

Appendices

Appendix - Table 1. NTS urgency levels and response times

NTS Urgency level	Definition	Response time	Medical help
U0 – Resuscitation	Loss of vital functions	Immediately	Ambulance
U1 – Life threatening	Unstable vital functions	Immediately, within 15 minutes	Ambulance
U2 – Emergent	Vital functions in danger or organ damage	As soon as possible, within 1 hour	Home visit by GP or appointment at OHS-PC
U3 – Urgent	Possible risk of damage, human reasons	A few hours (<3 hours)	Home visit by GP or appointment at OHS-PC
U4 – Non-urgent	Marginal risk of damage	24 hours	Appointment at OHS-PC or telephone advice
U5 – Advice	No risk of damage	Advice, no time related	Telephone advice
GP: general practitioner			
NTS: Netherlands Triage Standard			
OHS-PC: out-of-hours services in primary care			

Appendix-table 2: Combinations of NTS triage criteria that generate an U1 level within the NTS main complaints that can be used for patients with chest discomfort.

→ ABCD unstable (no main complaint is selected)			Urgency level U1: ambulance within 15 minutes
Main complaint 'Chest pain'			
→ ABCD stable	AND severe chest pain (Numeric Rating Scale (NRS)-score ≥ 8) lasting less than 12 hours		
→ ABCD stable	AND mild (NRS ≤ 4) to moderate (NRS 5-7) chest pain lasting for less than 12 hours	AND one of the following: - retrosternal located pain - tightening or pressing - radiation to jaw, arm or upper back - progressive pain intensity in short time - past or present autonomous nervous system-related symptoms - dizziness	
Main complaint 'Collapse'			
→ ABCD stable	AND collapse	AND chest pain of any severity	
Main complaint 'Back complaints'			
→ ABCD stable	AND severe upper back pain (NRS ≥ 8)	AND past or present autonomous nervous system-related symptoms	
<p>ABCD: acronym for Airway, Breathing, Circulation and Disability. When the triage nurse starts the telephone triage with the NTS, the system requires a mandatory 'ABCD-check'; i.e. the triage nurse has to ask questions to assess whether the patient has life-threatening problems concerning the Airway, Breathing, Circulation and Disability for which an ambulance should be sent immediately.</p>			

Appendix-table 3. Characteristics of patients divided among the seven OHS-PC locations.

Characteristics	Location A N=205 (9.4%)	Location B N=355 (16.2%)	Location C N=544 (24.8%)	Location D N=262 (12.0%)	Location E N=164 (7.5%)	Location F N=412 (18.8%)	Location G N=250 (11.4%)
Prevalence of ACS (n,%)	32 (15.4%)	31 (8.7%)	59 (10.8%)	35 (13.4%)	15 (9.1%)	53 (12.9%)	26 (10.4%)
Male sex (n,%)	77 (37.6%)	154 (43.4%)	256 (47.1%)	108 (41.2%)	84 (51.2%)	188 (45.6%)	112 (44.8%)
Mean age in years (SD)	62.3 (19.6)	58.6 (19.8)	58.0 (19.4)	56.6 (18.9)	61.8 (20.5)	61.6 (19.4)	56.1 (18.7)

Appendix – table 4. Overview of the percentages of missing predictors, divided into patients with and without the diagnosis ACS.

Characteristics N=2192	ACS, n=251 (11.5%) Missing (%)	No ACS, n=1941 (88.5%) Missing (%)
Mean in years age (SD)	0	0
Female sex	0	0
Median call duration in min (IQR)	0	0
Mean patient's introduction in min (IQR)	0	0
Triage nurse consulted the GP	0	0
Someone else called on behalf of patient	0	0
The person who calls expressed concerns	144 (57.3)	943 (48.6)
Cardiovascular disease or risk factor combined	30 (12.0)	318 (16.4)
History of coronary artery disease	107 (42.6)	933 (48.1)
Diabetes	162 (64.5)	1126 (58.0)
Hypertension	172 (68.5)	1126 (58.0)
Hypercholesterolemia/statin use	172 (68.5)	1196 (61.6)
Cardiac arrhythmia	176 (70.1)	1110 (57.2)
Chest pain	4 (1.6)	72 (3.7)

Shortness of breath	68 (27.1)	429 (22.1)
Chest pain duration <12 hours	28 (11.2)	242 (13.1)
Pain intensity severe (NRS >7 in range 1-10)	149 (59.4)	1124 (57.9)
Pressing heavy pain*	63 (25.1)	502 (25.9)
Stabbing chest pain*	63 (25.1)	502 (25.9)
Chest pain located retrosternal**	87 (34.7)	538 (27.7)
Chest pain located left or right on thorax**	87 (34.7)	538 (27.7)
Radiation of chest pain to any location	38 (15.1)	476 (24.5)
Radiation to the arm ***	94 (37.5)	1019 (52.5)
Radiation to the shoulder blades ***	94 (37.5)	1019 (52.5)
Radiation to the jaws ***	94 (37.5)	1019 (52.5)
Sweating	79 (31.5)	747 (38.5)
Nausea or vomiting	133 (53.0)	1071 (55.2)
Pallor or ashen skin	158 (62.9)	1361 (70.1)
(Near) fainting	33 (13.1)	217 (11.2)
Palpitations	225 (89.6)	1615 (83.2)
Patient recognizes symptoms from previous cardiac event	139 (55.4)	1137 (58.6)
*Pain described by patient. Pressing heavy pain: pressing, heavy or tightening pain vs. other types of pain (stabbing, burning, cramping, tearing) Stabbing pain: stabbing vs. other types of pain (pressing, heavy, tightening, burning, cramping)		
** Retrosternal location vs. other pain locations. Left or right side thorax vs. other pain locations		
*** Radiation location vs. no radiation and radiation other pain		

Appendix-table 5. Patient and call characteristics of 3,204 patients with chest discomfort calling OHS-PC between 2014-2017, comparing patients with and without information on the study outcome.

Characteristics N=3,204	Follow-up n= 2192 (68.4%)	No follow-up n= 1012 (31.6%)	P-value
Patient characteristics			
Median age in years (IQR) (n=3,204)	59.1 (19.5)	57.3 (20.4)	0.020
Female sex (n=3,204)	1213 (55.3)	565 (55.8)	0.794
Call characteristics			
Median total call duration in min (IQR) (n=3,204)	6:51 (4:59-9:23)	6:56 (5:04-9:15)	0.836
Mean patient's introduction in min (IQR) (n=3,204)	0:17 (0:11-0:25)	0:17 (0:11-0:26)	0.052
Triage nurse consulted the GP (n=3,204)	1147 (52.3)	519 (51.3)	0.583
Someone else called on behalf of patient (n=3,204)	1114 (50.8)	479 (47.3)	0.066
Person who calls expressed concerns (n=1,478)	988 (89.7)	430 (90.1)	0.804
Medical history and risk factors			
Cardiovascular disease or CV risk factor (n=2,672)	1192 (64.6)	515 (62.3)	0.254
History of coronary artery disease (n=1,663)	389 (33.8)	166 (32.4)	0.573
Diabetes (n=1,283)	180 (19.9)	68 (18.0)	0.432
Hypertension (n=1,274)	323 (36.1)	121 (31.9)	0.150
Hypercholesterolemia/statin use (n=1,176)	212 (25.7)	88 (25.1)	0.842
Cardiac arrhythmia (n=1,326)	230 (25.4)	102 (24.3)	0.684
Symptoms			
Chest pain (n=3,079)	1981 (93.6)	894 (92.8)	0.417
Shortness of breath (n=2,505)	1094 (64.5)	520 (64.3)	0.911
Chest pain duration <12 hours (n=2,793)	1403 (73.2)	610 (69.6)	0.052
Severe pain (NRS >7 in range 1-10) (n=1,351)	337 (36.6)	185 (43.0)	0.024
Pressing, heavy pain* (n=2,347)	1023 (62.9)	444 (61.6)	0.538
Stabbing chest pain* (n=2,349)	366 (22.5)	177 (24.5)	0.280
Chest pain located retrosternal** (n=2,298)	641 (40.9)	294 (40.2)	0.736
Chest pain located left or right on thorax** (n=2,299)	627 (40.0)	294 (40.2)	0.945
Radiation of chest pain to any location (n=2,437)	1077 (64.3)	458 (60.1)	0.047
Radiation to the arm ***(n=1,521)	452 (42.2)	179 (39.8)	0.373

Radiation to the shoulder blades *** (n=1,519)	326 (30.5)	136 (30.2)	0.924
Radiation to the jaws *** (n=1,984)	124 (11.6)	41 (9.1)	0.156
Sweating (n=1,758)	559 (40.9)	259 (42.0)	0.638
Nausea or vomiting (n=1,474)	489 (49.5)	229 (47.1)	0.381
Pallor or ashen skin (n=1,007)	322 (47.8)	136 (40.8)	0.038
(Near) fainting (n=2,855)	143 (7.4)	72 (7.8)	0.678
Palpitations (n=501)	284 (80.7)	125 (83.9)	0.396
Patient recognizes symptoms from previous cardiac event (n=1,298)	250 (27.3)	102 (26.7)	0.819
Urgency allocation			
High urgency (U1 or U2) (n=3,204)	1496 (68.2)	661 (65.3)	0.100
U1	974 (44.5)	390 (38.6)	
U2	522 (23.8)	271 (26.8)	
Low urgency (U3 or U4 or U5)	696 (31.8)	351 (34.7)	

Appendix - Table 6. Base model with age and sex for predicting the diagnosis ACS.

Predictors	Regression coefficients (standard error)
Intercept	- 14.671 (3.442)
Age	0.289 (0.079)
Age'	- 0.379 (0.123)
Age''	1.017 (0.386)
Female sex	2.155 (5.385)
Age * Female sex	- 0.084 (0.123)
Age' * Female sex	0.175 (0.190)
Age'' * Female sex	- 0.532 (0.589)
Apparent c-statistic 0.72 (95% CI 0.70-0.75)	
Adjusted c-statistic 0.72 (95% CI 0.68-0.75)	
Calibration slope 0.977 (95% CI 0.617-1.338)	
Calibration 0.016 (95% CI -0.702-0.734)	
R ² 0.065	
Knots for cubic spline functions placed at 5, 35, 65 and 95	

Appendix - Table 7. Full model including all candidate predictors for predicting the diagnosis ACS

Predictors	Regression coefficients (standard error)
Intercept	-15.914 (3.55)
Age	0.288 (0.081)
Age'	-0.388 (0.126)
Age''	1.058 (0.396)
Female gender	2.459 (5.519)
Age * Female sex	-0.094 (0.126)
Age' * Female sex	0.187 (0.195)
Age'' * Female sex	-0.554 (0.606)
Chest pain	-0.064 (0.365)
Acute chest pain (< 12 hours)	0.258 (0.200)
Shortness of breath	-0.141 (0.200)
Sweating	0.459 (0.183)
Retrosternal located pain	0.178 (0.177)
Radiation of chest pain	0.617 (0.180)
Pressing heavy feeling	0.619 (0.272)
Stabbing pain	-0.200 (0.353)
History of cardiovascular disease*	-0.039 (0.247)
History of coronary artery disease	0.108 (0.234)
Someone else calls instead of the patient	0.197 (0.160)
Patient calls during the night (0am-9am)	0.495 (0.152)
Apparent c-statistic 0.79 (95% CI 0.76-0.81) Adjusted c-statistic 0.77 (95% CI 0.74-0.80) Calibration slope 0.818 (95% CI 0.650-0.986) Calibration -0.238 (-0.621-0.145) R ² 0.107 Knots for cubic spline functions placed at 5, 35, 65 and 95	

Appendix – Figure 1. Calibration of full model with internal external validation

