

**Supplementary material**

**Title:** Place and causes of acute cardiovascular mortality during the COVID-19 pandemic

Supplementary table 1. ICD-10 codes used to define acute cardiovascular causes of death

Variable	Version	
<b>Diagnoses</b>		
STEMI	ICD-10	I210* I211* I212* I213
NSTEMACS	ICD-10	I214 I219 I200 (UA)
Type 2 myocardial infarction	ICD-10	I21A1
Reinfarction	ICD-10	I22*
Heart Failure	ICD-10	I50* I42* I25.5 I130 I132 I110
Cardiac arrest	ICD-10	I462 (due to cardiac condition); I468 and I469 (due to non-cardiac condition)
Ventricular tachycardia and ventricular fibrillation	ICD-10	VF: I4901 I4902; VT: I470 I472
Acute ischemic stroke	ICD-10	I63*
Acute haemorrhagic stroke	ICD-10	I60* I61* I62*
Other non-cerebral strokes	ICD-10	G463 G464 G465 G466 G467
Unspecified stroke type	ICD-10	I64*
Cardiogenic shock	ICD-10	R570
Pulmonary embolism	ICD-10	I26*
Deep Venous Thrombosis	ICD-10	I82.4*
Aortic aneurysm rupture	ICD-10	I713 I715 I718
Aortic dissection	ICD-10	I710*
Infective endocarditis	ICD-10	I33* I38* I39*

\*omitted all digits afterwards

ACS: acute coronary syndrome; STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation acute coronary syndrome. Notes: ACS combines STEMI, NSTEMI, type 2 myocardial infarction and reinfarction; stroke combines acute ischemic and acute haemorrhagic strokes as well as other non-cerebral strokes and unspecified stroke types

**Supplement Table 2. COVID-19 related and total excess acute CV deaths, without setting negative excess deaths to zero.**

	Excess acute CV deaths	
	COVID-19 related	Total*
<b>Total</b>	1,480 (+5%)	1,947 (+7%)
<b>Sex</b>		
Men	855 (+6%)	1,034 (+7%)
Women	625 (+5%)	918 (+7%)
<b>Age category (years)</b>		
18-49	57 (+5%)	115 (+11%)
50-59	124 (+7%)	218 (+12%)
60-69	212 (+7%)	440 (+14%)
70-79	379 (+6%)	652 (+10%)
80+	708 (+5%)	551 (+4%)
<b>Region</b>		
North East	61 (+4%)	-39 (-3%)
North West	198 (+5%)	-9 (0%)
Yorkshire and The Humber	136 (+5%)	63 (+2%)
East Midlands	91 (+4%)	13 (+1%)
West Midlands	193 (+6%)	215 (+7%)
East of England	136 (+5%)	46 (+2%)
London	268 (+9%)	220 (+7%)
South East	239 (+5%)	13 (+0%)
South West	78 (+3%)	131 (+4%)
Wales	80 (+4%)	-66 (-4%)
<b>Place of death**</b>		
Home	105 (+2%)	2,285 (+35%)
Care home and hospice	174 (+5%)	1,063 (+31%)
Hospital	1,196 (+7%)	-1,413 (-8%)
<b>Underlying acute CV cause of deaths</b>		
Stroke	562 (+6%)	671 (+7%)
Acute coronary syndrome	318 (+5%)	584 (+9%)
Heart failure	273 (+4%)	459 (+7%)
Pulmonary embolism	251 (+11%)	424 (+19%)
Cardiac arrest	93 (+6%)	-223 (-14%)
Aortic diseases	4 (+0%)	-101 (-8%)
Infective endocarditis	32 (+4%)	40 (+5%)
Cardiogenic shock	14 (+4%)	-33 (-10%)
VT and VF	4 (+2%)	4 (+9%)
Deep vein thrombosis	2 (+2%)	12 (+12%)

CV: cardiovascular; VT: ventricular tachycardia; VF: ventricular fibrillation

\*The excess death in subcategories may not add up to the total excess deaths due to estimation and rounding error when comparing to the respective historical average.

\*\*The excess death in place of death do not add up to the total excess deaths due to missing information for place of death (1.9%).