The following appendix is part of a Commonwealth Fund blog post, Evan D. Gumas and Jesse C. Baumgartner, "U.S. Overdose Deaths Remain Higher Than in Other Countries — How Harm Reduction Programs Could Help," *To the Point* (blog), June 22, 2023, https://www.commonwealthfund.org/blog/2023/us-overdose-deaths-remain-higher-other-countries-how-harm-reduction-programs-could-help

APPENDIX

Source Notes: Drug-Related Deaths

Country	Mortality type	Overdose/ drug-related deaths	Total population*	Deaths per 1,000,000 total population (unadjusted)	Overdose/ drug-related deaths	Deaths per 1,000,000 total population (unadjusted)	Overdose/ drug-related deaths	Deaths per 1,000,000 total population (unadjusted)	Percent change in mortality total	Deaths (any age) per 1,000,000 population ages 15–64 (unadjusted)	Source (mortality)	Source (population)
		2021	2021	2021	2020	2020	2019	2019	2019 to 2021	2021		
Australia	Drug overdose deaths	1,732	25,688,079	67.4	1,897	73.9	1,921	75.8	-10%	104.2	*Trends in Overdose and Other Drug-Induced Deaths in Australia, 2002-2021* (National Illicit Drug Indicators Project, May 2023)	*National, state and territory population* (Australian Bureau of Statistics, Sept. 2022)
Canada**	Apparent opioid toxicity deaths	8,006	38,226,498	209.4	6,423	169.0	3,711	98.7	116%	318.7	*Apparent Opioid and Stimulant Toxicity Deaths* (Public Health Agency of Canada, Mar. 2023)	*Population Estimates on July 1, by age and sex* (Statistics Canada, Dec. 2022)
France	Drug-induced deaths	627	67,738,858	9.3	567	8.4	503	7.5	25%	15.2	*Deaths Related to Drug and Substance Abuse* (Agence nationale de sécurité du médicament et des produits de santé DRAMES Survey, May 2023)	*Demography - Average population of the year* (French National Institute of Statistics and Economic Studies, Jan. 2023)
Germany	Drug-related deaths***	1,826	83,129,285	22.0	1,581	19.0	1,398	16.8	31%	34.3	*Commisioner of the Federal Government for Drug and Addiction Policy* (May 2022)	*Population by nationality and sex* (quality figures), (Statistisches Bundesamt, Destatis, 2022).
Netherlands	Drug-related deaths***	298	17,500,964	17.0	295	16.9	252	14.5	18%	26.4	*5.7.3 Mortality in the Netherlands* (National Drug Monitor, May 2023)	*Population dynamics; month and year* (CBS Netherlands, Jan. 2023)
New Zealand	Drug overdose deaths	171	5,109,600	33.5	150	29.5	124	24.9	38%	51.3	*Fatal overdoses in Aotearoa 2017–2021* (NZ Drug Foundation, Nov. 2022)	*Population Statistics* (Stats NZ, Tatauranga Aotearoa, Mar. 2023)
Norway	Drug-induced deaths***	247	5,391,369	45.8	331	61.7	275	51.6	-10%	70.5	*Drug-induced deaths in Norway* (Norwegian Institute of Public Health, June 2023)	*Population* (Statistics Norway, 2022)

Country	Mortality type	Overdose/ drug-related deaths	Total population*	Deaths per 1,000,000 total population (unadjusted)	Overdose/ drug-related deaths	Deaths per 1,000,000 total population (unadjusted)	Overdose/ drug-related deaths	Deaths per 1,000,000 total population (unadjusted)	Percent change in mortality total	Deaths (any age) per 1,000,000 population ages 15–64 (unadjusted)	Source (mortality)	Source (population)
		2021	2021	2021	2020	2020	2019	2019	2019 to 2021	2021		
Portugal	Drug overdose deaths	74	10,421,117	7.1	51	4.9	63	6.1	17%	11.2	*The Situation of the Country in Matters of Drugs and Drug Addictions* (SICAD, Dec. 2022)	Demographic Statistics — 2021 (Instituto Nacional de Estatística, Statistcs Portugal, 2023)
Sweden	Drug-related deaths	774	10,452,326	74.1	830	80.0	905	87.6	-14%	119.2	*Sweden Statistical Database, Cause of Death* (Socialstytrelsen, June 2023)	*Population and Population Changes 1749-2021* (Statistics Sweden, Feb. 2022)
Switzerland	Drug-related deaths	147	8,739,000	16.8	142	16.4	141	16.4	4%	25.5	*Drug-related deaths in Switzerland* (Federal Office of Public Health, Apr. 2023)	*Key population figures, 1950-2021* (Swiss Federal Statistical Office, Sept. 2022)
UK (England & Wales)	Drug poisoning deaths	4,859	59,641,829	81.5	4,561	76.4	4,393	73.9	11%	127.3	*Deaths related to drug poisoning in England and Wales: 2021 registrations* (Office for National Statistics, Aug. 2022)	*Population and household estimates, England and Wales: Census 2021* (Office for National Statistics, Nov. 2022)
UK (Northern Ireland)	Drug-related deaths	213	1,904,563	111.8	218	115.0	191	100.9	12%	175.9	*Drug-related and drug-misuse deaths 2011-2021* (Northern Ireland Statistics and Research Agency, Nov. 2022)	*2021 Mid Year Population Estimates for Northern Ireland* (NISRA, Nov. 2022)
UK (Scotland)	Drug poisoning deaths	1,444	5,479,900	263.5	1,461	267.3	1,406	257.4	3%	406.5	*Drug-related Deaths in Scotland in 2021* (National Records of Scotland, July 2022)	*Mid-2021 Population Estimates Scotland* (National Records of Scotland, Aug. 2022)
United States	Drug overdose deaths	106,699	331,793,657	321.6	91,799	277.0	70,630	215.2	51%	456.2	*Drug Overdose Deaths in the United States, 2001-2021* (National Center for Health Statistics, Dec. 2022)	*National Population Totals and Components of Change: 2020-2022* (United States Census Bureau, Mar. 2023)

* Population reflects the total population in the country for the mortality data year used (midyear point).

** Canada deaths include only those related to opioids (see notes below).

Drug Mortality Country Notes

EMCDDA

*** Reflects EMCDDA definition of "drug-induced deaths"; EMCDDA generally defines drug-induced deaths as "people who die directly due to use of illegal substances, although these often occur in combination with other substances such as alcohol or psychoactive medicines. The deaths generally occur shortly after the consumption of the substance and are commonly referred to as overdoses or poisonings."

Importantly, this definition/number may not include overdose deaths from certain drugs that contribute to totals reported by individual countries.

EMCDDA methodology counts mortality cases with underlying cause of death ICD-10 codes of F11/12/14/15/16/19; X41/42/61/62 and Y11/12 in combination with particular T codes; and X44/64 and Y14 in combination with particular T codes.

For a full EMCDDA methodology description with further details, see: https://www.emcdda.europa.eu/data/stats2022/methods/drd_en; also see EMCDDA notes by country indicating potential small differences between national defintions: https://www.emcdda.europa.eu/data/stats2022_en#displayTable:DRD-33.

Individual Countries

Australia: 2021 Australia data is revised preliminary data, for more details, see https://ndarc.med.unsw.edu.au/sites/default/files/ndarc/resources/NIDIP_Drug%20induced%20deaths_2002-2021_Methods.pdf. The National Drug and Alcohol research center defines drug overdose deaths as ""all deaths where the acute toxic effect of a drug was determined by the coroner, forensic pathologist or forensic toxicologist to be the UCOD (i.e., ICD-10 codes for accidental poisoning X40-X44, intentional poisoning X60-X64, undetermined intent of poisoning Y10-Y14 and assault by drugs X85).

Canada: An "apparent drug toxicity death" as defined by the Public Health Agency of Canda is caused by "intoxication/toxicity (poisoning) resulting from substance use, where one or more of the substances is an opioid or a stimulant, regardless of how it was obtained (e.g. illegally or through personal prescription)." **Because Canada does not report a total mortality number for deaths related to opioids or stimulants (i.e. one that is mutually exclusive), in this figure we only use the PHAC estimate for "apparent opioid toxicity deaths." Thus, while "apparent drug toxicity deaths" likely capture the majority of all drug-related deaths, the full mortality estimate for Canada is higher. For more detail, see: https://health-infobase.canada.ca/src/doc/SRHD/Update_Deaths_2023-03.pdf.

France: DRAMES Survey data uses drug and substance abuse-related deaths that meet the EMCDDA definition of direct drug-induced deaths. Suicide deaths are excluded. DRAMES aims to identify and quantify the substances involved by means of blood tests, though the register is not exhaustive as deaths must be reported to DRAMES in order to be counted.

Norway: In recently released data, Norway reported 321 drug-induced deaths in 2022.

New Zealand: Drug overdose deaths are made up of both active and closed cases from the New Zealand coroner's office. There is a large backlog of cases dating back a number of years, so overall numbers are underestimates and only show the number of deaths processed by the coroner's office at the most recent release of data. Suicides are excluded from New Zealand's reporting though overdose death counts include those attributed to alcohol. For more details on definitions, see: https://www.drugfoundation.org.nz/news-media-and-events/overdose-report-2017-2022.

Portugal: Drug overdose deaths are composed of deaths where drug use is the direct cause of mortality and medicolegal etiology; for more detail, see: https://www.sicad.pt/BK/Publicacoes/Lists/SICAD_PUBLICACOES/Attachments/178/RelatorioAnual_2021_%20ASituacaoDoPaisEmMateriaDeDrogasEToxicodependencias.pdf.

Sweden: As defined by the Public Health Agency of Sweden, drug-related deaths are for age 15 and up and include "deaths due to poisoning of specific drugs, narcotics or biological substances, as the underlying cause of death (ICD-10: X40-X44, X60-X64, Y10-Y14 in combination with T36-T50.9)." In recently released data, Sweden reported 860 drug-related deaths in 2022.

Switzerland: As defined by the Federal Office of Public Health, drug-related deaths are "the number of directly drug related deaths due to intoxication or overdose;" defined by ICD-10 codes (WHO version): F11/F12/F14/F15/F16/F19; X42; X62; Y12; for more detail, see: https://ind.obsan.admin.ch/en/indicator/monam/drug-related-deaths.

UK (England & Wales): As defined by the Office for National Statistics, drug poisoning deaths "involve a broad spectrum of substances, including controlled and non-controlled drugs, prescription medicines (either prescribed to the individual or obtained by other means) and over-the-counter medications. As well as deaths from drug abuse and dependence, figures include accidents and suicides involving drug poisonings, and complications of drug abuse such as deep vein thrombosis or septicaemia from intravenous drug use." Drug poisoning deaths include the following ICD-10 codes: F11–F16, F18–F19, X40–X44, X60–X64, Y10–Y14, X85. More details of the definition, including ICD codes used, can be found at: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/methodologies/deathsrelatedtodrugpoisoninginenglandandwalesqmi.

Of note, the ONS reports based on year of death registration and indicates that "because of registration delays, around half of these deaths will have occurred in previous years."

UK (Northern Ireland): As defined by the Northern Ireland Statistics and Research Agency, drug-related deaths are defined as "when the underlying cause of death recorded on the death certificate is drug poisoning, drug abuse or drug dependence." It includes the following ICD-10 codes: F11–F16, F18–F19, X40–X44, X60–X64, Y10–Y14, X85. Using only ICD-10 codes X40-X44, X60-X64, X85, and Y10-Y14, the totals are 212 deaths for 2021; 216 for 2020 and 191 for 2019. More details of the definition can be found at: https://www.nisra.gov.uk/system/files/statistics/Drug%20Deaths%20in%20NI%202021%20-%20revised.pdf.

Northern Ireland statistics are also based on death registration year.

UK (Scotland): The Office for National Statistics and National Records of Scotland use the following ICD-10 codes to create the ""drug poisoning death"" total: F11–F16, F18–F19, X40–X44, X60–X64, Y10–Y14, X85. More details of the definition can be found at: https://www.nrscotland.gov.uk/files//statistics/drug-related-deaths/21/drug-related-deaths-21-annex-B.pdf.

Scotland statistics are also based on registration year.

United States: As defined by the Centers for Disease Control and Prevention, drug poisoning (overdose) deaths include "deaths resulting from unintentional or intentional overdose of a drug, being given the wrong drug, taking a drug in error, or taking a drug inadvertently;" drug overdose deaths are identified using the ICD–10 underlying cause of-death codes X40–X44, X60–X64, X85, and Y10–Y14. For more details, see: https://www.cdc.gov/nchs/products/databriefs/db457.htm#Definitions.

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Source Notes: Synthetics

Country	Year	Mortality type	Total overdose/ drug-related deaths	Synthetic opioid deaths category definition	Number of deaths involving synthetic opioids (any type)	Synthetic opioid deaths as percent of overall drug mortality (%)	Tramadol-related deaths category definition	Number of deaths involving tramadol	Tramadol-related deaths as percent of overall drug mortality (%)	Fentanyl/ fentanyl analogue-related deaths category definition	Number of deaths involving fentanyl/ fentanyl analogues	Fentanyl/ fentanyl analogue-related deaths as percent of overall drug mortality (%)	Additional notes	Source (mortality)
Australia	2021	Drug overdose deaths	1,732	Deaths involving synthetic opioids (e.g. fentanyl, pethidine, and tramadol); ICD-10 code T40.4	184	11%	—	—	—	—	—	—		*Trends in Overdose and Other Drug-Induced Deaths in Australia, 2002-2021* (National Illicit Drug Indicators Project, May 2023)
France	2021	Drug-induced deaths	627	—	—	—	Drug-induced deaths involving tramadol	13	2%	Drug-induced deaths involving fentanyl	3	0.5%	49 reported drug-induced deaths involving buprenorphine (7.8%)	*Deaths Related to Drug and Substance Abuse* (ANMS DRAMES Survey, May 2023)
Norway	2021	Drug-induced deaths***	247	Deaths where the main intoxicant substance that the death was linked to was ICD-10 code T40.4	—	18%	—	—	—	—	—	—	Norway has reported 321 drug-induced deaths for 2022, with 14% attributed to synthetic opioids.	*Drug-induced deaths in Norway* (Norwegian Institute of Public Health, June 2023)
Sweden	2021	Drug-related deaths	774	Deaths involving synthetic opioids (e.g. fentanyl, pethidine, and tramadol); ICD-10 code T40.4	142	18%	—	—	—	—	—	—	In 2021, fentanyl, tramadol, or pethidine were mentioned on the death certificate of 79 deaths (either alone or in combination).	*Sweden Statistical Database, Cause of Death* (Socialstytrelsen, June 2023) and authors' direct communication with Socialstyrelsen Sweden.
UK (England & Wales)	2021	Drug poisoning deaths	4,859	—	—	—	Poisoning deaths involving tramadol	195	4%	Poisoning deaths involving fentanyl	58	1%	3 reported poisoning deaths involving fentanyl analogues (0.06%) 51 reported poisoning deaths involving buprenorphine (1%)	*Deaths related to drug poisoning in England and Wales: 2021 registrations* (Office for National Statistics, Aug. 2022)

Country	Year	Mortality type	Total overdose/ drug-related deaths	Synthetic opioid deaths category definition	Number of deaths involving synthetic opioids (any type)	Synthetic opioid deaths as percent of overall drug mortality (%)	Tramadol-related deaths category definition	Number of deaths involving tramadol	Tramadol-related deaths as percent of overall drug mortality (%)	Fentanyl/ fentanyl analogue-related deaths category definition	Number of deaths involving fentanyl/ fentanyl analogues	Fentanyl/ fentanyl analogue-related deaths as percent of overall drug mortality (%)	Additional notes	Source (mortality)
UK (Northern Ireland)	2021	Drug-related deaths	213	—	—	—	Drug-related deaths involving tramadol	22	10%	Drug-related deaths involving fentanyl	11	5%		*Drug-related and drug-misuse deaths 2011–2021* (Northern Ireland Statistics and Research Agency, Nov. 2022)
UK (Scotland)	2021	Drug poisoning deaths	1,444	Drug poisoning deaths in which implicated deaths coded to T40.4	234	16%	—	58	4%	Poisoning deaths involving fentanyl	7	0.5%	128 reported poisoning deaths involving buprenorphine (8.9%)	*Drug-related Deaths in Scotland in 2021* (National Records of Scotland, July 2022)
United States	2021	Drug overdose deaths	106,699	Drug overdose deaths involving ICD-10 multiple cause of death code, T40.4, "Synthetic opioids other than methadone"	70,601	66%	—	—	—	—	—	—		*Drug Overdose Deaths in the United States, 2001–2021* (National Center for Health Statistics, Dec. 2022)

Drug Mortality Country Notes

Individual Countries

Many countries do not report a specific "synthetic opioid" death number, instead they report deaths involving individual drugs. However, multiple drugs may be present in a reported case, hence why they are unable to be combined. In all countries, deaths broken out by individual drug may be underestimates.

France: The country does not report a specific "synthetic opioid" death number; instead they report deaths involving individual drugs.

Norway: Other synthetic opioids refer to drugs like pethidine, fentanyl, aporex, buprenorphine/ subutex, tramadol, nobligan, ketogan, nozinan, etc.

UK (England & Wales): The country does not report a specific "synthetic opioid" death number; instead they report deaths involving individual drugs. The number of deaths involving specific drugs are defined as drug poisoning deaths "where the underlying cause was drug poisoning and the specified substance was mentioned on the death certificate."

UK (Northern Ireland): The country does not report a specific "synthetic opioid" death number; instead they report deaths involving individual drugs. The number of deaths involving specific drugs are defined as drug-related deaths "where selected substances were mentioned on the death certificate by registration year."

United States: As noted by the Centers for Disease Control and Prevention, fentanyl makes up the majority of synthetic opioid deaths. For details see: https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2022/202205.htm.

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