

## Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1. Overview of Used ICD-9 and ICD-10 Codes**

<b>ICD-9</b>	
<b>Any stroke</b>	
431	Intracerebral hemorrhage
433	Occlusion and stenosis of pre-cerebral arteries with/without cerebral infarction
434	Occlusion of cerebral arteries with/without cerebral infarction
436	Stroke, unspecified as hemorrhagic or infarction
<b>Intracerebral hemorrhage</b>	
431	Intracerebral hemorrhage
<b>Ischemic stroke</b>	
433	Occlusion and stenosis of pre-cerebral arteries with/without cerebral infarction
434	Occlusion of cerebral arteries with/without cerebral infarction
<b>Unspecified stroke</b>	
436	Stroke, unspecified as hemorrhagic or infarction
<b>ICD-10</b>	
<b>Any stroke</b>	
I61	Intracerebral hemorrhage
I63	Cerebral infarction
I64	Stroke, unspecified as hemorrhagic or infarction
<b>Intracerebral hemorrhage</b>	
I61	Intracerebral hemorrhage
<b>Ischemic stroke</b>	
I63	Cerebral infarction
<b>Unspecified stroke</b>	
I64	Stroke, unspecified as hemorrhagic or infarction

**eTable 2. Results of Validation Procedure\* of ICD Codes in Young Patients With Stroke**

Diagnosis assigned by Statistics Netherlands			
	Ischemic stroke	Intracerebral hemorrhage	Unspecified stroke
<b>Total N</b>	301	183	85
<b>Correct diagnosis, N (%)</b>	272/301 (90.4%)	158/183 (86.3%)	74/85 (87.1%)
<b>Incorrect diagnoses N (%)</b>	29/301 (9.6%)	25/183 (13.6%)	11/85 (12.9%)
<b>Differentiation of incorrect diagnosis</b>	5/301 (1.7%) – conversion	10/183 (5.5%) – PMH	4/85 (4.7%) – conversion
	4/301 (1.3%) – vestibulopathy	4/183 (2.2%) - traumatic	3/85 (3.5%) – neoplasm
	3/301 (1.0%) – TIA <sup>a</sup>	3/183 (1.6%) – SAH	2/85 (2.3%) – TIA
	3/301 (1.0%) – ICH <sup>b</sup>	8/183 (4.4%) – ischemic stroke	1/85 (1.2%) – traumatic ICH
	3/301 (1.0%) – SAH <sup>c</sup>		1/85(1.2%) – CADASIL <sup>g</sup>
	2/301 (0.7%) – neoplasm		
	2/301 (0.7%) – encephalitis / meningitis		
	1/301 (0.3%) – migraine with aura		
	1/301 (0.3%) – HaNDL syndrome <sup>d</sup>		
	1/301 (0.3%) – SUSAC syndrome		
	1/301 (0.3%) – subdural hematoma		
	1/301 (0.3%) – MS <sup>e</sup>		
	1/301 (0.3%) – PMH <sup>f</sup>		
1/301 (0.3%) – traumatic ICH			

\* based on cross-checking the ICD codes assigned by the coders of Statistics Netherlands with the original source data from the clinical files

Due to rounding off to one decimal, summed percentages may deviate from 100%.

<sup>a</sup> TIA = transient ischemic attack

<sup>b</sup> ICH = intracerebral hemorrhage

<sup>c</sup> SAH = subarachnoid hemorrhage

<sup>d</sup> HaNDL syndrome = 'Headache and Neurological Deficit with cerebrospinal fluid Lymphocytosis'

<sup>e</sup> MS = multiple sclerosis

**eTable 3. ICD Codes of Causes of Death**

<b>Causes of death</b>	<b>ICD-10 codes</b>
Any stroke	I60, I61, I62, I63, I64, I67, I68, I69, G45
Ischemic stroke	I63
Intracerebral hemorrhage	I61
Composite vascular	I10 - I15, I20 - I25, I33 - I35, I38, I42, I44, I46 - I51, I70 - I72 - I77, I80 - I82, I99
Cardiac	I20 - I25, I33 - I35, I38, I42, I44, I46 - I51
Other vascular	I10 - I15, I70 - I72 - I77, I80 - I82, I99
Other stroke-related	I60, I62, I67, I68, I69
Malignancies	C00 - C97, D00 - D48
Hematological malignancy	C81 - C97
Breast cancer	C50, D05
Lung cancer	C34, D022
Melanoma	C43, D03
Brain tumor	C71
Other forms of cancer	C00 - C97, D00 - D48 except C81 - C97, C50, D05, D34, D022, C43, D03 and C71
Infections	A00 - A99, B00 - B99, J130, J220
Trauma	S00 - S99, T00 - T98, V01 - V99, W00 - W99, X00 - X99, Y00 - Y98
Miscellaneous	All other

**eTable 4. Demographics Including Age, Sex, Comorbidity, and Follow-up of Stroke of 30-Day Survivors**

	N (%)	Mean age, y (SD)	Charlson Comorbidity Index				Follow-up (FU)	
			Score 0 (%)	Score 1 (%)	Score 2 (%)	Score >=3 (%)	Median FU, in years (IQR)	N Deaths at end of FU (%)
<b>Any stroke</b>	13481 (100)	41.76 (6.8)	11282 (83.7)	1601 (11.9)	455 (3.4)	143 (1.1)	10.19 (7.1 – 13.6)	1764 (13.1)
men	6299 (46.7)	42.31 (6.4)	5235 (83.1)	767 (12.2)	223 (3.5)	74 (1.2)	9.95 (6.7 – 13.4)	988 (15.7)
women	7182 (53.3)	41.28 (7.0)	6047 (84.2)	834 (11.6)	232 (3.2)	69 (1.0)	10.33 (7.3 – 13.8)	776 (10.8)
<b>Ischemic stroke</b>	7815 (100)	41.97 (6.6)	6653 (85.1)	844 (10.8)	246 (3.1)	72 (0.9)	9.99 (7.0 – 13.5)	947 (12.1)
men	3560 (45.6)	42.62 (6.1)	3016 (84.7)	383 (10.8)	126 (3.5)	35 (1.0)	9.75 (6.8 – 13.3)	534 (14.7)
women	4255 (54.4)	41.42 (6.9)	3637 (85.5)	461 (10.9)	120 (2.8)	37 (0.9)	10.17 (7.2 – 13.7)	423 (9.9)
<b>Intracerebral hemorrhage</b>	2086 (100)	40.38 (7.7)	1667 (79.9)	304 (14.6)	85 (4.1)	30 (1.4)	10.16 (6.7 – 14.0)	349 (16.7)
men	1113 (53.4)	40.53 (7.5)	891 (80.1)	165 (14.8)	41 (3.7)	16 (1.4)	9.93 (6.6 – 13.6)	210 (18.9)
women	973 (46.6)	40.21 (7.9)	776 (79.8)	139 (14.3)	44 (4.5)	14 (1.4)	10.35 (6.9 – 14.3)	139 (14.3)
<b>Stroke not otherwise specified</b>	3580 (100)	42.12 (6.5)	2962 (82.7)	453 (12.7)	124 (3.5)	41 (1.1)	10.58 (7.5 – 13.7)	468 (13.1)
men	1626 (45.4)	42.86 (6.0)	1328 (81.7)	219 (13.5)	56 (3.4)	23 (1.4)	10.45 (7.3 – 13.7)	254 (15.6)
women	1954 (54.6)	41.50 (6.7)	1634 (83.6)	234 (12.0)	68 (3.5)	18 (0.9)	10.69 (7.6 – 13.8)	214 (11.0)

Duration of Follow up is defined as time between event and death or end of study, whichever occurred first in years

SD = standard deviation, IQR = interquartile range.

CCI score of 0 means no comorbidity, the higher the CCI score, the more comorbidity.

**eTable 5. Sex-Specific Mortality for Any Stroke and Stroke Subtypes**

	N at risk <sup>a</sup>	Case fatalities		Deaths at end of FU		N at risk <sup>b</sup>	1 year cum. Mortality		5 year cum. mortality		10 year cum. Mortality		15 year cum. Mortality	
		N	%	N	%		%	95% CI	%	95% CI	%	95% CI	%	95% CI
<b>Any stroke</b>	15257	1776	11.6%	3540	23.2%	13481	3.1%	2.8-3.4	7.0%	6.6-7.4	11.5%	11.0-12.1	17.0%	16.2-17.9
men	7127	828	11.6%	1816	25.5%	6299	3.5%	3.1-4.0	8.1%	7.5-8.8	13.8%	12.9-14.7	20.8%	19.5-22.2
women	8130	948	11.7%	1724	21.2%	7182	2.8%	2.4-3.2	6.0%	5.5-6.6	9.5%	8.9-10.3	13.7%	12.7-14.8
<b>Ischemic stroke</b>	8444	629	7.4%	1576	18.7%	7815	2.5%	2.2-2.8	5.9%	5.4-6.4	10.6%	9.9-11.4	16.4%	15.3-17.6
men	3851	291	7.6%	815	21.2%	3560	2.6%	2.1-3.2	6.9%	6.1-7.8	13.0%	11.8-14.2	20.5%	18.7-22.4
women	4593	338	7.4%	761	16.6%	4255	2.4%	1.9-2.9	5.0%	4.4-5.7	8.6%	7.8-9.6	13.1%	11.8-14.6
<b>Intracerebral hemorrhage</b>	3077	991	32.2%	1340	43.5%	2086	6.8%	5.8-7.9	11.7%	10.4-13.2	15.7%	14.1-17.4	19.1%	17.2-21.1
men	1585	472	29.8%	682	43.0%	1113	7.4%	6.0-9.1	12.9%	11.1-15.1	17.6%	15.4-20.1	21.9%	19.2-25.1
women	1492	519	34.8%	658	44.1%	973	6.1%	4.7-7.8	10.3%	8.5-12.4	13.4%	11.4-15.8	15.8%	13.4-18.6
<b>Stroke not otherwise specified</b>	3736	156	4.2%	624	16.7%	3580	2.4%	2.0-3.0	6.6%	5.8-7.5	11.0%	10.0-12.2	17.2%	15.6-18.9
men	1691	65	3.8%	319	18.9%	1626	2.8%	2.1-3.7	7.4%	6.2-8.8	12.8%	11.2-14.6	21.0%	18.4-23.9
women	2045	91	4.4%	320	15.6%	1954	2.2%	1.6-2.9	5.9%	5.0-7.1	9.6%	8.3-11.0	14.0%	12.1-16.2

<sup>a</sup> Number (%) of case fatalities and number of deaths at end of follow-up (%) calculated in total study population.

<sup>b</sup> 1-year, 5-year, 10-year and 15-year mortality (% and 95%CI) was calculated in 30-day survivors of the study population.

**eTable 6. Annual Case Fatality, 1-Year Mortality and 5-Year Mortality Stratified for Stroke Subtypes, and Sex**

<i>Case fatality</i>	Any stroke			Ischemic stroke			Intracerebral hemorrhage			Stroke not otherwise specified		
	Year	total	men	women	total	men	women	total	men	women	total	men
1998	15.2%	16.3%	14.2%	8.4%	9.2%	7.9%	37.9%	36.0%	39.7%	9.2%	11.4%	7.2%
1999	13.7%	13.0%	14.3%	7.8%	9.2%	6.8%	36.4%	29.9%	42.3%	4.3%	4.7%	3.9%
2000	16.5%	14.8%	17.9%	10.2%	8.1%	11.9%	38.9%	34.1%	43.5%	6.5%	8.2%	4.8%
2001	14.4%	14.4%	14.4%	10.9%	10.8%	11.0%	36.3%	32.8%	39.7%	2.3%	1.1%	2.9%
2002	14.4%	15.8%	13.2%	9.7%	10.1%	9.5%	37.7%	37.2%	38.2%	6.1%	6.1%	6.0%
2003	14.0%	14.4%	13.7%	8.0%	9.4%	6.7%	40.4%	39.8%	41.0%	7.1%	3.1%	10.7%
2004	10.8%	10.1%	11.4%	7.0%	7.0%	7.0%	29.5%	24.6%	35.0%	3.5%	3.6%	3.3%
2005	10.6%	11.0%	10.3%	7.1%	6.3%	7.7%	30.6%	32.3%	28.8%	2.7%	2.0%	3.3%
2006	9.4%	9.8%	9.0%	7.4%	7.3%	7.5%	24.2%	25.2%	23.1%	2.4%	2.1%	2.6%
2007	10.1%	9.4%	10.7%	6.5%	5.9%	7.0%	30.6%	28.0%	33.3%	2.5%	1.6%	3.3%
2008	8.3%	8.7%	8.0%	4.0%	4.7%	3.5%	27.7%	25.9%	29.6%	3.6%	1.8%	4.8%
2009	9.0%	7.7%	10.3%	6.8%	6.0%	7.6%	24.8%	19.6%	30.4%	2.9%	2.4%	3.3%
2010	6.9%	7.8%	6.1%	4.9%	6.4%	3.7%	21.1%	18.9%	23.3%	1.2%	1.7%	0.7%
linear regression p-values	<.001	<.001	<.001	.002	.001	.022	<.001	.003	<.001	.006	.005	.100
Yearly APC <sup>a</sup>	-5.6%	-5.2%	-4.7%	-1.3%	-1.4%	2.5%	-3.8%	-3.3%	-3.0%	-0.4%	23.4%	-0.6%
<i>1-year mortality</i>	Any stroke			Ischemic stroke			Intracerebral hemorrhage			Stroke not otherwise specified		
	Year	total	men	women	total	men	women	total	men	women	total	men
1998	3.7%	3.9%	3.6%	3.3%	3.9%	3.0%	8.2%	6.8%	9.6%	1.7%	1.8%	1.6%
1999	3.1%	2.6%	3.5%	2.4%	1.4%	3.1%	5.7%	6.1%	5.3%	2.9%	2.5%	3.3%
2000	3.6%	3.4%	3.8%	3.1%	3.4%	2.9%	8.5%	6.9%	10.3%	1.3%	0.9%	1.7%
2001	4.1%	4.3%	4.0%	3.3%	2.3%	4.2%	7.8%	8.8%	6.8%	3.6%	5.8%	2.4%
2002	3.8%	4.8%	3.0%	3.2%	4.3%	2.3%	7.6%	9.9%	4.8%	3.1%	2.4%	3.5%
2003	3.8%	4.6%	2.9%	3.6%	3.7%	3.4%	6.6%	9.1%	3.4%	2.9%	3.9%	1.9%
2004	3.6%	4.1%	3.2%	2.6%	2.5%	2.6%	9.8%	11.5%	7.5%	2.1%	1.9%	2.3%
2005	3.1%	4.3%	2.1%	2.4%	3.4%	1.7%	7.3%	10.0%	4.5%	2.2%	2.7%	1.7%
2006	2.4%	3.1%	1.9%	1.7%	1.7%	1.7%	4.6%	4.3%	4.8%	2.8%	5.0%	0.7%
2007	2.9%	3.6%	2.3%	2.6%	3.1%	2.0%	6.9%	8.2%	5.4%	1.5%	1.6%	1.4%
2008	2.9%	2.7%	3.1%	2.7%	2.8%	2.6%	3.1%	1.2%	5.3%	3.3%	3.6%	3.1%
2009	1.8%	1.4%	2.1%	1.0%	0.6%	1.5%	5.6%	5.6%	5.6%	1.5%	0.8%	2.0%
2010	2.3%	3.1%	1.6%	1.2%	1.9%	0.7%	6.1%	7.0%	5.1%	2.8%	3.5%	2.2%
linear regression p-values	.002	1.33	.001	.005	1.51	.003	.065	.342	.069	.973	.858	.648
Yearly APC	-2.2%	4.7%	-4.2%	-2.8%	23.9%	-4.8%	5.4%	33.2%	4.2%	24.1%	76.1%	20.3%

5-year mortality	Any stroke			Ischemic stroke			Intracerebral hemorrhage			Stroke not otherwise specified		
	Year	total	men	women	total	men	women	total	men	women	total	men
<b>1998</b>	8.3%	9.8%	7.1%	8.0%	9.2%	7.2%	9.6%	9.6%	9.6%	8.0%	11.0%	5.4%
<b>1999</b>	7.4%	7.3%	7.4%	6.9%	6.9%	6.9%	8.3%	8.5%	8.0%	7.8%	7.4%	8.1%
<b>2000</b>	8.5%	9.8%	7.2%	8.2%	10.5%	6.2%	13.3%	12.6%	14.1%	5.7%	6.3%	5.1%
<b>2001</b>	8.4%	10.2%	6.9%	7.4%	8.2%	6.7%	11.8%	16.3%	6.8%	8.4%	10.5%	7.3%
<b>2002</b>	8.2%	9.6%	7.0%	6.1%	9.1%	3.9%	13.9%	13.6%	14.3%	9.2%	8.1%	9.9%
<b>2003</b>	7.3%	9.6%	5.1%	6.2%	8.2%	4.4%	14.0%	14.3%	13.6%	6.4%	9.7%	3.1%
<b>2004</b>	7.7%	7.9%	7.5%	6.2%	5.8%	6.6%	14.7%	17.3%	11.3%	6.6%	5.6%	7.4%
<b>2005</b>	6.8%	8.6%	5.3%	5.8%	8.1%	3.9%	13.4%	17.8%	9.0%	5.3%	4.1%	6.2%
<b>2006</b>	5.8%	7.1%	4.6%	4.5%	4.8%	4.2%	8.6%	9.8%	7.2%	7.0%	10.0%	4.1%
<b>2007</b>	7.1%	8.1%	6.2%	6.2%	7.5%	4.9%	13.2%	12.9%	13.5%	5.9%	6.4%	5.4%
<b>2008</b>	5.7%	6.4%	5.2%	5.2%	5.9%	4.7%	10.5%	10.5%	10.5%	4.1%	4.5%	3.8%
<b>2009</b>	5.4%	4.8%	5.9%	4.8%	4.3%	5.3%	8.7%	8.9%	8.5%	4.8%	3.2%	6.1%
<b>2010</b>	5.2%	7.3%	3.5%	3.0%	4.0%	2.2%	12.1%	15.1%	8.9%	7.2%	10.4%	4.4%
<b>linear regression p-values</b>	<b>&lt;.001</b>	<b>.006</b>	<b>.003</b>	<b>&lt;.001</b>	<b>.002</b>	<b>.006</b>	.977	.792	.695	<b>.046</b>	.227	.181
<b>Yearly APC</b>	-3.1%	-0.0%	-2.7%	-6.2%	-1.9%	-4.5%	5.9%	8.5%	8.8%	2.8%	18.4%	12.2%

APC stands for percentage change, trends over time were tested through linear regression.