

## C.8 Evidence tables

Reference	Aldridge 2016 <sup>6</sup>
Study type and analysis	Retrospective cohort study. Logistic regression.
Number of participants and characteristics	Total n not reported Weekend admissions n not reported; Weekday admissions n not reported Inclusion criteria: adult emergency hospital admissions for financial year 2013-2014 from the Health and Social Care Information Centre Exclusion criteria: patients younger than 16 years and primary maternity admissions
Prognostic variable	Weekend admission (admissions starting on a Saturday or Sunday by date) versus weekday admission (reference day Wednesday by date)
Confounders	Trust Sex Age Income deprivation component of the Index of Multiple Deprivation 2010 Diagnostic category as represented by the Clinical Classification Software code and a categorised index of comorbidity
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR 1.10 (95% CI 1.08 to 1.12)
Comments	Risk of bias assessments: Low risk of bias

Reference	Anselmi 2016 <sup>8</sup>
Study type and analysis	Retrospective cohort study. Logistic regression.
Number of participants and characteristics	Total n=3,027,946 Number in each risk factor category not reported Inclusion criteria: emergency admissions via A&E between 1 April 2013 and 28 February 2014 Exclusion criteria: all but first admission in cases of multiple admissions in the last 30 days of life, incomplete information on risk-adjustment variables

Reference	Anselmi 2016 <sup>8</sup>
Prognostic variable	Weekend admission (7pm Friday night to 6.59am Monday morning) versus weekday admission (reference day Wednesday 7am to 6.59pm)
Confounders	Interaction between gender and age Ethnicity Primary diagnosis Comorbidities (30 binary indicators recorded in the secondary diagnosis fields, measured using Elixhauser conditions) Source of admission Deprivation in area of residence Admitting hospital Month of admission
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR 1.02 (95% CI 1.0 to 1.03)
Comments	Risk of bias assessments: High risk of bias

Reference	Aylin 2010 <sup>11</sup>
Study type and analysis	Retrospective cohort study. Logistic regression.
Number of participants and characteristics	Total n=4,317,866 Weekend admissions 999,062; Weekday admissions 3,318,804 Inclusion criteria: Emergency inpatient admissions extracted from finished consultant episodes of care for inpatients in all acute public hospitals in England from the NHS Wide Clearing Service with discharge dates between 1 April 2005 and 31 March 2006 Exclusion criteria: Day cases (day surgery) and admissions occurring in non-acute trusts
Prognostic variable	Weekend admission (admissions starting on a Saturday or Sunday by date) versus weekday admission
Confounders	Age Sex Deprivation quintile Charlson comorbidity score Case mix (clinical classification system diagnostic groups)
Outcomes and	Protocol outcome: Hospital mortality

<b>Reference</b>	<b>Aylin 2010<sup>11</sup></b>
effect sizes	OR 1.10 (95% CI 1.08 to 1.12)
Comments	Risk of bias assessments: Low risk of bias

<b>Reference</b>	<b>Bell 2013<sup>23</sup></b>
Study type and analysis	Retrospective cohort study. Step-wise multivariate regression analysis.
Number of participants and characteristics	Total n=1.3 million Number in each risk factor category not reported Inclusion criteria: Adult ( $\geq 16$ years) acute medical admissions derived from hospital episode statistics for patients admitted to participating hospitals as an acute medical emergency 1 April 2009 to 31 March 2010 Exclusion criteria: not reported
Prognostic variable	Weekend admission versus weekday admission
Confounders	Charlson comorbidity index Age Index of multiple deprivation
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR 1.15 (95% CI 0.89 to 1.49)
Comments	Risk of bias assessments: Low risk of bias

<b>Reference</b>	<b>Bray 2014<sup>28</sup></b>
Study type and analysis	Prospective cohort study. Cox proportional hazards model.
Number of participants and characteristics	Total n=32,388 Number in each risk factor category not reported Inclusion criteria: Adults ( $\geq 18$ years) admitted with stroke from the Stroke Improvement National Audit Programme from 1 June 2011 to 1 December 2012 linked with English national register of deaths Exclusion criteria: Subarachnoid haemorrhage or transient ischaemic attack
Prognostic variable	Weekend admission versus weekday admission

Reference	Bray 2014 <sup>28</sup>
Confounders	<ul style="list-style-type: none"> <li>Age</li> <li>Stroke type</li> <li>Pre-stroke independence</li> <li>Hypoxia in the first 24 hours of admission</li> <li>Lowest level of consciousness in the first 24 hours</li> <li>Arm weakness</li> <li>Leg weakness</li> <li>Hemianopia</li> <li>Dysphasia</li> <li>No. of SU beds</li> <li>Presence of 24/7 on-site thrombolysis service</li> <li>Ratio of HCAs/nurses to beds</li> <li>Presence of 7-day physician ward rounds</li> <li>Management solely in an optimal setting in first 24 hrs</li> <li>Antiplatelet therapy if required</li> <li>Brain scan within 24 hours</li> </ul>
Outcomes and effect sizes	<ul style="list-style-type: none"> <li>Protocol outcome: 30 day mortality</li> <li>HR 0.96 (95% CI 0.85 to 1.08)</li> </ul>
Comments	Risk of bias assessments: Low risk of bias

Reference	Bray 2016 <sup>29</sup>
Study type and analysis	Prospective cohort study. Logistic regression.
Number of participants and characteristics	<ul style="list-style-type: none"> <li>Total n=74,307</li> <li>Weekend admissions 18,916; Weekday admissions 55,391</li> <li>Inclusion criteria: adult patients (aged&gt;16 years) admitted with acute stroke in England and Wales between 1 April 2013 and 31 March 2014 from the Sentinel Stroke National Audit Programme (SSNAP)</li> <li>Exclusion criteria: not reported</li> </ul>
Prognostic variable	Weekend admission (Saturday to Sunday 08:00-19:59 h and Saturday to Sunday 20:00-07:59 hours) versus Weekday admission (Monday to

Reference	Bray 2016 <sup>29</sup>
	Friday 08:00-19:59 h)
Confounders	Age Sex Place of stroke onset (in or out of hospital) Stroke type Vascular comorbidity (atrial fibrillation, heart failure, diabetes, previous stroke or transient ischemic attack, hypertension) Pre-stroke functional level(as measured by the modified Rankin Scale) Time from stroke onset to admission Stroke severity (National Institutes of Health Stroke Scale score or level of consciousness on admission) Hospital level random intercepts
Outcomes and effect sizes	Protocol outcome: 30 day mortality (30 day survival following admission) OR: 1.03 (95% CI 0.95 to 1.12) (weekend 8am-7.59pm) OR: 0.89 (95% CI 0.78 to 1.02) (weekend 8pm to 7.59am)
Comments	Risk of bias assessments: Low risk of bias

Reference	Brims 2011 <sup>31</sup>
Study type and analysis	Retrospective cohort study. Multivariate logistic regression.
Number of participants and characteristics	Total n=9,915 Weekend admissions 2,071; Weekday admissions 7,844 Inclusion criteria: Acute exacerbations of chronic obstructive pulmonary disease patients admitted to a large secondary care hospital in Portsmouth between January 1997 and December 2004 extracted from hospital databases Exclusion criteria: Admissions occurring within 21 days of a previous admission
Prognostic variable	Weekend admission (midnight Friday to midnight Sunday) versus Weekday admission (all other time)
Confounders	Age Sex Creatinine PaO2

<b>Reference</b>	<b>Brims 2011<sup>31</sup></b>
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR: 1.75 (95% CI 0.75 to 4.09)
Comments	Risk of bias assessments: High risk of bias

<b>Reference</b>	<b>Campbell 2014<sup>33</sup></b>
Study type and analysis	Prospective cohort study. Logistic regression.
Number of participants and characteristics	Total n= 45,726 Out of hours admissions 23,779; In hours admissions 21,947 Inclusion criteria: Stroke admissions to 130 hospitals in England (1 April 2010 - 31 January 2012) from the Stroke Improvement National Audit Programme Exclusion criteria: Subarachnoid haemorrhage
Prognostic variable	Weekend admission versus Weekday admission Out of hours admission (weekdays before 08:00 or after 18:00 or at any time on a weekend day or English public holiday) versus In hours admission (weekdays 08:00 to 18:00)
Confounders	Age Sex Worst level of consciousness in the first 24 hours (surrogate for severity) Stroke type Pre-stroke independence
Outcomes and effect sizes	Protocol outcome: 30 day mortality Weekend admission versus Weekday admission OR: 1.14 (95% CI 1.06 to 1.23) Out of hours admission versus In hours admission OR 1.07 (95% CI 1.00 to 1.14)
Comments	Risk of bias assessments: Low risk of bias

<b>Reference</b>	<b>Deshmukh 2016<sup>57</sup></b>
Study type and analysis	Prospective cohort study. Cox proportional hazards model.

Reference	Deshmukh 2016 <sup>57</sup>
Number of participants and characteristics	Total n=385 Weekend admissions 100; Weekday admissions 285 Inclusion criteria: patients admitted between January 2009 and December 2011 with acute subarachnoid haemorrhage from 12 hospitals in Northwest England Exclusion criteria: not reported
Prognostic variable	Weekend admission (16:00 Friday to 16:00 Sunday) versus Weekday admission
Confounders	Age Sex Severity of SAH (baseline World Federation of Neurosurgical Societies grade) Treatment modalities following admission Time from scan to admission and from admission to treatment
Outcomes and effect sizes	Protocol outcome: Hospital mortality HR: 2.10 (95% CI 1.13 to 3.90)
Comments	Risk of bias assessments: Low risk of bias

Reference	Freemantle 2012 <sup>62</sup>
Study type and analysis	Retrospective cohort study. Contingency tables for each day, utilising a complementary log-log link function and binomial error.
Number of participants and characteristics	Total n=14,217,640 Number in each risk factor category not reported Inclusion criteria: All admissions to National Health Service Hospitals in England April 2009 - March 2010 using inpatient hospital trusts within England. Linked data on mortality from the Office of National Statistics Exclusion criteria: not reported
Prognostic variable	Saturday admission versus Wednesday admission Sunday admission versus Wednesday admission
Confounders	Age Sex Ethnicity

Reference	Freemantle 2012 <sup>62</sup>
	Source of admission Diagnostic group No. of previous emergency admissions No. of previous complex admissions Charlson comorbidity index Social deprivation Hospital trust Day of the year (seasonality)
Outcomes and effect sizes	Protocol outcome: Hospital mortality Saturday versus Wednesday HR 1.11 (95% CI 1.09 to 1.13) Sunday versus Wednesday HR 1.16 (95% CI 1.14 to 1.18) Protocol outcome: 30 day mortality Saturday versus Wednesday HR 1.12 (95% CI 1.10 to 1.14) Sunday versus Wednesday HR 1.14 (95% CI 1.13 to 1.15)
Comments	Risk of bias assessments: Low risk of bias

Reference	Freemantle 2015 <sup>63</sup>
Study type and analysis	Retrospective cohort study. Contingency tables for each day, utilising a complementary log-log link function and binomial error.
Number of participants and characteristics	Total n= 14 818 374 17% admitted on each weekday, 8% on Saturday and 6% on Sunday Inclusion criteria: All admissions to National Health Service Hospitals in England in 2013-2014 Exclusion criteria: At least one case mix item missing
Prognostic variable	Saturday admission versus Wednesday admission Sunday admission versus Wednesday admission
Confounders	Case mix (clinical classifications software category) Age Time of year



Reference	Freemantle 2015 <sup>63</sup>
	Trust Deprivation No. of previous emergency admissions No. of previous complex admissions Admission source Admission urgency Sex Ethnicity Charlson comorbidity index
Outcomes and effect sizes	Protocol outcome: 30 day mortality Saturday versus Wednesday HR 1.10 (95% CI 1.08 to 1.12) Sunday versus Wednesday HR 1.15 (95% CI 1.14 to 1.16)
Comments	Risk of bias assessments: Low risk of bias

Reference	Iqbal 2015 <sup>88</sup>
Study type and analysis	Retrospective cohort study. Logistic regression and Cox proportional hazards regression models.
Number of participants and characteristics	Total n=11,466 Out of hours admission 7,496; In hours admission 3,970 Inclusion criteria: Consecutive STEMI patients treated with PPCI between 2005 and 2011 at 8 tertiary centres in London from local British Cardiac Intervention Society databases linked with Office of National Statistics data Exclusion criteria: not reported
Prognostic variable	Out of hours (weekdays 17:00 to 09:00 and any time on a Saturday or Sunday) versus In hours (09:00 to 17:00 Monday to Friday)
Confounders	Age Sex Diabetes GP2b-3a inhibitor use Previous MI Renal disease

Reference	Iqbal 2015 <sup>88</sup>
	Radial access Cardiogenic shock IABP use Intubation status LMS intervention LAD intervention Multi-vessel intervention Completeness of revascularisation
Outcomes and effect sizes	Protocol outcome: 30 day mortality HR: 1.03 (95% CI 0.89 to 1.19) Protocol outcome: Avoidable adverse events (in-hospital bleeding complications) OR: 1.47 (95% CI 0.97 to 2.23)
Comments	Risk of bias assessment: Low risk of bias

Reference	Jairath 2011 <sup>89</sup>
Study type and analysis	Prospective cohort study. Mixed effects logistic regression.
Number of participants and characteristics	Total n=6,749 Weekend admission 1,499; Weekday 5,250 Inclusion criteria: Adults (16 years and over) presenting with acute upper gastrointestinal bleeding from the 2007 UK National audit of AUGIB of all NHS hospitals accepting acute admissions in the UK (majority from England). 1 May - 30 June 2007 Exclusion criteria: not reported
Prognostic variable	Weekend admission versus Weekday admission
Confounders	Individual components of the Rockall score (age, presentation with shock, co-morbid illness) Presentation with hematemesis Presentation with melaena Haemoglobin and urea concentration on admission Use of aspirin Use of non-steroidal anti-inflammatory drugs

Reference	Jairath 2011 <sup>89</sup>
	Use of proton pump inhibitors Gender Variceal bleeding Peptic ulcer bleeding Availability of OOH rota enabling 24hr access to endoscopy Admission status (new patient versus inpatient)
Outcomes and effect sizes	Protocol outcome: Hospital mortality up to 30 days post-index AUGIB OR: 0.93 (95% CI 0.75 to 1.15) Protocol outcome: Avoidable adverse events (re-bleeding) OR: 0.91 (95% CI 0.74 to 1.12) Protocol outcome: Avoidable adverse events (surgery/radiology) OR: 1.13 (95% CI 0.81 to 1.58) Protocol outcome: Avoidable adverse events (red cell transfusion) OR: 1.12 (95% CI 0.94 to 1.33)
Comments	Risk of bias assessment: High risk of bias (for the outcome of hospital mortality); Low risk of bias (for the outcomes of avoidable adverse events) 43% of patients missing at least one baseline variable, but group missing data rates not reported. Multiple imputation used to account for uncertainty caused by missing data

Reference	Kolic 2015 <sup>99</sup>
Study type and analysis	Prospective cohort study. Multivariate logistic regression.
Number of participants and characteristics	Total n=370 Weekend admission 75; Weekday admission 295 Inclusion criteria: All patients presenting to the acute medical unit at Queen Elizabeth Hospital in London 1 October 2013 - 15 October 2013 and 9 December 2013 - 22 December 2013 Exclusion criteria: Patients with <12hr inpatient stay
Prognostic variable	Weekend admission versus Weekday admission
Confounders	Age Severity (NEW score)

<b>Reference</b>	<b>Kolic 2015<sup>99</sup></b>
Outcomes and effect sizes	Protocol outcome: Avoidable adverse events (inadequate clinical response to NEW score) OR: 4.15 (95% CI 2.24 to 7.69)
Comments	Risk of bias assessment: High risk of bias

<b>Reference</b>	<b>Meacock 2016<sup>118</sup></b>
Study type and analysis	Retrospective cohort study. Logistic regression.
Number of participants and characteristics	Total n=4,656,586 Number in each risk factor category not reported Inclusion criteria: emergency admissions to type 1 units (consultant-led, multispecialty 24-hour services with full resuscitation facilities and designated accommodation for reception of A&E patients) from 140 trusts in England from hospital episode statistics 1 April 2013 to 28 February 2014 Exclusion criteria: single speciality centres, minor injury units and walk-in centres
Prognostic variable	Weekend admission (Saturday and Sunday by date) versus Weekday admission (Monday to Friday by date)
Confounders	Age Sex Ethnicity Primary diagnosis (SHMI-grouped Clinical Classifications Software category) Elixhauser (comorbidity) conditions Admission method Admission source Deprivation quintile Month Admitting hospital
Outcomes and effect sizes	Protocol outcome: 30 day mortality OR: 1.05 (95% CI 1.04 to 1.07) (A&E admissions) OR: 1.21 (95% CI 1.16 to 1.26) (direct admissions)
Comments	Risk of bias assessment: Low risk of bias

Reference	Mohammed 2012 <sup>122</sup>
Study type and analysis	Retrospective cohort study. Logistic regression.
Number of participants and characteristics	Total n=3,105,249 Weekend admission 735,933; Weekday admission 2,369,316 Inclusion criteria: Emergency admissions April 2008 - March 2009 from all acute hospitals (n=328) in England via Hospital Episode Statistics Exclusion criteria: Admissions discharged alive with a zero day length of stay, age <16 years, maternity care, mental health care other than dementia
Prognostic variable	Weekend admission (by date) versus Weekday admission (by date)
Confounders	Age category Complex elderly Male Healthcare resource group with comorbidities/complications Interaction: Age and HRG with comorbidities/complications Admission quarter
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR: 1.09 (95% CI 1.05 to 1.13)
Comments	Risk of bias assessment: Low risk of bias

Reference	Mohammed 2016 <sup>121</sup>
Study type and analysis	Retrospective cohort study. Linear and logistic regression.
Number of participants and characteristics	Total n=58,481 Weekend admission 14,198; Weekday admission 44,283 Inclusion criteria: all adult (≥16 years) emergency medical and elderly admissions, discharged between 1 January 2014 and 31 December 2014 from 3 general acute hospitals in England Exclusion criteria: records where NEWS was missing or recorded outside ±24 hours of the admission time
Prognostic variable	Weekend admission (Saturday and Sunday by date) versus Weekday admission (Monday to Friday by date)

<b>Reference</b>	<b>Mohammed 2016<sup>121</sup></b>
Confounders	Index NEWS Age Sex Calendar month
Outcomes and effect sizes	Protocol outcome: Hospital mortality RR: 0.98 (95% CI 0.91 to 1.06)
Comments	Risk of bias assessment: Low risk of bias

<b>Reference</b>	<b>Noman 2012<sup>142</sup></b>
Study type and analysis	Retrospective cohort study. Multiple logistic regression.
Number of participants and characteristics	Total n=2,571 Out of hours 1,535; Routine hours 1,036 Inclusion criteria: STEMI patients undergoing PPCI March 2008 - June 2011 at one tertiary cardiac centre in Newcastle from local coronary artery disease database (Dentrite) linked with Office of National Statistics data Exclusion criteria: not reported
Prognostic variable	Out of hours (weekdays between 18:00 and 08:00 and any time on a Saturday or Sunday) versus Routine hours (08:00 to 18:00 Monday to Friday)
Confounders	Age Sex Previous MI Diabetes mellitus Anterior MI site Baseline haemoglobin and creatinine Admission HR and SBP Cardiogenic shock Onset of symptoms to balloon time Presence of multi-vessel disease Thrombolysis in MI flow 3 post-PPCI

<b>Reference</b>	<b>Noman 2012<sup>142</sup></b>
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR: 1.33 (95% CI 0.73 to 2.42)
Comments	Risk of bias assessment: Low risk of bias

<b>Reference</b>	<b>Palmer 2012<sup>147</sup></b>
Study type and analysis	Retrospective cohort study. Multiple logistic regression.
Number of participants and characteristics	Total n=93,621 Weekend admission 23,297; Weekday admission 70,324 Inclusion criteria: Stroke admissions from Hospital Episode Statistics 1 April 2009 - 31 March 2010 Exclusion criteria: not reported
Prognostic variable	Weekend (midnight Friday to Midnight Sunday) versus Weekday
Confounders	Age Sex Socioeconomic deprivation quintile No. of previous admissions Comorbidities (Charlson index with weights derived from all admissions in England) Month of discharge Ethnic group Source of admission Stroke type
Outcomes and effect sizes	Protocol outcome: Hospital mortality OR: 1.18 (95% CI 1.12 to 1.24) Protocol outcome: Avoidable adverse events (aspiration pneumonia) OR: 1.11 (95% CI 1.04 to 1.18) Length of stay (discharge to usual place of residence within 56 days) OR 0.92 (95% CI 0.88 to 0.96)
Comments	Risk of bias assessment: High risk of bias (for outcome of mortality); Low risk of bias (for outcomes of avoidable adverse events); Low risk of bias

<b>Reference</b>	<b>Palmer 2012<sup>147</sup></b>
	(for outcome of length of stay)

<b>Reference</b>	<b>Rathod 2013<sup>161</sup></b>
Study type and analysis	Retrospective cohort study. Logistic regression.
Number of participants and characteristics	Total n=3347 Out of hours admissions 2,048; In hours admissions 1,299 Inclusion criteria: Consecutive STEMI patients undergoing PPCI in one tertiary heart attack centre in London January 2004 - July 2012 from clinical database, electronic patient record and cardiac surgical database linked with Office of National Statistics data Exclusion criteria: not reported
Prognostic variable	Out of hours (17:01 to 07:59 Monday to Friday and 17:01 Friday to 07:59 Monday) versus In hours (08:00 to 17:00 Monday to Friday)
Confounders	Age Shock eGFR>60 (epidermal growth factor receptor) EF>40 Procedural success Multi-vessel disease
Outcomes and effect sizes	Protocol outcome: 30 day mortality HR: 0.74 (95% CI 0.42 to 1.30) Protocol outcome: Avoidable adverse events (death, recurrent MI, target vessel revascularisation) HR: 0.81 (95% CI 0.54 to 1.22)
Comments	Risk of bias assessment: Low risk of bias

<b>Reference</b>	<b>Ruiz 2015<sup>168</sup></b>
Study type and analysis	Retrospective cohort study. Multilevel mixed-effects logistic regression.
Number of participants	Total n=885,864 Number in each risk factor category not reported



Reference	Ruiz 2015 <sup>168</sup>
and characteristics	Inclusion criteria: Emergency admissions from an International dataset from the Global Comparators project consisting of hospital administrative data 2009-2012 (separate English data analysis) Exclusion criteria: day cases, non-acute care, records with missing/invalid entries, short-term emergency admissions not ending in death or transfer within 24 hours and with recorded major procedure
Prognostic variable	Saturday admission versus Monday admission; Sunday admission versus Monday admission
Confounders	Age Gender Transfers in from another hospital Year of admission Comorbidity score Diagnosis risk factor Bed numbers Rate of transfers to other hospitals
Outcomes and effect sizes	Protocol outcome: Hospital mortality Saturday admission versus Monday admission OR 1.07 (95% CI 1.03 to 1.11) Sunday admission versus Monday admission OR 1.08 (95% CI 1.04 to 1.12)
Comments	Risk of bias assessment: High risk of bias

Reference	Showkathali 2013 <sup>181</sup>
Study type and analysis	Retrospective cohort study. Binary logistic regression.
Number of participants and characteristics	Total n=1471 Out of hours admission: 866; In hours admission 605 Inclusion criteria: All patients undergoing PPCI September 2009 - November 2011 at one cardiothoracic centre in Essex from the cardiac service database system Exclusion criteria: not reported
Prognostic variable	Out of hours admission (18:00 to 08:00 weeknights and Saturday 08:00 to Monday 08:00) versus In hours admission (08:00 to 18:00 weekdays)
Confounders	Age >75 years Sex

Reference	Showkathali 2013 <sup>181</sup>
	Cardiogenic shock Diabetes Hypertension Previous MI Single vessel PCI Pre-procedure TIMI 0/1 flow Drug eluting stent use Door to balloon time
Outcomes and effect sizes	Protocol outcome: 30 day mortality HR: 1.10 (95% CI 0.60 to 2.02)
Comments	Risk of bias assessment: Low risk of bias