

Appendix

Figure A1: Diagram illustrating patient cohorts and data linkage

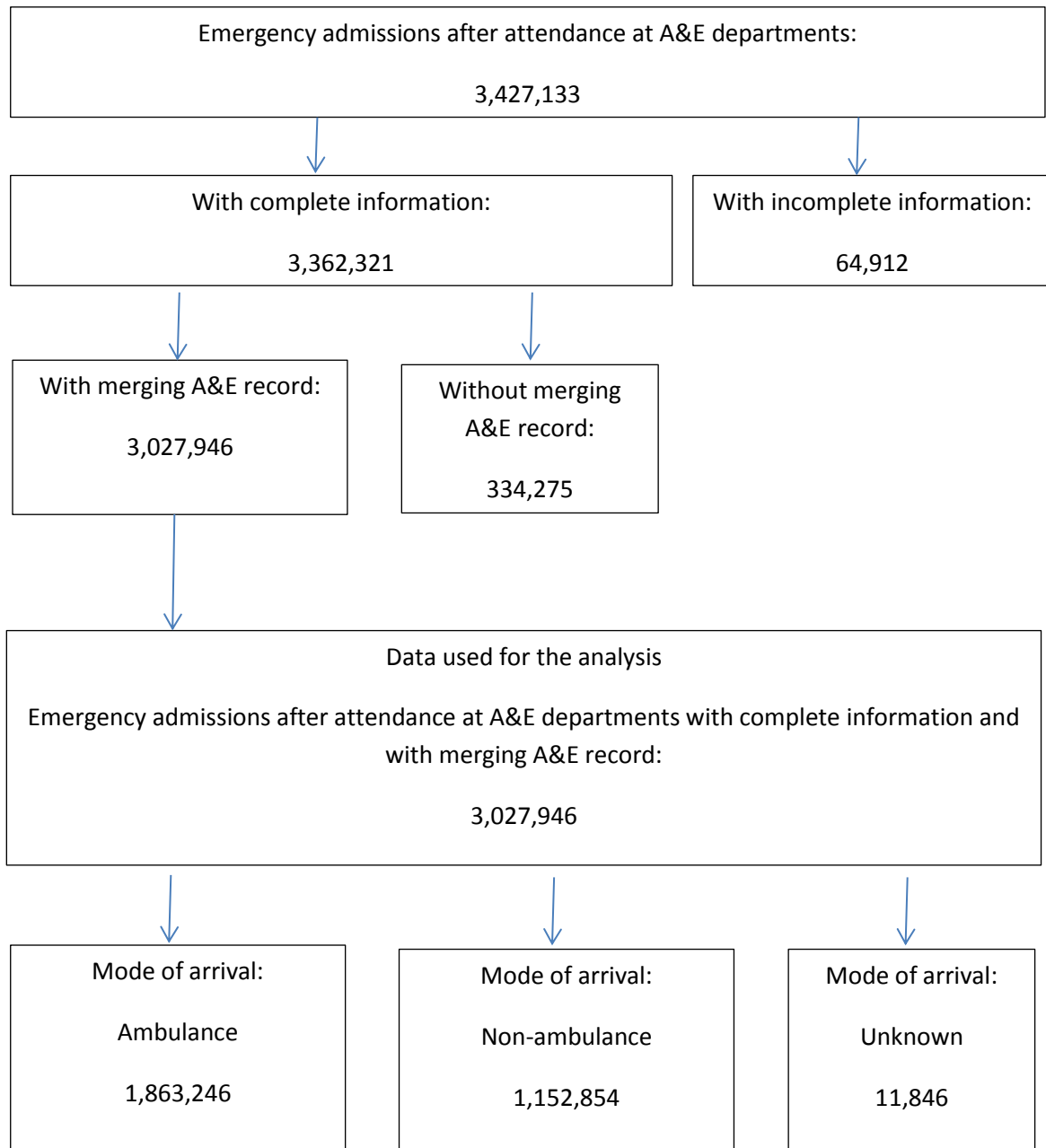


Table A2: Association of day of admission with risk-adjusted mortality amongst patients admitted via A&E with or without a matching A&E attendance record

	All patients admitted via A&E		Patients admitted via A&E without matching A&E record		Patients admitted via A&E with matching A&E record	
	O.R.	95% C.I.	O.R.	95% C.I.	O.R.	95% C.I.
Day						
Wednesday	Ref.	-	Ref.	-	Ref.	-
Thursday	1.020	[0.996,1.045]	0.954	[0.875,1.040]	1.025	[1.000,1.051]
Friday	1.005	[0.981,1.030]	0.957	[0.878,1.043]	1.009	[0.984,1.035]
Saturday	1.043	[1.018,1.069]	1.047	[0.957,1.144]	1.041	[1.015,1.068]
Sunday	1.080	[1.054,1.106]	1.089	[0.994,1.193]	1.075	[1.048,1.103]
Monday	1.027	[1.002,1.052]	1.022	[0.938,1.115]	1.027	[1.001,1.053]
Tuesday	0.997	[0.973,1.022]	0.991	[0.909,1.079]	0.997	[0.973,1.023]
N	3,362,221		334,275		3,027,946	
C-statistic	0.908		0.920		0.907	

Notes: Standard risk adjustment applied in Table 1, Model 1 is applied. Standard risk adjustment includes controls for age, gender, ethnicity, primary diagnosis, Elixhauser conditions, admission source, deprivation quintile, month and admitting hospital included.

Days are defined as 00:00 to 23.59

Table A3: Association of day and time of attendance with risk-adjusted mortality within 30 days - absolute differences in mortality expressed as marginal effects

	Model 1 Standard risk adjustment		Model 2 Standard risk adjustment plus mode of arrival		Model 3 Standard risk adjustment (Mode of arrival: Ambulance)		Model 4 Standard risk adjustment (Mode of arrival: Non-ambulance)	
	M.E.	95% C.I.	M.E.	95% C.I.	M.E.	95% C.I.	M.E.	95% C.I.
Day and time								
Wednesday day	Ref.	-	Ref.	-	Ref.	-	Ref.	-
Wednesday night	0.0016	[0.0005, 0.0026]	-0.0004	[-0.0014, 0.0007]	-0.0008	[-0.0025, 0.0008]	0.0006	[-0.0003, 0.0015]
Thursday day	0.0008	[-0.0001, 0.0017]	0.0008	[-0.0001, 0.0017]	0.0013	[-0.0002, 0.0027]	0.0001	[-0.0006, 0.0007]
Thursday night	0.0015	[0.0004, 0.0025]	-0.0004	[-0.0015, 0.0007]	-0.0010	[-0.0026, 0.0007]	0.0007	[-0.0002, 0.0016]
Friday day	0.0000	[-0.0009, 0.0009]	0.0002	[-0.0007, 0.0011]	0.0003	[-0.0012, 0.0017]	0.0001	[-0.000, 0.0007]
Friday night	0.0008	[-0.0003, 0.0018]	-0.0011	[-0.0022, -0.0000]	-0.0018	[-0.0035, -0.0002]	0.0000	[-0.0009, 0.0010]
Saturday day	0.0016	[0.0007, 0.0026]	0.0009	[-0.0000, 0.0018]	0.0012	[-0.0002, 0.0026]	0.0006	[-0.0001, 0.0013]
Saturday night	0.0020	[0.0009, 0.0032]	-0.0001	[-0.0012, 0.0010]	-0.0003	[-0.0020, 0.0013]	0.0005	[-0.0005, 0.0015]
Sunday day	0.0025	[0.0016, 0.0034]	0.0017	[0.0008, 0.0026]	0.0023	[0.0009, 0.0037]	0.0011	[0.0004, 0.0018]
Sunday night	0.0026	[0.0015, 0.0037]	0.0005	[-0.0005, 0.0016]	0.0005	[-0.0012, 0.0020]	0.0009	[-0.0001, 0.0019]
Monday day	0.0003	[-0.0006, 0.0012]	0.0005	[-0.0004, 0.0014]	0.0006	[-0.0008, 0.0020]	0.0004	[-0.0003, 0.0010]
Monday night	0.0002	[-0.0009, 0.0013]	-0.0016	[-0.0026, -0.0005]	-0.0026	[-0.0043, -0.0010]	0.0003	[-0.0006, 0.0012]
Tuesday day	0.0001	[-0.0008, 0.0010]	0.0002	[-0.0007, 0.0011]	0.0004	[-0.0011, 0.0018]	0.0000	[-0.0007, 0.0006]
Tuesday night	0.0008	[-0.0003, 0.0019]	-0.0010	[-0.0022, 0.0001]	-0.0013	[-0.0029, 0.0004]	-0.0009	[-0.0019, 0.0000]
Mode of arrival								
Ambulance			Ref	-				
Non-ambulance			-0.0244	[-0.0249, -0.0240]				
Unknown			-0.0195	[-0.0229, -0.0162]				

Notes: Marginal effects of the analysis in Table 1 are reported here. Standard risk adjustment includes controls for age, gender, ethnicity, primary diagnosis, Elixhauser conditions, admission source, deprivation quintile, month and admitting hospital. Daytime defined as 07:00 to 18:59, night time defined as 19:00 to 06:59 the following day.

Table A4: Association of day and time with risk-adjusted mortality using time of attendance or time of admission

	Model 2 Standard risk adjustment plus mode of arrival (Time of attendance)		Model 2 Standard risk adjustment plus mode of arrival (Time of admission)	
	O.R.	95% C.I.	O.R.	95% C.I.
Day and Time				
Wednesday day	Ref.	-	Ref.	-
Wednesday night	0.988	[0.951,1.025]	1.005	[0.970,1.042]
Thursday day	1.027	[0.996,1.060]	1.021	[0.986,1.057]
Thursday night	0.986	[0.950,1.024]	1.018	[0.982,1.055]
Friday day	1.007	[0.976,1.039]	1.010	[0.975,1.046]
Friday night	0.962	[0.927,0.999]	0.982	[0.947,1.017]
Saturday day	1.031	[0.999,1.064]	1.033	[0.998,1.070]
Saturday night	0.997	[0.960,1.035]	1.021	[0.984,1.059]
Sunday day	1.061	[1.028,1.095]	1.061	[1.025,1.099]
Sunday night	1.019	[0.981,1.058]	1.043	[1.005,1.081]
Monday day	1.017	[0.986,1.049]	1.019	[0.984,1.056]
Monday night	0.947	[0.912,0.983]	1.007	[0.972,1.043]
Tuesday day	1.007	[0.975,1.039]	0.991	[0.956,1.026]
Tuesday night	0.964	[0.929,1.002]	0.998	[0.962,1.034]
Mode of arrival				
Ambulance	Ref.	-	Ref.	-
Non-ambulance	0.339	[0.330,0.348]	0.341	[0.332,0.350]
Unknown	0.456	[0.380,0.548]	0.458	[0.381,0.550]
N	3,027,946		3,027,946	
C-statistic	0.911		0.911	

Notes: Standard risk adjustment includes controls for age, gender, ethnicity, primary diagnosis, Elixhauser conditions, admission source, deprivation quintile, month and admitting hospital. Daytime defined as 07:00 to 18:59, night time defined as 19:00 to 06:59 the following day. Time of admission is measured by the time of departure from A&E.

Table A5: Association of day and time of attendance at A&E with risk-adjusted mortality using different definitions of daytime and night-time

	Model 2 Standard risk adjustment plus mode of arrival (Daytime: 07:00-18:59 Night-time: 19:00-06.59)		Model 2 Standard risk adjustment plus mode of arrival (Daytime: 08:00-19:59 Night-time: 20:00-07.59)	
	O.R.	95% C.I.	O.R.	95% C.I.
Day and time				
Wednesday day	Ref.	-	Ref.	-
Wednesday night	0.988	[0.951,1.025]	1.007	[0.969,1.046]
Thursday day	1.027	[0.996,1.060]	1.032	[1.000,1.064]
Thursday night	0.986	[0.950,1.024]	0.995	[0.958,1.034]
Friday day	1.007	[0.976,1.039]	1.008	[0.977,1.040]
Friday night	0.962	[0.927,0.999]	0.977	[0.940,1.015]
Saturday day	1.031	[0.999,1.064]	1.035	[1.003,1.068]
Saturday night	0.997	[0.960,1.035]	1.008	[0.970,1.047]
Sunday day	1.061	[1.028,1.095]	1.065	[1.032,1.099]
Sunday night	1.019	[0.981,1.058]	1.030	[0.992,1.070]
Monday day	1.017	[0.986,1.049]	1.024	[0.993,1.056]
Monday night	0.947	[0.912,0.983]	0.950	[0.914,0.987]
Tuesday day	1.007	[0.975,1.039]	1.015	[0.984,1.048]
Tuesday night	0.964	[0.929,1.002]	0.965	[0.928,1.003]
Mode of arrival				
Ambulance	Ref.	-	Ref.	-
Non-ambulance	0.339	[0.330,0.348]	0.339	[0.330,0.348]
Unknown	0.456	[0.380,0.548]	0.456	[0.380,0.548]
N	3,027,946		3,027,946	
C-statistic	0.911		0.911	

Notes: Standard risk adjustment includes controls for age, gender, ethnicity, primary diagnosis, Elixhauser conditions, admission source, deprivation quintile, month and admitting hospital.

Table A6: Association of day of admission recorded in the inpatient record with risk-adjusted mortality within 30 days

	Standard risk adjustment		Standard risk adjustment plus mode of arrival	
	O.R.	95% C.I.	O.R.	95% C.I.
Day of the week				
Wednesday	Ref.		Ref.	
Thursday	1.025	[1.000, 1.051]	1.024	[0.999, 1.051]
Friday	1.009	[0.984, 1.035]	1.013	[0.988, 1.039]
Saturday	1.041	[1.015, 1.068]	1.021	[0.996, 1.048]
Sunday	1.075	[1.048, 1.103]	1.054	[1.027, 1.081]
Monday	1.027	[1.002, 1.053]	1.031	[1.006, 1.058]
Tuesday	0.997	[0.973, 1.023]	0.999	[0.974, 1.025]
Mode of arrival				
Ambulance			Ref.	-
Non-ambulance			0.341	[0.332, 0.350]
Unknown			0.458	[0.382, 0.550]
N	3,027,946		3,027,946	
C-statistic	0.9068		0.9105	

Notes: Standard risk adjustment includes controls for age, gender, ethnicity, primary diagnosis, Elixhauser conditions, admission source, deprivation quintile, month and admitting hospital.

Days are defined as 00:00 to 23.59

Table A7: Association of weekend admission recorded in the inpatient record with risk-adjusted mortality within 30 days

	Standard risk adjustment		Standard risk adjustment plus mode of arrival	
	O.R.	95% C.I.	O.R.	95% C.I.
Weekday vs weekend				
Week				
Weekend	1.046	[1.031, 1.061]	1.024	[1.008, 1.039]
Mode of arrival				
Ambulance			Ref.	-
Non-ambulance			0.341	[0.332, 0.350]
Unknown			0.458	[0.382, 0.550]
N	3,027,946		3,027,946	
C-statistic	0.9068		0.9105	

Notes: Standard risk adjustment includes controls for age, gender, ethnicity, primary diagnosis, Elixhauser conditions, admission source, deprivation quintile, month and admitting hospital. Week is defined as Monday 00:00 to Friday 23.59. Weekend is defined as Saturday 00:00 to Sunday 23.59.

Table A8: Source data for Figure 1 - Volume and percentage of admissions by quintiles of risk of mortality within 30 days and day and time of arrival at A&E

Day and time:		Quintiles of risk of mortality within 30 days					Total
		Q 1 (Lowest)	Q 2	Q 3	Q 4	Q 5 (Highest)	
Wednesday day	Volume	52,594	53,156	56,101	55,852	56,036	273,739
	Percentage	19.21	19.42	20.49	20.4	20.47	100
Wednesday night	Volume	33,686	33,471	30,677	30,548	29,915	158,297
	Percentage	21.28	21.14	19.38	19.3	18.9	100
Thursday day	Volume	52,733	53,908	57,018	56,767	57,194	277,620
	Percentage	18.99	19.42	20.54	20.45	20.6	100
Thursday night	Volume	34,253	33,297	30,734	31,036	29,877	159,197
	Percentage	21.52	20.92	19.31	19.5	18.77	100
Friday day	Volume	51,168	53,486	57,977	57,755	58,184	278,570
	Percentage	18.37	19.2	20.81	20.73	20.89	100
Friday night	Volume	36,098	36,172	31,888	31,358	29,986	165,502
	Percentage	21.81	21.86	19.27	18.95	18.12	100
Saturday day	Volume	47,031	46,586	50,946	53,144	53,757	251,464
	Percentage	18.7	18.53	20.26	21.13	21.38	100
Saturday night	Volume	37,168	36,722	31,322	30,145	28,955	164,312
	Percentage	22.62	22.35	19.06	18.35	17.62	100
Sunday day	Volume	50,058	47,738	50,831	52,735	55,169	256,531
	Percentage	19.51	18.61	19.81	20.56	21.51	100
Sunday night	Volume	34,065	32,826	29,827	29,408	29,173	155,299
	Percentage	21.94	21.14	19.21	18.94	18.79	100
Monday day	Volume	55,933	58,484	60,461	58,743	60,905	294,526
	Percentage	18.99	19.86	20.53	19.94	20.68	100
Monday night	Volume	34,310	33,105	31,034	31,614	30,447	160,510
	Percentage	21.38	20.62	19.33	19.7	18.97	100
Tuesday day	Volume	52,803	53,717	56,396	55,917	56,637	275,470
	Percentage	19.17	19.5	20.47	20.3	20.56	100
Tuesday night	Volume	33,690	32,921	30,377	30,567	29,354	156,909
	Percentage	21.47	20.98	19.36	19.48	18.71	100
Whole week	Volume	605,590	605,589	605,589	605,589	605,589	3,027,946
	Percentage	20	20	20	20	20	100

Table A9: Source data for Figure 2 - Volume and percentage of admissions by quintiles of risk of mortality within 30 days and day and time of arrival at A&E for each mode of arrival

Mode of arrival:		Quintiles of risk of mortality within 30 days					Total
		Q 1 (Lowest)	Q 2	Q 3	Q 4	Q 5 (Highest)	
Ambulance	Volume	208,084	291,189	379,646	473,870	510,457	1,863,246
	Percentage	11.17	15.63	20.38	25.43	27.4	100
Non-ambulance	Volume	393,730	311,330	223,731	130,155	93,908	1,152,854
	Percentage	34.15	27.01	19.41	11.29	8.15	100
Unknown	Volume	3,776	3,070	2,212	1,564	1,224	11,846
	Percentage	31.88	25.92	18.67	13.2	10.33	100
All modes	Volume	605,590	605,589	605,589	605,589	605,589	3,027,946
	Percentage	20.00	20.00	20.00	20.00	20.00	100.00

Table A10: Source data for Figure 3 - Volume and percentage of admissions by mode and time of arrival at A&E

Day and time:		Mode of arrival at A&E			Total
		Ambulance	Non-ambulance	Unknown	
Wednesday day	Volume	157,675	114,819	1,245	273,739
	Percentage	57.60	41.94	0.45	100
Wednesday night	Volume	106,248	51,434	615	158,297
	Percentage	67.12	32.49	0.39	100
Thursday day	Volume	160,146	116,240	1,234	277,620
	Percentage	57.69	41.87	0.44	100
Thursday night	Volume	107,511	50,995	691	159,197
	Percentage	67.53	32.03	0.43	100
Friday day	Volume	159,339	117,925	1,306	278,570
	Percentage	57.20	42.33	0.47	100
Friday night	Volume	112,742	52,213	547	165,502
	Percentage	68.12	31.55	0.33	100
Saturday day	Volume	153,602	97,072	790	251,464
	Percentage	61.08	38.60	0.31	100
Saturday night	Volume	113,400	50,381	531	164,312
	Percentage	69.02	30.66	0.32	100
Sunday day	Volume	154,123	101,487	921	256,531
	Percentage	60.08	39.56	0.36	100
Sunday night	Volume	105,371	49,427	501	155,299
	Percentage	67.85	31.83	0.32	100
Monday day	Volume	164,155	129,183	1,188	294,526
	Percentage	55.74	43.86	0.40	100
Monday night	Volume	106,782	53,132	596	160,510
	Percentage	66.53	33.10	0.37	100
Tuesday day	Volume	157,148	117,279	1,043	275,470
	Percentage	57.05	42.57	0.38	100
Tuesday night	Volume	105,004	51,267	638	156,909
	Percentage	66.92	32.67	0.41	100
Whole week	Volume	1,863,246	1,152,854	11,846	3,027,946
	Percentage	61.53	38.07	0.39	100