

Web Table 1. Causes of death and associated International Classification of Disease (ICD) codes

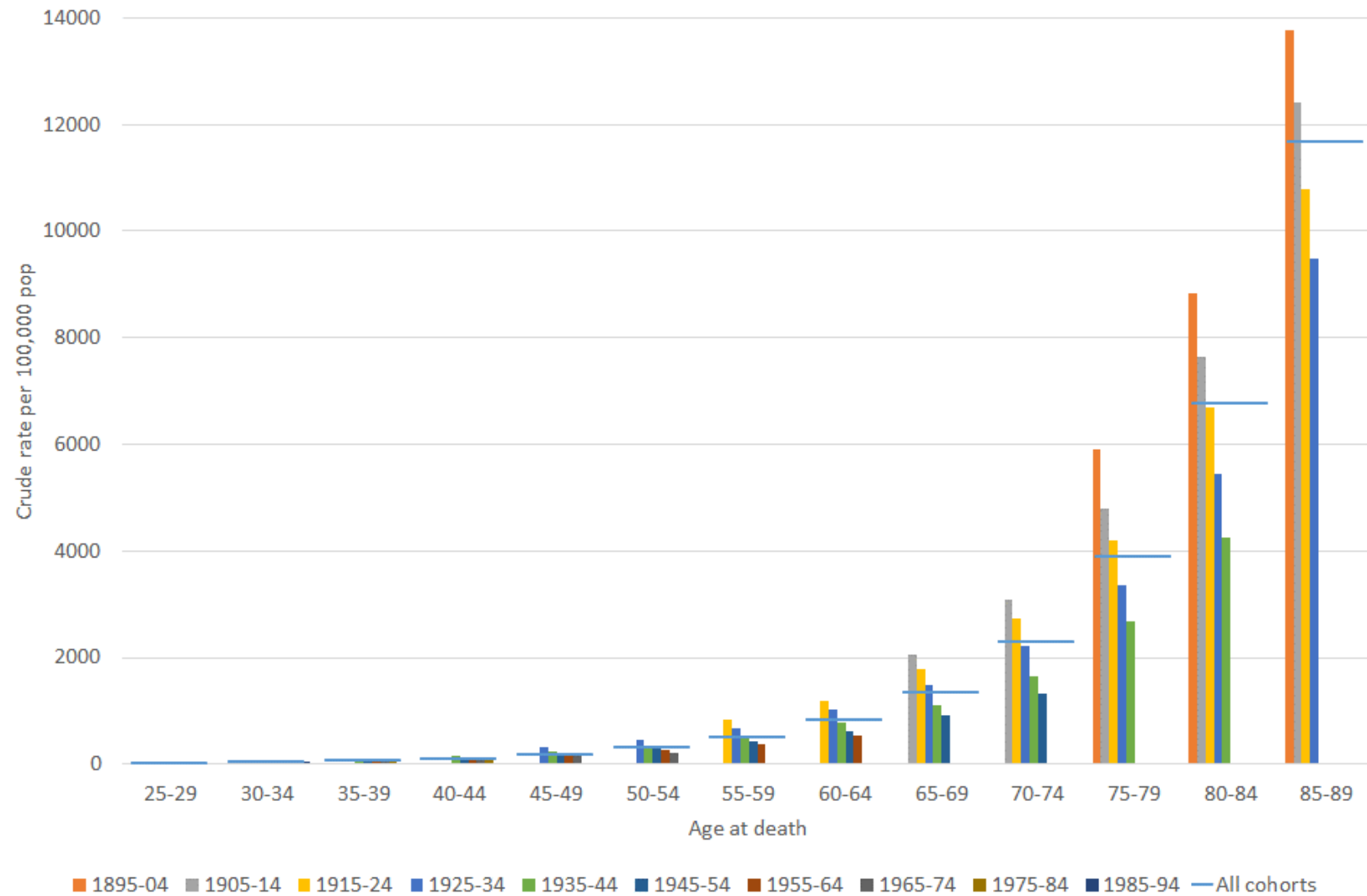
<b>Cause</b>	<b>ICD9 code(s)<sup>i</sup></b>	<b>ICD10 codes<sup>ii</sup></b>
Intentional self-harm (including events of undetermined intent)	E950-E959, E980-E989	X60-X84, Y10-Y34, Y87.0, Y87.2
Alcohol related causes <sup>iii</sup>	291, 303, 305.0, 425.5, 571.0-571.5, 571.8, 571.9, E860	F10, G312, G621, I426, K292, K70, K73, K740-K742, K746-K749, K860, X45, X65, Y15
Drug related poisonings <sup>iv</sup>	304, 305.2-305.9, E850-E858, E950.0-E950.5, E9620, E980.0-E980.5	F11-F16, F18, F19, X40-X44, X60-X64, X85, Y10-Y14

<sup>i</sup> 1981-1999 in Scotland; 1981-2000 in England & Wales.

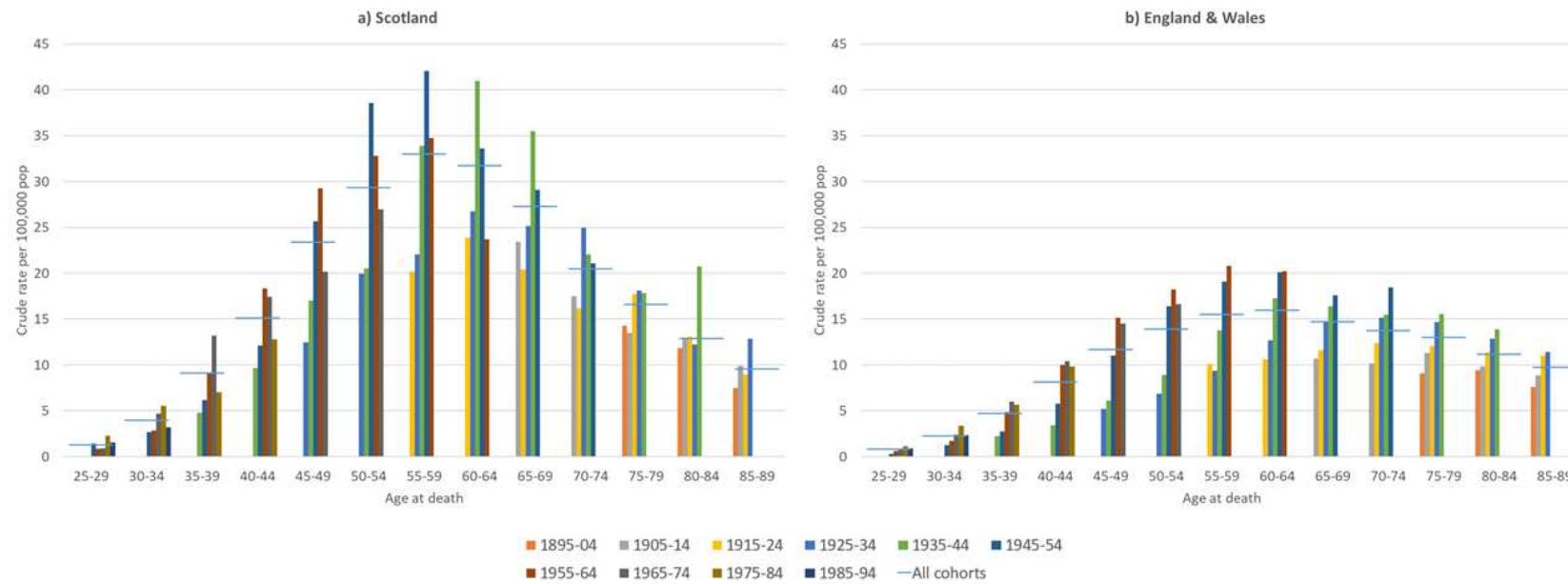
<sup>ii</sup> 2000-2017 in Scotland; 2001-2017 in England & Wales.

<sup>iii</sup> These are the groups of codes agreed by National Records of Scotland (NRS) and the (UK) Office for National Statistics (ONS) in 2007. They have since been updated, but the request for mortality data from national agencies pre-dated the change in codes.

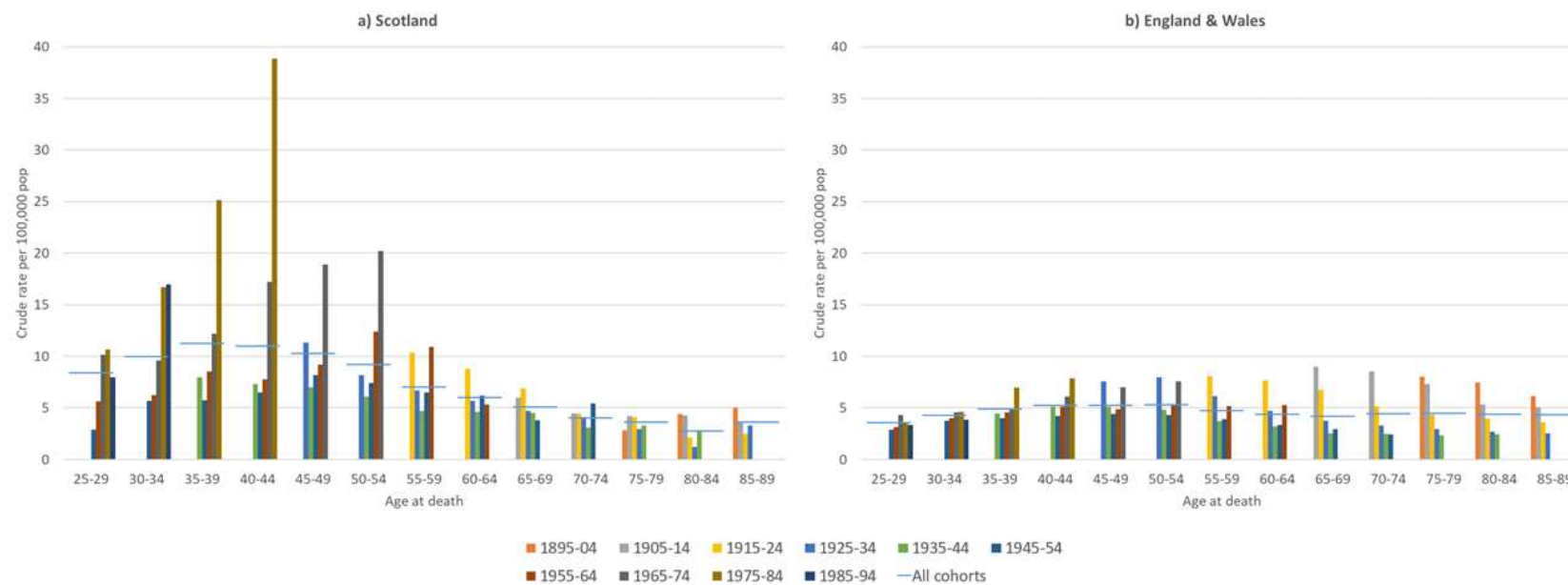
<sup>iv</sup> These are the set of codes previously deemed most comparable between Scotland and England & Wales. See: Walsh D., Bendel N., Jones R., Hanlon P. It's not 'just deprivation': Why do equally deprived UK cities experience different health outcomes? *Public Health* 2010; 124: 487-495.



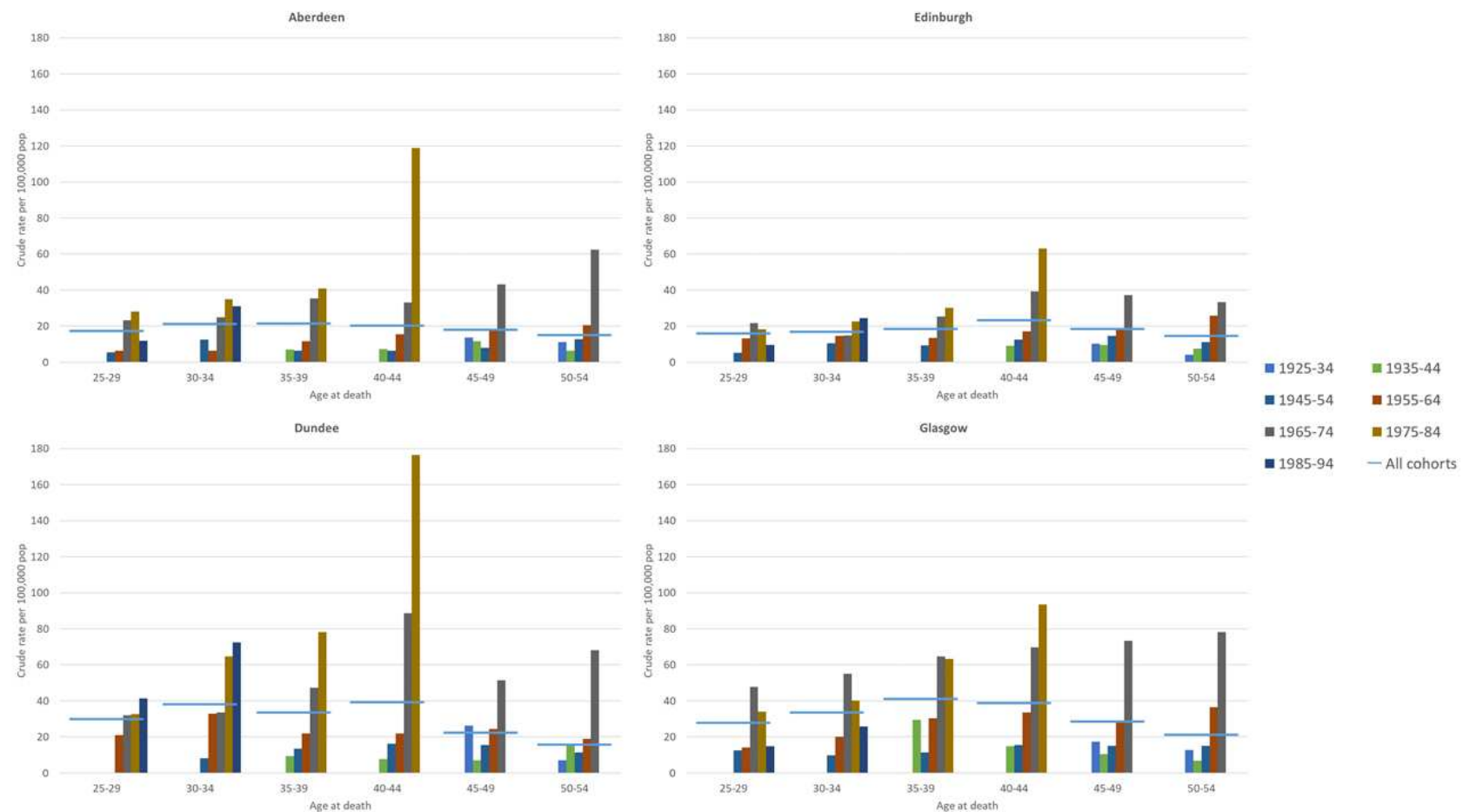
Web Figure. 1. Crude all-cause mortality rates per 100,000 population by 10-year birth cohort, females, England & Wales, 1981-2017



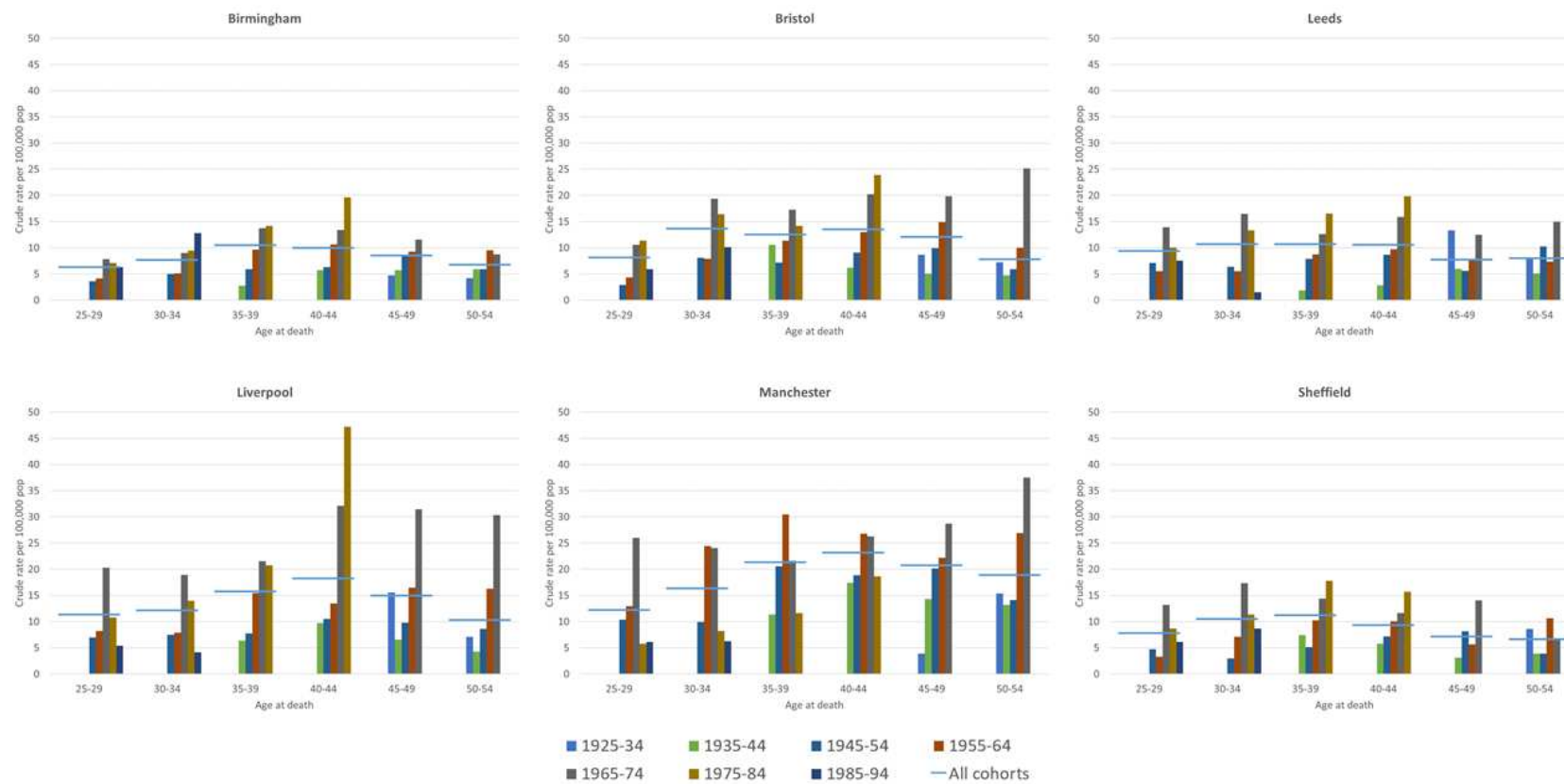
Web Figure 2. Alcohol-related mortality: crude rates per 100,000 population by 10-year birth cohort, females, (a) Scotland and (b) England & Wales, 1981-2017



Web Figure 3. Deaths from drug-related poisonings: crude rates per 100,000 population by 10-year birth cohort, females, (a) Scotland and (b) England & Wales, 1981-2017



Web Figure 4. Deaths from drug-related poisonings (25-54 years): crude rates per 100,000 population by 10-year birth cohort, both sexes, four Scottish cities, 1981-2017. Note different x-axis scale to that used in Web Figure 5.



Web Figure 5. Deaths from drug-related poisonings (25-54 years): crude rates per 100,000 population by 10-year birth cohort, both sexes, six English cities, 1981-2017. Note different x-axis scale to that used in Web Figure 4.

**Web Table 2. Results of negative binomial regression analyses showing coefficients (and standard errors) for six separate models**

	<b>Drug-related poisonings, males</b>	<b>Drug-related poisonings, females</b>	<b>Alcohol-related deaths, males</b>	<b>Alcohol-related deaths, females</b>	<b>Suicide, males</b>	<b>Suicide, females</b>
(Intercept)	-9.665***	-9.939***	-8.217***	-8.922***	-8.553***	-9.489***
	(0.056)	(0.047)	(0.080)	(0.078)	(0.038)	(0.038)
age_group0-4	-4.763***	-4.324***	-6.462***	-5.942***	-2.869***	-2.137***
	(0.171)	(0.198)	(0.269)	(0.276)	(0.086)	(0.094)
age_group5-9	-6.723***	-5.374***	-7.781***	-7.039***	-4.327***	-3.461***
	(0.345)	(0.276)	(0.404)	(0.381)	(0.121)	(0.133)
age_group10-14	-4.288***	-3.129***	-8.015***	-7.373***	-3.234***	-2.669***
	(0.117)	(0.100)	(0.396)	(0.395)	(0.075)	(0.088)
age_group15-19	-1.514***	-1.343***	-5.366***	-5.652***	-0.745***	-0.758***
	(0.071)	(0.066)	(0.142)	(0.182)	(0.049)	(0.054)
age_group20-24	-0.658***	-0.927***	-4.265***	-4.607***	-0.077*	-0.379***
	(0.066)	(0.060)	(0.111)	(0.129)	(0.046)	(0.049)
age_group25-29	-0.236***	-0.642***	-3.127***	-3.274***	0.032	-0.204***
	(0.063)	(0.057)	(0.096)	(0.103)	(0.044)	(0.046)

	<b>Drug-related poisonings, males</b>	<b>Drug-related poisonings, females</b>	<b>Alcohol-related deaths, males</b>	<b>Alcohol-related deaths, females</b>	<b>Suicide, males</b>	<b>Suicide, females</b>
age_group30-34	-0.019	-0.421***	-2.165***	-2.200***	0.073*	-0.129***
	(0.061)	(0.054)	(0.089)	(0.091)	(0.043)	(0.045)
age_group35-39	0.058	-0.216***	-1.408***	-1.374***	0.076*	-0.055
	(0.060)	(0.053)	(0.085)	(0.085)	(0.042)	(0.043)
age_group40-44	0.168***	-0.070	-0.813***	-0.784***	0.143***	-0.013
	(0.059)	(0.051)	(0.083)	(0.082)	(0.041)	(0.042)
age_group45-49	0.124**	-0.019	-0.309***	-0.287***	0.099**	0.031
	(0.059)	(0.051)	(0.081)	(0.080)	(0.040)	(0.041)
age_group55-59	-0.163***	-0.188***	0.280***	0.257***	-0.106***	-0.198***
	(0.062)	(0.052)	(0.082)	(0.081)	(0.041)	(0.042)
age_group60-64	-0.309***	-0.345***	0.431***	0.346***	-0.305***	-0.413***
	(0.064)	(0.054)	(0.082)	(0.081)	(0.042)	(0.044)
age_group65-69	-0.534***	-0.558***	0.514***	0.365***	-0.490***	-0.626***
	(0.069)	(0.057)	(0.086)	(0.084)	(0.044)	(0.045)
age_group70-74	-0.651***	-0.730***	0.440***	0.274***	-0.578***	-0.811***



	<b>Drug-related poisonings, males</b>	<b>Drug-related poisonings, females</b>	<b>Alcohol-related deaths, males</b>	<b>Alcohol-related deaths, females</b>	<b>Suicide, males</b>	<b>Suicide, females</b>
	(0.073)	(0.060)	(0.086)	(0.085)	(0.046)	(0.048)
age_group75-79	-0.645***	-0.878***	0.395***	0.236***	-0.554***	-0.958***
	(0.078)	(0.064)	(0.091)	(0.090)	(0.049)	(0.050)
age_group80-84	-0.550***	-1.058***	0.364***	0.133	-0.491***	-1.114***
	(0.084)	(0.069)	(0.093)	(0.092)	(0.052)	(0.054)
age_group85-89	-0.410***	-1.131***	0.266**	-0.024	-0.418***	-1.261***
	(0.095)	(0.077)	(0.104)	(0.101)	(0.057)	(0.060)
cohort1895-04	0.581***	1.424***	-0.984***	-0.541***	0.996***	1.748***
	(0.118)	(0.089)	(0.139)	(0.133)	(0.071)	(0.068)
cohort1905-14	0.497***	1.230***	-0.874***	-0.466***	0.816***	1.509***
	(0.084)	(0.068)	(0.109)	(0.106)	(0.054)	(0.053)
cohort1915-24	0.118*	0.817***	-0.689***	-0.384***	0.455***	1.041***
	(0.071)	(0.058)	(0.095)	(0.093)	(0.046)	(0.046)
cohort1925-34	-0.174***	0.410***	-0.595***	-0.326***	0.188***	0.589***
	(0.063)	(0.052)	(0.087)	(0.085)	(0.042)	(0.041)

	Drug-related poisonings, males	Drug-related poisonings, females	Alcohol-related deaths, males	Alcohol-related deaths, females	Suicide, males	Suicide, females
cohort1935-44	-0.335***	0.039	-0.355***	-0.246***	0.011	0.183***
	(0.059)	(0.049)	(0.083)	(0.081)	(0.039)	(0.039)
cohort1955-64	0.396***	0.192***	0.273***	0.308***	0.059	-0.078**
	(0.057)	(0.048)	(0.085)	(0.084)	(0.039)	(0.038)
cohort1965-74	0.936***	0.412***	0.434***	0.444***	0.116***	-0.147***
	(0.060)	(0.051)	(0.092)	(0.092)	(0.041)	(0.041)
cohort1975-84	1.225***	0.581***	0.556***	0.611***	-0.048	-0.230***
	(0.066)	(0.057)	(0.103)	(0.105)	(0.045)	(0.046)
cohort1985-94	0.655***	0.203***	0.263**	0.528***	-0.262***	-0.345***
	(0.077)	(0.069)	(0.128)	(0.136)	(0.052)	(0.055)
<i>Interaction terms (Scottish excess mortality)</i>						
populationscot†	0.306***	0.471***	0.772***	0.721***	0.288***	0.392***
	(0.065)	(0.058)	(0.084)	(0.084)	(0.042)	(0.046)
cohort1895-04 × populationscot††	-0.605**	-0.923***	-0.439**	-0.513**	-0.437***	-0.614***

	Drug-related poisonings, males	Drug-related poisonings, females	Alcohol-related deaths, males	Alcohol-related deaths, females	Suicide, males	Suicide, females
	(0.291)	(0.199)	(0.219)	(0.202)	(0.139)	(0.135)
cohort1905-14 × populationscot++	-0.474***	-0.922***	-0.202	-0.355**	-0.281***	-0.611***
	(0.153)	(0.123)	(0.150)	(0.147)	(0.084)	(0.089)
cohort1915-24 × populationscot++	-0.352***	-0.517***	-0.084	-0.332**	-0.095	-0.309***
	(0.123)	(0.098)	(0.131)	(0.129)	(0.071)	(0.075)
cohort1925-34 × populationscot++	-0.060	-0.378***	0.065	-0.182	-0.012	-0.213***
	(0.105)	(0.090)	(0.121)	(0.120)	(0.064)	(0.070)
cohort1935-44 × populationscot++	0.063	-0.152*	0.144	0.012	0.051	-0.122*
	(0.098)	(0.087)	(0.118)	(0.118)	(0.062)	(0.068)
cohort1955-64 × populationscot++	0.206**	0.091	-0.127	-0.187	0.051	0.047
	(0.088)	(0.080)	(0.122)	(0.123)	(0.059)	(0.065)
cohort1965-74 × populationscot++	0.490***	0.348***	-0.133	-0.190	0.197***	0.180***
	(0.088)	(0.080)	(0.130)	(0.132)	(0.061)	(0.066)

	Drug-related poisonings, males	Drug-related poisonings, females	Alcohol-related deaths, males	Alcohol-related deaths, females	Suicide, males	Suicide, females
cohort1975-84 × populationscot††	0.702***	0.592***	-0.293**	-0.224	0.325***	0.219***
	(0.094)	(0.085)	(0.148)	(0.156)	(0.066)	(0.075)
cohort1985-94 × populationscot††	0.900***	0.541***	-0.202	-0.189	0.284***	0.231***
	(0.108)	(0.106)	(0.201)	(0.231)	(0.076)	(0.089)

### Notes

Reference category for age group: 50-54 years

Reference category for birth cohort: 1945-54

\* =  $p < 0.1$ ; \*\* =  $p < 0.05$ ; \*\*\*  $p < 0.01$

† ‘Populationscot’ is a variable that adjusts cause-specific mortality effects for the reference population (persons 50-54 years old in the 1945-54 birth cohort) associated with living in Scotland compared with England & Wales. The cohort:Scotland interaction terms (e.g. ‘cohort1905-14 × populationscot’) then further adjusts estimates for cohorts other than the reference category.

†† ‘Cohortxxx-xx × populationscot’ variables are the interaction terms between birth cohort and country of residence. These therefore further adjust the estimates for cohorts other than the reference category (i.e. so associated with living in Scotland and not being in the reference birth cohort of 1945-54).

### Methodological note

The above table summarises the results of the negative binomial regression models. For each cause of death, the formula used was  $n\_deaths \sim age\_group + cohort * population + offset(\log(pop\_size))$ , where  $n\_deaths$  is number of deaths from that cause,  $age\_group$  and  $cohort$  indicate the age group and birth cohort respectively,  $population$  is a dummy variable set to 1 if the population is Scotland, 0 if England & Wales, and  $pop\_size$  is the population size (so number at risk of the event,  $n\_deaths$ , i.e. of dying of the specific cause of interest). The inclusion of the asterisk term, \*, indicates that interactions between birth cohorts and the population flag terms should also be calculated. Excess mortality risks in Scottish population, compared with equivalent birth

cohorts in England & Wales, are therefore identified by looking at whether the population terms, and population:cohort interaction terms, are positive and statistically significant.