	0.75	0.11	0.1	0.5
2006	0.28	0.93	0.09	0.09	0.76	2006	0.34	0.75	0.12	0.1	0.49
2007	0.28	0.91	0.09	0.09	0.77	2007	0.34	0.75	0.12	0.1	0.49
2008	0.29	0.92	0.09	0.1	0.79	2008	0.34	0.76	0.11	0.09	0.48
2009	0.29	0.92	0.1	0.1	0.81	2009	0.35	0.77	0.11	0.09	0.47
2010	0.29	0.9	0.1	0.1	0.83	2010	0.35	0.78	0.11	0.09	0.47
2011	0.29	0.9	0.1	0.1	0.83	2011	0.37	0.81	0.12	0.09	0.5

Table 5 (continued)

2012	0.3	0.89	0.11	0.1	0.86	2012	0.37	0.82	0.12	0.1	0.51
2013	0.3	0.86	0.11	0.11	0.88	2013	0.38	0.83	0.13	0.1	0.52
2014	0.29	0.82	0.11	0.11	0.88	2014	0.39	0.85	0.13	0.1	0.55
2015	0.31	0.82	0.12	0.11	0.94	2015	0.41	0.87	0.14	0.11	0.58
2016	0.32	0.82	0.13	0.13	0.99	2016	0.41	0.86	0.15	0.12	0.62
2017	0.34	0.83	0.14	0.14	1.07	2017	0.43	0.86	0.17	0.13	0.69
2018	0.39	0.97	0.17	0.16	1.15	2018	0.5	1.06	0.16	0.12	0.66
2019	0.39	0.96	0.17	0.16	1.13	2019	0.48	0.98	0.17	0.13	0.69

Appendix 2

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Declarations

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Appendix 3

Authors' Contributions

Contributions to be included in appendix:

Providing Data or Critical Feedback on Data Sources

Emilie E Agardh, Peter Allebeck, Pär Flodin, Mika Gissler, Ann Kristin Skrindo Knudsen, John J. McGrath, Christopher J L Murray, Mohsen Naghavi, Maja Pasovic, Jens Christoffer Skogen, and Theo Vos.

Developing Methods or Computational Machinery

Simon I Hay, Christopher J L Murray, Mohsen Naghavi, and Theo Vos.

Providing Critical Feedback On Methods or Results

Emilie E Agardh, Peter Allebeck, Amanda Emma Arronsson, Ramesh Paul Bangah, Omid Dadras, Anna-Karin Danielsson, Keshab Deuba, Terje Andreas Eikemo, Pär Flodin, Mika Gissler, Simon I Hay, Khedidja Hedna, Ann Kristin Skrindo Knudsen, John J. McGrath, Alexios-Fotios A. Mentis, Christopher J L Murray, Maja Pasovic, Dominic Sagoe, Jens Christoffer Skogen, Peter Wennberg, and Nanna Weye.

Drafting the Work or Revising is Critically for Important Intellectual Content

Emilie E Agardh, Peter Allebeck, Amanda Emma Arronsson, Anna-Karin Danielsson, Terje Andreas Eikemo, Mika Gissler, Simon I Hay, Khedidja Hedna, Ann Kristin Skrindo Knudsen, John J. McGrath, Alexios-Fotios A. Mentis, Mohsen Naghavi, Maja Pasovic, Sanna Rönkä, Dominic Sagoe, Rannveig Sigurvinsdottir, Jens Christoffer Skogen, Theo Vos, and Nanna Weye.

Management of the Overall Research Enterprise

Emilie E Agardh, Peter Allebeck, Simon I Hay, Christopher J L Murray, Mohsen Naghavi, Maja Pasovic, and Theo Vos.

Acknowledgements Please see Appendix 2

Author contributions Please see Appendix 3 (pp xx-xx) for more detailed information about individual author contributions to the research, divided into the following categories: providing data or critical feedback on data sources; developing methods or computational machinery; providing critical feedback on methods or results; drafting the manuscript or revising it critically for important intellectual content; and management of the overall research enterprise. Members of the core research team for this topic area had full access to the underlying data used to generate estimates presented in this article. All other authors had access to and reviewed estimates as part of the research evaluation process, which includes additional stages of formal review.

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Declarations Please see Appendix 2.

Ethical Approval The study is solely based on aggregated data publicly available in the GBD Global Health Data Exchange (GHDx) platform hosted by the Institute for Health Metrics and Evaluation.

Conflict of Interest None to declare.

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Authors and Affiliations

GBD 2019 Nordic Drug Use Collaborators · Emilie E. Agardh[1] · Peter Allebeck[1] · Ann Kristin Skrindo Knudsen[2,3] · Amanda E. Aronsson[4] · Pär Flodin[1] · Terje A. Eikemo[4] · Paul R. Bangah[1] · Jens Christoffer Skogen[5,6,7] · Mika Gissler[8,9,10] · Sanna Rönkä[8] · John J. McGrath[11,12,13] · Rannveig Sigurvinsdóttir[14] · Omid Dadras[15,16] · Keshab Deuba[1,17] · Khedidja Hedna[18,19] · Alexios-Fotios A. Mentis[20] · Dominic Sagoe[21] · Rahman Shiri[22] · Nanna Weye[2,3,23] · Simon I. Hay[24,25] · Christopher J. L. Murray[24,25] · Mohsen Naghavi[24,25] · Maja Pasovic[24] · Theo Vos[24,25] · Peter Wennberg[1,2,26] · Anna-Karin Danielsson[1]

✉ Emilie E. Agardh
emilie.agardh@ki.se

[1] Department of Global Public Health, Karolinska Institutet, SE-171 77 Stockholm, Sweden

[2] Department of Public Health Sciences, Stockholm University, Stockholm, Sweden

[3] Department of Disease Burden, the Norwegian Institute of Public Health, Bergen, Norway

[4] Centre for Global Health Inequalities Research (CHAIN), Department of Sociology and Political Science, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

[5] Department of Health Promotion, Norwegian Institute of Public Health, Bergen, Norway

[6] Centre for Evaluation of Public Health Measures, Norwegian Institute of Public Health, Oslo, Norway

[7] Alcohol & Drug Research Western Norway, Stavanger University Hospital, Stavanger, Norway

[8] Department of Knowledge Brokers, Finnish Institute for Health and Welfare, Helsinki, Finland

[9] Department of Molecular Medicine and Surgery, Karolinska Institutet, Stockholm, Sweden

[10] Region Stockholm, Academic Primary Health Care Centre, Stockholm, Sweden

[11] NCRR, National Center for Register-Based Research, Business and Social Sciences, Aarhus University, Aarhus, Denmark

[12] Queensland Brain Institute, The University of Queensland, St Lucia, QLD, Australia

[13] Queensland Centre for Mental Health Research, The Park Centre for Mental Health, Wacol, QLD, Australia

[14] Department of Psychology, Reykjavik University, Reykjavik, Iceland

[15] Section Global Health and Rehabilitation, Western Norway University of Applied Sciences, Bergen, Norway

[16] Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway

[17] National Centre for AIDS and STD Control, Save the Children, Kathmandu, Nepal

[18] Department of Neuropsychiatric Epidemiology, University of Gothenburg, Gothenburg, Sweden

[19] Statistikkonsulterna, Gothenburg, Sweden

[20] International Dx Department, BGI Genomics, Copenhagen, Denmark

[21] Department of Psychosocial Science (D Sagoe PhD), University of Bergen, Bergen, Norway

[22] Finnish Institute of Occupational Health, Helsinki, Finland

[23] Department of Clinical Epidemiology, Aarhus University, Aarhus N, Denmark

[24] Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA, USA

[25] Department of Health Metrics Sciences, School of Medicine, University of Washington, Seattle, WA, USA

[26] Department of Psychology, Inland Norway University of Applied Sciences, Elverum, Norway