

Supplementary material

Table S2: Demographic characteristics and descriptive outcomes per age band for Baseline, ECH Year 1 and ECH Year 2.

Table S4: Comparison of ECH Year 2 with ECH Year 1 outcomes according to age bands

Table S5: Primary discharge codes and inpatient deaths for the whole cohort summarised by Clinical Classification Software in descending order of Baseline case number.

Age in years	Baseline				ECH Year 1				ECH Year 2			
	All (18+)	18-64	65-79	80+	All (18+)	18-64	65-79	80+	All (18+)	18-64	65-79	80+
Number of index admissions	18,586	6,951	5,285	6,350	16,126	5,758	4,849	5,519	17,727	6,198	5,281	6,248
Male (%)	7,856 (42.3%)	2,871 (41.3%)	2,581 (48.9%)	2,403 (37.8%)	7,060 (43.8%)	2,467 (42.9%)	2,470 (50.9%)	2,124 (38.5%)	7,690 (43.4%)	2,661 (42.9%)	2,582 (49.0%)	2,443 (39.1%)
Age mean (SD)	67.0 (20.2)	44.7 (13.4)	72.7 (4.3)	86.6 (4.7)	67.9 (19.3)	46.1 (13.1)	72.6 (4.3)	86.6 (4.7)	68.3 (19.1)	46.3 (12.9)	72.6 (4.3)	86.6 (4.7)
CCI mean (SD)	1.54 (2.12)	0.83 (1.56)	1.90 (2.24)	2.03 (2.32)	1.66 (2.19)	0.92 (1.67)	2.00 (2.28)	2.14 (2.37)	1.74 (2.24)	0.97 (1.75)	2.00 (2.27)	2.26 (2.43)
IMDS mean (SD)	24.7 (15.3)	27.6 (15.9)	23.9 (14.8)	22.2 (14.5)	24.2 (15.1)	27.1 (15.6)	23.4 (14.8)	21.8 (14.2)	24.0 (15.0)	27.0 (15.6)	23.0 (14.8)	21.9 (14.0)
Day 60 deaths (%)	1,729 (9.3%)	159 (2.3%)	511 (9.7%)	1,059 (16.7%)	1,488 (9.2%)	167 (2.9%)	485 (10.0%)	836 (15.1%)	1,574 (8.9%)	173 (2.8%)	478 (9.1%)	923 (14.8%)
Inpatient deaths (%)	931 (5.0%)	83 (1.2%)	235 (4.4%)	613 (9.7%)	831 (5.2%)	85 (1.5%)	256 (5.3%)	490 (8.9%)	854 (4.8%)	83 (1.3%)	252 (4.8%)	519 (8.3%)
Outpatient deaths (%)	798 (4.3%)	76 (1.1%)	276 (5.2%)	446 (7.0%)	657 (4.1%)	82 (1.4%)	229 (4.7%)	346 (6.3%)	720 (4.1%)	90 (1.5%)	226 (4.3%)	404 (6.5%)
Inpatient days median (IQR)	1 (0-6)	0 (0-2)	2 (0-7)	4 (1-12)	1 (0-6)	1 (0-2)	2 (0-7)	4 (1-14)	1 (0-6)	1 (0-2)	2 (0-6)	3 (1-12)
Inpatient days mean (SD)	6.2 (13.8)	2.4 (6.7)	6.4 (13.4)	10.3 (18.1)	6.8 (15.5)	2.4 (6.9)	6.9 (17.2)	11.3 (18.7)	5.8 (12.3)	2.3 (6.5)	5.7 (11.6)	9.5 (15.8)
Readmissions (% discharged alive)	3,752 (21.3%)	1,108 (16.1%)	1,186 (23.5%)	1,458 (25.4%)	3,001 (19.6%)	796 (14.0%)	997 (21.7%)	1,208 (24.0%)	3,177 (18.8%)	815 (13.3%)	988 (19.7%)	1,374 (24.0%)

CCI: Charlson Comorbidity Index; IMDS: Index of Multiple Deprivation Score

Table S2: Demographic characteristics and descriptive outcomes per age band for Baseline, ECH Year 1 and ECH Year 2.

	All (18+ years)	Age 18-64 years	Age 65-79 years	Age 80+ years
All Day 60 mortality	0.93 (0.85 to 1.00) p=0.05	0.93 (0.75 to 1.16) p=0.53	0.89 (0.78 to 1.03) p=0.11	0.94 (0.85 to 1.05) p=0.28
Inpatient Day 60 mortality	0.89 (0.81 to 0.99) p=0.04	0.88 (0.65 to 1.20) p=0.42	0.90 (0.75 to 1.08) p=0.26	0.90 (0.79 to 1.03) p=0.12
Post-discharge Day 60 mortality	0.96 (0.86 to 1.07) p=0.46	0.98 (0.72 to 1.33) p=0.89	0.89 (0.74 to 1.08) p=0.23	0.99 (0.86 to 1.16) p=0.99
Probability of discharge per day up to Day 60	1.03 (1.01 to 1.05) p=0.01	0.99 (0.96 to 1.03) p=0.36	1.01 (0.96 to 1.05) p=0.32	1.08 (1.04 to 1.13) p<0.01
Readmission <60 days of discharge	0.93 (0.89 to 0.99) p=0.01	0.94 (0.86 to 1.03) p=0.18	0.89 (0.82 to 0.97) p<0.01	0.98 (0.92 to 1.05) p=0.65
ED re-attendance <60 days of discharge	0.72 (0.67 to 0.78) p<0.01	0.79 (0.72 to 0.88) p<0.01	0.73 (0.62 to 0.85) p<0.01	0.59 (0.51 to 0.69) p<0.01

Outcomes are odds ratios (95% CI) for ECH Year 2 relative to ECH Year 1

Table S4: Comparison of ECH Year 2 with ECH Year 1 outcomes according to age bands

Clinical Classification Software Code	Baseline		ECH Year 1		ECH Year 2	
	Index cases	Inpatient deaths <60 days	Index cases	Inpatient deaths <60 days	Index cases	Inpatient deaths <60 days
Pneumonia (except caused by TB or STI)	1,058	228	894	156	1,167	190
Nonspecific chest pain	1,040	1	856	0	975	0
Urinary tract infections	831	22	674	23	630	19
Chronic obstructive pulmonary disease & bronchiectasis	819	32	705	19	677	21
Other connective tissue disease	731	8	781	11	838	9
Abdominal pain	671	1	428	4	432	0
Cardiac dysrhythmias	418	4	396	9	404	4
Acute cerebrovascular disease	410	68	384	55	408	76
Acute bronchitis	409	14	244	11	316	6
Coronary atherosclerosis & other heart disease	384	3	347	0	336	2
Intestinal infection	350	7	292	6	325	5
Congestive heart failure, non-hypertensive	337	57	308	48	326	34
Spondylosis, intervertebral disc disorders; other back problems	335	1	292	4	306	3
Other gastrointestinal disorders	329	10	165	4	214	7
Superficial injury, contusion	328	1	237	2	281	2
Skin & subcutaneous tissue infections	325	4	326	3	424	4
Biliary tract disease	267	5	262	13	254	9
Headache, including migraine	267	0	273	0	298	0
Syncope	265	0	223	1	250	0
Fracture of neck of femur (hip)	259	21	291	26	317	21
Other non-traumatic joint disorders	257	4	135	0	170	1
Epilepsy, convulsions	225	3	161	1	183	2
Senility & organic mental disorders	223	15	179	9	154	11

Septicaemia (except in labour)	217	43	231	45	372	66
Poisoning by psychotropic agents	210	1	191	0	210	0
Poisoning by other medications & drugs	207	1	174	1	207	1
Acute myocardial infarction	205	19	190	10	261	23
Asthma	203	1	167	0	177	2
Gastrointestinal haemorrhage	202	12	135	8	146	7
Alcohol-related mental disorders	193	0	160	0	163	1
Fracture of upper limb	192	3	131	10	139	2
Acute & unspecified renal failure	191	22	222	32	202	29
Open wounds of head, neck, & trunk	185	0	136	0	174	0
Other CNS infection & poliomyelitis	177	0	141	1	139	1
Deficiency and other anaemia	169	2	133	1	117	1
Other fractures	167	6	183	13	217	6
Fracture of lower limb	150	5	116	8	113	4
Other upper respiratory disease	145	0	98	0	151	0
Other nervous system disorders	141	1	135	0	190	5
Conditions associated with dizziness	137	0	97	0	108	0
Complication of device, implant or	134	2	124	1	150	3
Fluid & electrolyte disorders	130	5	163	5	128	1
Pancreatic disorders (not diabetes)	124	3	127	6	127	0
Transient cerebral ischemia	120	1	119	0	128	0
Diverticulosis & diverticulitis	111	2	91	6	139	3
Residual codes, unclassified	111	0	102	1	143	0
Complication of surgical procedures or medical care	109	1	100	0	94	1
Other endocrine disorders	105	1	100	4	69	1
Aspiration pneumonitis, food/vomitus	102	47	101	24	90	26
Calculus of urinary tract	99	0	56	0	77	0
Cancer of bronchus, lung	98	38	89	28	90	27
Intestinal obstruction without hernia	95	8	104	6	123	5

Crushing injury or internal injury	94	2	68	4	77	1
Oesophageal disorders	94	3	121	3	121	0
Diabetes mellitus with complication	91	2	104	1	113	6
Genitourinary symptoms & ill-defined conditions	91	1	61	0	86	1
Gastritis & duodenitis	89	0	73	0	56	0
Other lower respiratory disease	88	9	60	8	69	2
Phlebitis, thrombophlebitis & thromboembolism	88	0	153	1	133	1
Abdominal hernia	86	3	63	1	77	5
Other complications of pregnancy	83	0	53	0	48	0
Pulmonary heart disease	76	4	88	5	97	2
Pleurisy, pneumothorax, pulmonary collapse	71	2	87	1	67	1
Viral infection	69	0	65	0	87	0
Regional enteritis & ulcerative colitis	63	0	47	1	46	1
Gout and other crystal arthropathies	62	1	41	1	55	0
Other psychoses	61	0	56	0	52	1
Liver disease, alcohol-related	60	12	68	15	62	16
Diabetes mellitus without complications	59	0	52	0	37	0
Menstrual disorders	59	0	16	0	31	0
Open wounds of extremities	59	0	52	1	58	1
Nausea & vomiting	57	0	53	0	62	0
Nephritis, nephrosis, renal sclerosis	57	0	52	0	64	0
Anxiety, somatoform, dissociative,	53	0	33	0	38	0
Pathological fracture	50	2	37	3	60	2
Appendicitis & other appendiceal conditions	49	0	62	0	45	0
Other upper respiratory infections	49	0	33	0	52	0
Missing	47	1	50	3	82	0
Other liver diseases	47	3	27	2	42	4
Other skin disorders	47	0	42	0	34	0
Affective disorders	45	0	24	0	23	0

Other injuries & conditions due to external causes	43	0	38	2	40	2
Parkinson's disease	42	1	30	0	33	2
Allergic reactions	41	0	33	0	32	0
Cancer of colon	40	10	23	8	36	8
Secondary malignancies	38	5	51	11	66	7
Anal & rectal conditions	36	1	39	0	33	1
Conduction disorders	36	1	47	0	50	2
Malaise & fatigue	35	2	30	1	34	1
Other diseases of kidneys & ureters	33	0	36	0	52	0
Intracranial injury	32	5	45	4	61	3
Other bone disease & musculoskeletal deformities	32	0	29	1	27	0
Peripheral & visceral atherosclerosis	31	14	24	12	38	11
Other hereditary & degenerative nervous system conditions	30	1	20	1	24	2
Spontaneous abortion	30	0	15	0	16	0
Haemorrhage during pregnancy, abrupt	29	0	14	0	13	0
Other nutritional, endocrine & metabolic	29	1	46	4	41	1
Respiratory failure, insufficiency, arrest	29	7	31	3	29	4
Other disorders of stomach & duodenum	28	0	25	0	25	0
Blindness & vision defects	27	0	24	0	13	0
Cancer of stomach	26	8	13	6	13	2
Skull & face fractures	26	1	24	0	21	1
Essential hypertension	25	0	22	0	29	0
Haemorrhoids	24	0	4	0	0	0
Joint disorders & dislocations, trauma-related	24	0	19	0	22	0
Cancer of pancreas	22	7	25	5	21	8
Coma, stupor & brain damage	22	2	13	3	25	4
Ovarian cyst	22	0	28	0	21	0
Poisoning by nonmedicinal substances	22	0	3	0	8	0
Cancer of breast	21	4	23	3	19	6

Cancer of oesophagus	20	8	17	5	29	5
Cancer of prostate	20	5	20	10	17	4
Inflammatory diseases of female pelvic organs	20	0	10	0	19	0
Leukaemia	20	4	18	4	22	9
Chronic ulcer of skin	19	0	40	0	20	1
Heart valve disorders	19	2	33	2	19	4
Cancer of rectum and anus	18	5	20	6	18	5
Non-infectious gastroenteritis	18	0	10	1	21	0
Other inflammatory conditions of skin	18	2	9	0	13	0
Peri-, endo-, & myocarditis, cardiomyopathy (except TB or STI)	18	2	23	1	16	0
Induced abortion	17	0	14	0	12	0
Influenza	16	2	36	2	59	3
Infective arthritis & osteomyelitis	15	1	18	0	29	1
Fever of unknown origin	14	0	16	1	27	0
Hyperplasia of prostate	14	0	12	0	9	0
Other mental conditions	14	0	13	0	12	0
Aortic, peripheral & visceral arteries	13	3	8	1	11	3
Gastroduodenal ulcer (except haemorrhage)	13	1	17	2	17	2
Malignant neoplasm without specification of site	13	4	21	8	12	6
Multiple sclerosis	12	1	8	0	6	0
Non-malignant breast conditions	12	0	5	0	5	0
Other screening for suspected conditions	12	0	13	0	12	0
Rheumatoid arthritis & related disease	12	1	8	0	4	0
Acute & chronic tonsillitis	11	0	9	0	15	0
Cancer of brain & nervous system	11	1	13	4	16	2
Cardiac arrest & ventricular fibrillation	11	6	11	6	12	7
Chronic renal failure	11	0	7	1	7	2
Coagulation & haemorrhagic disorders	11	0	12	0	10	0
Inflammatory conditions of male genital organs	11	0	7	0	11	0

Multiple myeloma	11	3	11	5	14	4
Mycoses	11	0	8	0	7	0
Non-Hodgkin's lymphoma	11	1	12	4	12	2
Other male genital disorders	11	0	7	0	7	0
Cancer of liver & intrahepatic bile	10	3	16	3	11	3
Ectopic pregnancy	10	0	8	0	11	0
Other & unspecified benign neoplasm	10	0	12	1	5	1
Substance-related mental disorders	10	0	12	0	10	0
Diseases of mouth, excluding dental	9	0	9	0	12	1
Disorders of teeth & jaw	9	0	8	0	6	0
Neoplasms of unspecified nature or uncertain behaviour	9	0	9	0	12	3
Rehabilitation care, fitting of prostheses	9	0	2	0	5	0
Sprains & strains	9	0	11	0	6	0
Lung disease due to external agents	8	0	5	1	7	1
Meningitis (except that caused by TB or STI)	8	0	12	0	4	0
Osteoarthritis	8	1	9	0	7	0
Other & ill-defined cerebrovascular	8	0	5	1	1	0
Other complications of birth, puerperium affecting mother	8	0	6	0	2	0
Other female genital disorders	8	0	8	0	4	0
Burns	7	0	5	1	2	0
Cancer, other & unspecified primary	7	5	7	2	4	1
Cancer, other respiratory & intrathoracic	7	4	9	5	8	2
Other disease of veins & lymphatics	7	0	22	0	23	0
Paralysis	7	0	11	0	16	0
Bacterial infection, unspecified site	6	1	7	2	12	2
Diseases of white blood cells	6	0	5	0	5	1
Menopausal disorders	6	0	2	0	1	0
Otitis media & related conditions	6	0	2	0	4	0
Varicose veins of lower extremity	6	0	11	0	17	0

Cancer of head & neck	5	2	3	2	4	2
Cancer of ovary	5	0	5	0	10	4
Encephalitis (except that caused by TB or STI)	5	0	3	1	2	1
Endometriosis	5	0	3	0	1	0
Other diseases of bladder & urethra	5	0	2	0	4	0
Other ear & sense organ disorders	5	0	3	0	6	0
Other eye disorders	5	0	10	0	6	0
Other infections, including parasitic	5	0	3	0	6	0
Peritonitis & intestinal abscess	5	0	1	1	14	1
Cancer of bladder	4	1	5	0	7	3
Cancer of other female genital organs	4	1	12	0	10	1
Open wounds of head, neck & trunk	4	0	2	1	9	1
Shock	4	2	1	0	2	2
Aortic & peripheral arterial emboli	3	1	6	1	1	0
Benign neoplasm of uterus	3	0	1	0	4	0
Cancer of kidney & renal pelvis	3	3	9	1	7	2
Digestive congenital anomalies	3	0	4	0	1	0
Medical examination/evaluation	3	0	1	0	1	0
Other aftercare	3	0	4	0	4	0
Prolapse of female genital organs	3	0	1	0	1	0
Schizophrenia & related disorders	3	0	4	0	6	0
Systemic lupus erythematosus & connective tissue disorders	3	0	3	0	0	0
Thyroid disorders	3	0	6	0	2	0
Cancer of bone & connective tissue	2	0	2	2	2	1
Cancer of uterus	2	0	2	0	1	1
Hepatitis	2	0	2	0	0	0
Hypertension with complications & secondary hypertension	2	0	5	1	2	0
Immunity disorders	2	0	1	0	0	0
Nutritional deficiencies	2	0	1	0	4	0

Osteoporosis	2	0	1	0	2	0
Other hematologic conditions	2	0	2	0	2	0
Retinal detachments, defects, vascular occlusion	2	0	2	0	7	0
Acquired foot deformities	1	0	0	0	0	0
Acute post-haemorrhagic anaemia	1	0	0	0	0	0
Cancer of cervix	1	0	1	0	1	0
Cancer of other GI organs, peritoneum	1	1	0	2	1	3
Contraceptive & procreative management	1	0	0	0	0	0
Disorders of lipid metabolism	1	0	1	0	0	0
Hodgkin's disease	1	1	1	0	2	1
Inflammation, infection of eye (except TB or STI)	1	0	3	2	9	0
Lymphadenitis	1	0	0	0	4	0
Melanomas of skin	1	0	3	0	0	0
Other acquired deformities	1	0	1	0	2	0
Other non-epithelial cancer of skin	1	1	1	0	0	0
Post-abortion complications	1	0	0	0	0	0
Preadult disorders	1	0	0	0	0	0
Sexually transmitted diseases (not HIV or hepatitis)	1	0	1	0	1	0
Tuberculosis	1	0	2	1	0	0
Cancer of other urinary organs	0	0	1	0	1	1
Cancer of thyroid	0	0	1	1	0	0
Cardiac & circulatory congenital anomalies	0	0	1	0	1	0
Cystic fibrosis	0	0	0	0	1	0
Gangrene	0	0	1	0	3	0
Genitourinary congenital anomalies	0	0	0	0	1	0
Glaucoma	0	0	0	0	2	0
Nervous system congenital anomalies	0	0	0	0	1	0
Normal pregnancy and/or delivery	0	0	1	0	1	0
Occlusion or stenosis of precerebral arteries	0	0	1	0	2	0

Other & ill-defined heart disease	0	0	4	0	1	0
Other circulatory disease	0	4	4	7	3	5
Other congenital anomalies	0	0	1	0	0	0
Personal history of mental disorder	0	0	3	0	2	0
Spinal cord injury	0	0	1	0	0	0
Total	18,586	931	16,126	831	17,727	854

Table S5: Primary discharge codes and inpatient deaths for the whole cohort summarised by Clinical Classification Software in descending order of Baseline case number.