Improvement Analytics Unit
September 2018

Technical appendix: The impact of integrated care teams on hospital use in North East Hampshire and Farnham

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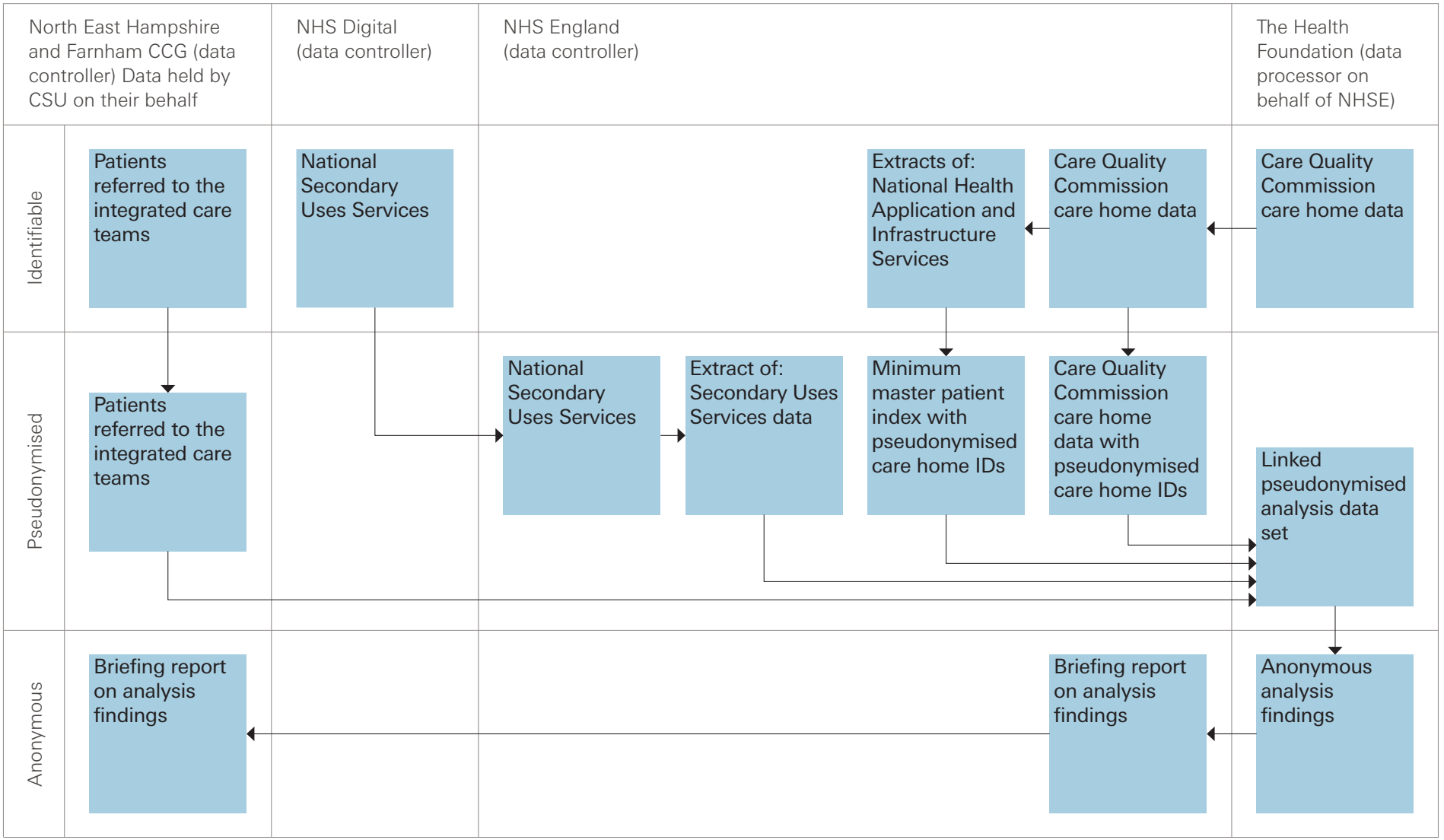
About this technical appendix

This technical appendix provides supplemental information relating to analysis conducted by the Improvement Analytics Unit, a partnership between NHS England and the Health Foundation. It supports a Health Foundation briefing considering the findings of the analysis - available from www.health.org.uk/publication/impact-integrated-care-teams-hospital-use-north-east-hampshire-and-farnham. This technical appendix provides supplemental information and results that were not published in the main briefing. For information on the methods used, see the statistical analysis protocol, which is available from the link above.

The Health Foundation

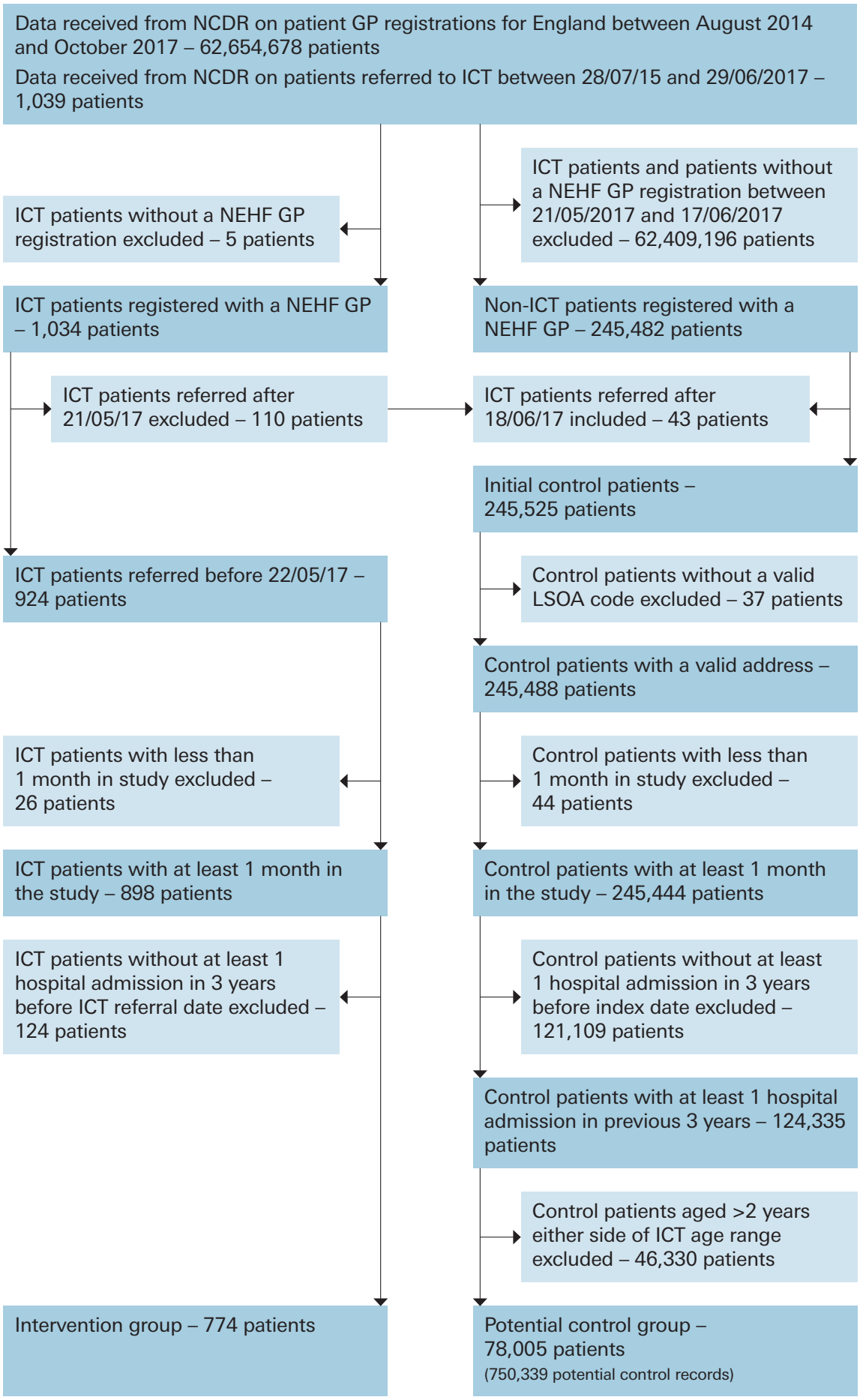
1. Data linkage and selection of patients in the study

Figure A1. Data linkage and pseudonymisation process



Note: Anonymous means that the data cannot in any way be attributed to an individual. Pseudonomised means that identifiable information, such as NHS numbers and date of birth, has been removed from the dataset. All data processed by the IAU are pseudonymised in line with the ICO's code of practice to anonymisation.

Figure A2. Flow diagram of study cohort selection



2. Results

Main analyses

Table A1. Baseline characteristics before and after matching

	ICT patients	Matched control patients	Potential matched control patient records	Potential matched control patients
Total number of people	774	731	78,005	78,005
Total number of unique records	774	768	750,339	78,005
Total number of records	774	774	750,339	78,005
Age, median [IQR]	81.00 [72.00, 87.00]	79.00 [68.00, 86.00]	68.00 [51.00, 77.00]	54.00 [38.00, 69.00]
Male	43.0%	39.7%	46.2%	45.8%
Ethnicity - white	83.9%	87.7%	76.7%	73.2%
Ethnicity - other	3.4%	2.5%	5.1%	5.9%
Ethnicity - unknown	12.8%	9.8%	18.2%	20.9%
IMD quintile 1 (most deprived)	3.0%	2.7%	1.3%	1.4%
IMD quintile 2	14.6%	15.4%	10.1%	11.0%
IMD quintile 3	14.1%	12.8%	9.9%	10.7%
IMD quintile 4	22.4%	21.2%	18.8%	19.6%
IMD quintile 5 (least deprived)	46.0%	47.9%	59.7%	57.2%
Locality				
Aldershot	22.5%	22.5%	18.5%	19.6%
Farnborough	34.1%	34.1%	25.2%	26.5%
Farnham	19.5%	19.5%	22.3%	21.3%
Fleet	11.0%	11.0%	19.8%	18.8%
Yately	12.9%	12.9%	14.2%	13.7%
Rural setting	2.5%	2.8%	5.3%	5.0%
Residence - care home	freq <10	freq <10	0.8%	0.6%
Study start date quarter				
1	3.9%	7.8%	15.3%	73.5%
2	3.0%	8.3%	12.7%	4.3%
3	5.4%	8.9%	12.7%	4.5%

Table A1. Continued

	ICT patients	Matched control patients	Potential matched control patient records	Potential matched control patients
4	18.9%	13.6%	12.8%	4.3%
5	23.9%	18.6%	12.9%	4.2%
6	21.4%	16.7%	13.0%	3.8%
7	23.5%	18.2%	13.1%	3.9%
8	freq <10	8.0%	7.5%	1.4%
History of mental ill health	55.4%	47.3%	19.7%	20.0%
History of serious mental ill health	4.0%	3.4%	0.9%	1.0%
Charlson index	1.97 (1.94)	1.75 (1.84)	0.58 (1.18)	0.41 (1.00)
Number of frailty comorbidities	1.34 (1.30)	1.20 (1.27)	0.24 (0.61)	0.19 (0.52)
Cognitive impairment	33.7%	28.7%	4.3%	2.8%
Anxiety or depression	21.6%	19.6%	6.6%	6.5%
Functional dependence	6.8%	6.7%	0.7%	0.5%
Fall or significant fracture	38.1%	36.4%	9.6%	7.1%
Incontinence	5.9%	4.4%	0.9%	0.6%
Mobility problems	21.1%	18.7%	1.8%	1.0%
Pressure ulcers	7.2%	5.0%	0.4%	0.3%
Number of Elixhauser comorbidities	3.45 (2.21)	3.05 (1.98)	1.29 (1.52)	0.91 (1.30)
Alcohol abuse	7.8%	5.4%	2.4%	2.8%
Arrhythmias	32.9%	32.0%	11.9%	7.2%
Blood loss anaemia	freq <10	freq <10	0.1%	0.1%
Chronic pulmonary disease	29.2%	25.2%	14.5%	12.3%
Coagulopathy	freq <10	freq <10	0.6%	0.5%
Congestive heart failure	18.9%	16.9%	3.5%	2.0%
Deficiency anaemia	7.1%	4.8%	2.3%	1.5%
Depression	18.1%	16.4%	5.4%	5.4%
Diabetes, complicated	4.9%	3.2%	1.2%	0.8%
Diabetes, uncomplicated	26.6%	22.6%	10.3%	7.2%

Table A1. Continued

	ICT patients	Matched control patients	Potential matched control patient records	Potential matched control patients
Drug abuse	freq <10	freq <10	0.5%	0.7%
Fluid/electrolyte disorders	27.6%	26.5%	4.6%	2.9%
Hemiplegia or paraplegia	3.4%	2.2%	0.4%	0.3%
Hypertension, complicated	freq <10	freq <10	0.1%	0.1%
Hypertension, uncomplicated	64.9%	62.8%	36.9%	23.7%
Hypothyroidism	10.3%	8.9%	6.0%	4.2%
Liver disease	3.6%	2.6%	1.1%	1.0%
Lymphoma	1.8%	freq <10	0.6%	0.4%
Metastatic cancer	4.0%	4.3%	1.3%	1.0%
Obesity	4.8%	3.6%	1.5%	1.4%
Other neurological disorders	18.1%	13.4%	3.5%	2.9%
Peptic ulcer disease	1.9%	1.3%	0.8%	0.6%
Psychoses	2.1%	1.6%	0.5%	0.5%
Pulmonary circulation disorder	3.9%	3.1%	1.0%	0.7%
Renal failure	22.2%	20.2%	5.6%	3.1%
Rheumatoid arthritis	6.3%	5.2%	2.9%	2.0%
Solid tumour without metastasis	11.5%	10.3%	5.5%	3.9%
Valvular disease	9.9%	8.8%	3.5%	2.0%
Weight loss	5.0%	3.9%	1.0%	0.8%
Other comorbidities predictive of emergency admissions				
Myocardial infarction	14.2%	10.6%	5.4%	3.1%
Cardiovascular disease	19.1%	14.6%	3.9%	2.5%
Dementia	18.2%	17.6%	2.7%	1.6%
Miscalleneous cognitive dysfunction	28.9%	23.9%	4.7%	3.6%
Previous hospital use				
Emergency admissions in prior 2 months	0.70 (0.92)	0.59 (0.74)	0.06 (0.27)	0.12 (0.37)
Emergency admissions in prior year	1.93 (2.23)	1.67 (1.88)	0.30 (0.76)	0.32 (0.75)

Table A1. Continued

	ICT patients	Matched control patients	Potential matched control patient records	Potential matched control patients
Emergency admissions in year before prior year	0.89 (1.55)	0.66 (1.15)	0.26 (0.69)	0.18 (0.61)
Emergency chronic acute care sensitive admissions in prior 2 months	0.09 (0.32)	0.08 (0.30)	0.00 (0.07)	0.01 (0.09)
Emergency chronic acute care sensitive admissions in prior year	0.22 (0.70)	0.18 (0.63)	0.03 (0.20)	0.02 (0.18)
Emergency chronic acute care sensitive admissions in year before prior year	0.10 (0.41)	0.05 (0.32)	0.02 (0.19)	0.01 (0.16)
Emergency urgent care sensitive admissions in prior 2 months	0.19 (0.50)	0.17 (0.44)	0.01 (0.12)	0.02 (0.17)
Emergency urgent care sensitive admissions in prior year	0.54 (1.14)	0.45 (0.93)	0.07 (0.32)	0.07 (0.34)
Emergency urgent care sensitive admissions in year before prior year	0.22 (0.63)	0.19 (0.58)	0.06 (0.30)	0.04 (0.26)
Elective admissions in prior year	0.56 (1.01)	0.53 (0.95)	0.59 (1.01)	0.58 (0.93)
A&E attendances in prior year	2.44 (3.67)	2.00 (2.66)	0.49 (1.13)	0.54 (1.17)
Outpatient attendances in prior year	7.50 (9.53)	7.67 (9.68)	5.04 (7.16)	3.89 (5.84)
Missed outpatient appointments in prior year	1.04 (1.95)	0.74 (1.40)	0.23 (0.70)	0.21 (0.69)
Emergency readmission within 30 days in prior year	0.93 (1.63)	0.93 (1.34)	0.20 (0.54)	0.21 (0.56)
Emergency bed days in prior year	19.47 (28.35)	16.41 (25.79)	1.66 (8.36)	1.44 (8.02)
Elective bed days in prior year	1.71 (8.94)	1.27 (7.83)	0.44 (3.82)	0.39 (3.93)
Average length of stay following emergency admissions in prior year	14.11 (18.61)	12.10 (16.66)	5.13 (10.72)	4.27 (9.98)
Average length of stay following elective admissions in prior year	4.02 (13.76)	3.18 (12.15)	0.74 (4.32)	0.68 (6.49)

Note: Numbers presented are either mean (standard deviation), median [interquartile range] or percentage.

When there is an underlying frequency of less than 10 or where a value is disclosive when viewed in conjunction with another value the percentage is not shown.

IMD: Index of Multiple Deprivation (2015).

Figure A3. Assessment of balance before and after matching: standardised mean differences between ICT and matched control patients (note, standardised differences within +/- 10% are taken to imply adequate balance)

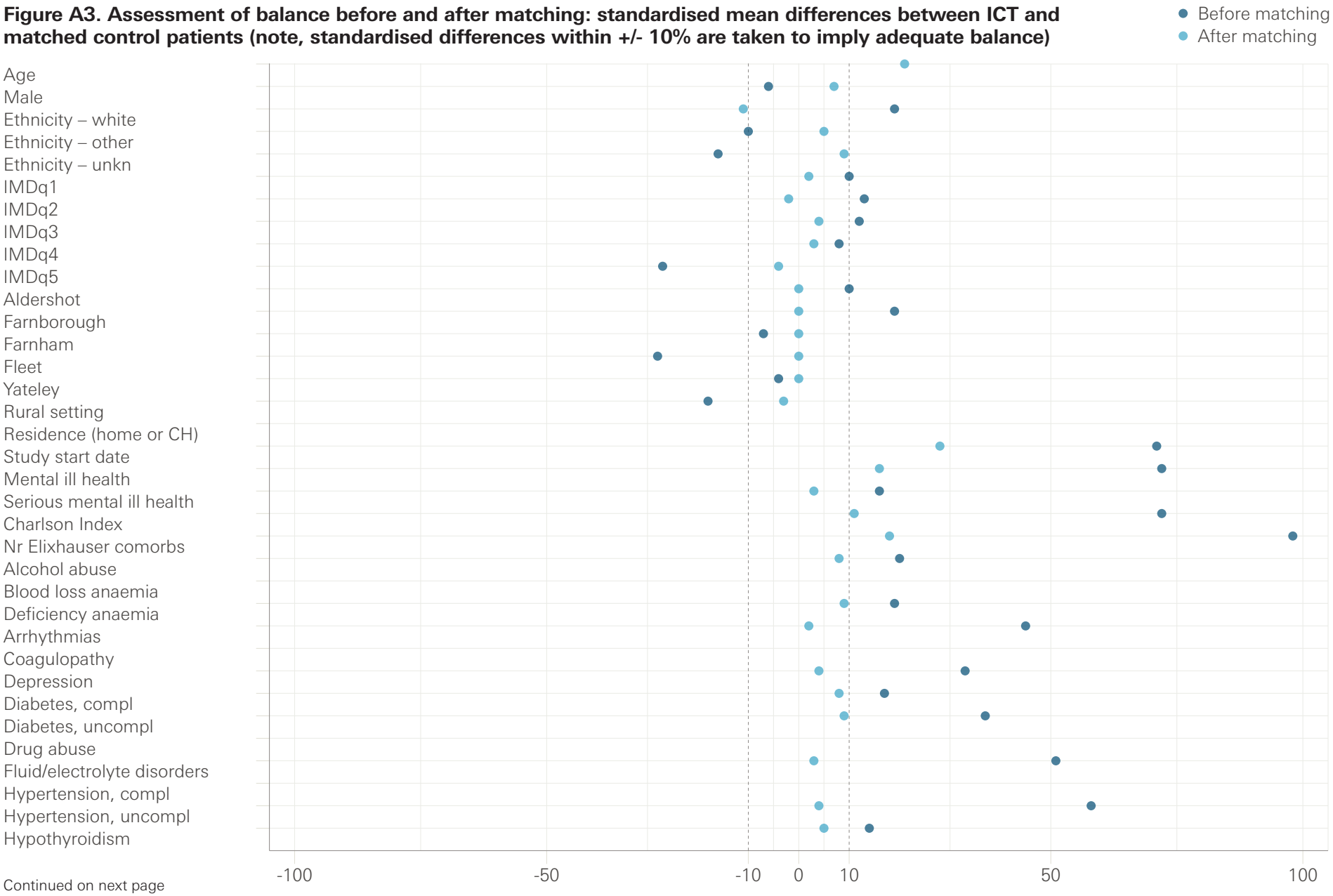


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Figure A3. Continued

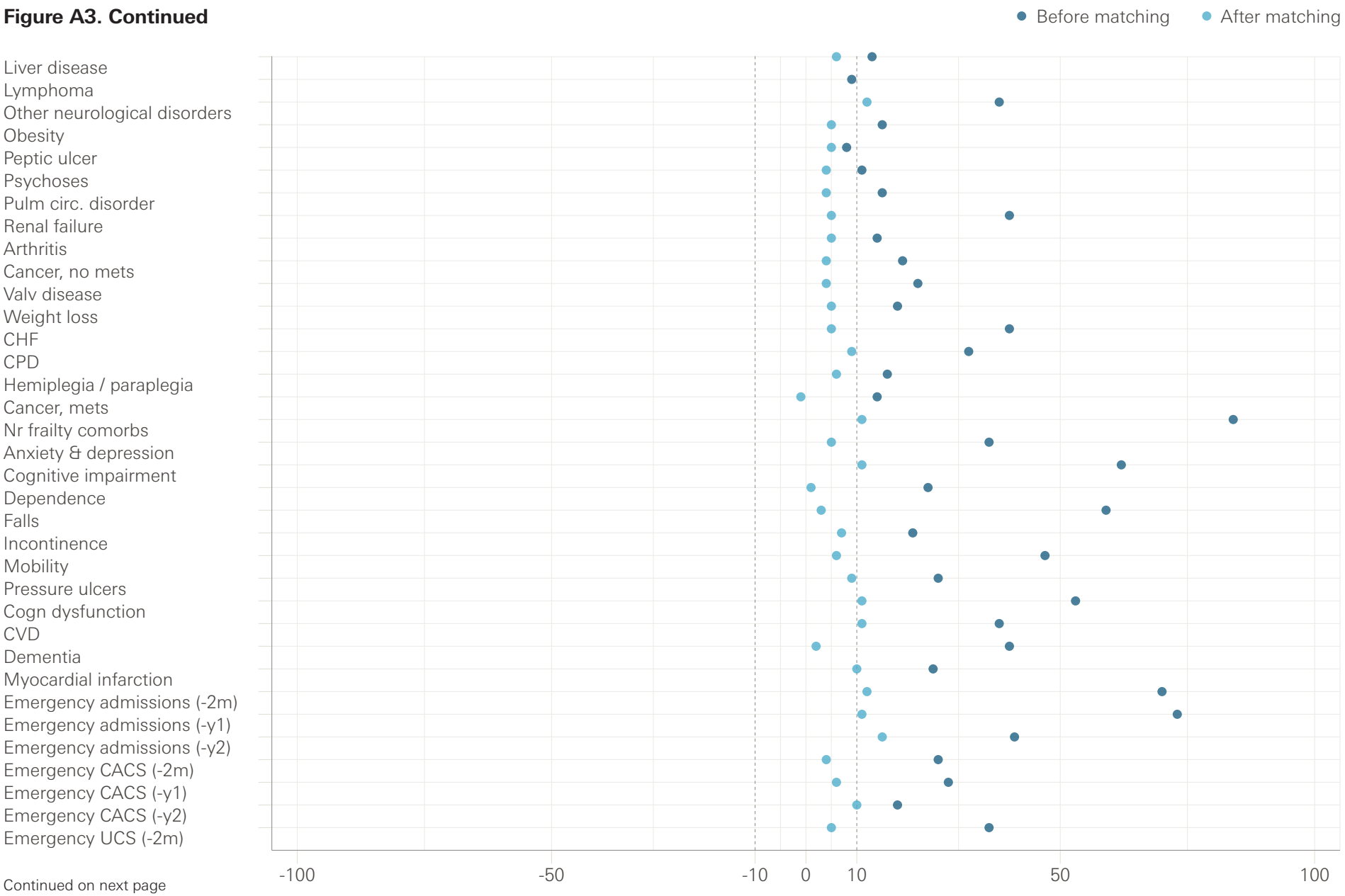

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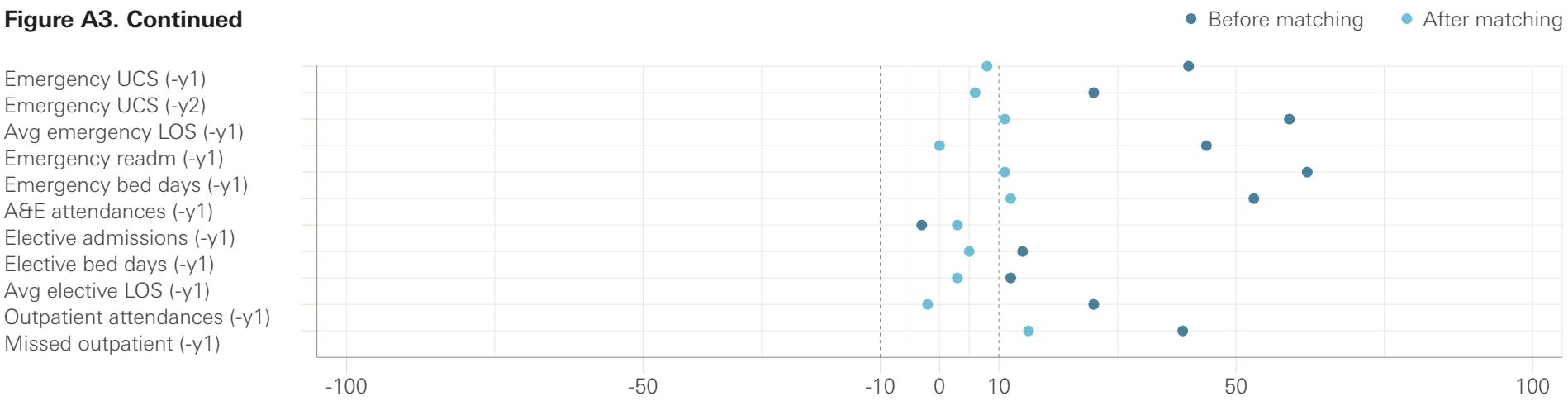
Figure A3. Continued



Note: A standardised mean difference of 0 indicates no difference between the groups. A negative standardised difference indicates that ICT patients had a smaller average value than the matched control group, while the opposite is true for a positive value. Vertical dotted lines denote the +/– 10% threshold assumed to describe adequate balance; any values between these lines are considered balanced.

Some standardised mean differences are not shown. For variables blood loss anaemia, coagulopathy, drug abuse, complicated hypertension, lymphoma and residence, this is due to there being counts below 10. For any other variables, this is due to standardised mean differences values exceeding 100, e.g. age before matching.

Table A2. Rates of hospital use over time: number of patients contributing to crude rates in each quarter in figure 2 of the briefing

Follow-up quarter	Number of ICT patients	Number of matched control patients
1	774	774
2	579	536
3	382	375
4	200	240
5	89	158
6	39	87
7	18	57
8	<10	22

Note: When the count is less than 10 the number is not shown.

Table A3. Crude rates of hospital use and adjusted absolute differences

	ICT patients		Matched control patients		Absolute difference (per person per year, adjusted)#	
	Events	**Crude rates (number per person per year)**	**Events**	**Crude rates (number per person per year)**	**Point estimate**	**95% CI**
Total number of patient records	774		774			
Total number of unique patients	774		731			
Person-years of follow-up	428.1		486.8			
A&E attendances	1092	2.55	804	1.65	0.54	(0.26, 0.89)
Emergency admissions	849	1.98	598	1.23	0.53	(0.28, 0.82)
Chronic ACS emergency admissions	102	0.24	59	0.12	0.13	(0.04, 0.27)
Urgent care sensitive emergency admissions	255	0.60	155	0.32	0.24	(0.11, 0.41)
Average length of stay following emergency admission, days*	820	12.23 (15.12)	581	11.12 (19.25)	3.67	(0.89, 7.01)
Emergency readmissions within 30 days of discharge**	396	0.33	303	0.30	0.01	(-0.03, 0.06)
Emergency hospital bed days***	16.0 (28.9)	0.103 (0.18)	9.5 (22.2)	0.063 (0.152)	NA	NA
Elective admissions	188	0.44	295	0.61	-0.15	(-0.25, -0.01)
Average length of stay following elective admissions, days*	186	5.37 (13.76)	295	2.09 (6.91)	NA	NA
Elective hospital bed days***	1.1 (6.5)	0.008 (0.060)	0.8 (5.3)	0.006 (0.048)	NA	NA
Outpatient attendances	3234	7.56	3690	7.58	0.23	(-0.61, 1.29)

Table A3. Continued

	ICT patients		Matched control patients		Absolute difference (per person per year, adjusted)#	
	Events	**Crude rates (number per person per year)**	**Events**	**Crude rates (number per person per year)**	**Point estimate**	**95% CI**
Deaths in hospital (% of all deaths)	75	50.3%	71%	58.2%	-0.27	(-0.42, 0.02)
Deaths (% of all records)	149	19.3%	122%	15.8%	0.03	(-0.02, 0.11)

#Absolute difference is calculated by first calculating the relative difference (see technical appendix table A4), then multiplying the relative difference with the crude rate in the matched control group, and then comparing the resulting rate to the crude rate. No adjustment was possible for emergency bed days, elective bed days and average length of stay following elective admission. The corresponding p-values are displayed in Appendix Table A4.

*Average length of stay is presented as the mean (standard deviation) of average length of stay (in 'crude rate' column). The number of admissions (in the 'events' column) includes those admissions for which the entire hospital stay was within the follow-up.

**Readmission rates are calculated as the number of readmissions over the number of all possible admissions that could result in a readmission (in 'crude rate' column).

***Bed days are presented as mean (standard deviation) of the absolute number of bed days (in 'events' column) and of bed days as a proportion of their time in the study (in 'crude rate' column).

Table A4. Results of regression modelling, unadjusted and adjusted

	Unadjusted model			Adjusted model		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
A&E attendances	1.51	(1.29, 1.76)	<0.001	1.33	(1.16, 1.54)	<0.001
Emergency admissions	1.63	(1.4, 1.91)	<0.001	1.43	(1.23, 1.67)	<0.001
Chronic ACS emergency admissions	2.12	(1.35, 3.35)	0.001	2.05	(1.32, 3.22)	0.001
Urgent care sensitive emergency admissions	1.87	(1.42, 2.47)	<0.001	1.76	(1.35, 2.29)	<0.001
Average length of stay following emergency admission	1.10	(0.91, 1.34)	0.329	1.33	(1.08, 1.63)	0.005
Emergency readmissions within 30 days of discharge	1.09	(0.94, 1.27)	0.249	1.04	(0.89, 1.21)	0.621
Emergency hospital bed days	1.63	(1.27, 2.11)	<0.001	NA	NA	NA
Elective admissions	0.75	(0.58, 0.97)	0.03	0.76	(0.59, 0.98)	0.031
Average length of stay following elective admissions	2.58	(1.27, 5.36)	0.009	NA	NA	NA
Elective hospital bed days	1.43	(0.65, 3.14)	0.361	NA	NA	NA
Outpatient attendances	1.00	(0.88, 1.14)	0.987	1.03	(0.92, 1.17)	0.581
Deaths in hospital	0.73	(0.45, 1.18)	0.197	0.54	(0.28, 1.03)	0.064
Deaths	1.27	(0.98, 1.66)	0.071	1.22	(0.88, 1.68)	0.234

*CI: confidence interval

Note: Where possible, all baseline characteristics were adjusted for; however this was not always possible due to multicollinearity (i.e. where two or more variables are interrelated) and/or sparse data (see Table A3). A&E attendances and emergency admissions were adjusted for all observed baseline characteristics that were not highly interrelated. No adjustment was possible for emergency bed days, elective bed days and average length of stay following elective admission. Average length of stay following emergency admission, elective admissions and deaths were adjusted for a subset of variables considered 'core' (see statistical analysis protocol). All other outcomes were adjusted for a subset of variables that were most predictive of the outcome. See Table A5 for more details on which baseline characteristics were adjusted for in each regression model.

Table A5. List of baseline characteristics adjusted for in each regression model

Outcome	Model	Set of variables adjusted for	List of variables adjusted for
A&E attendances	Negative binomial	All baseline characteristics*	intervention, imd15quint, locality, ethnwou, findexdateq, male, age, ru11rural, res_home, smihhist_h36, mihhist_h36, i_charlson_h36, nr_frailty_h36, nr_elix_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, em_h24m12, emcacs_h24m12, emucs_h24m12, emlosnm_h12, e_alcabuse_h36, e_anaemiabloss_h36, e_anaemiadef_h36, e_arrhythmias_h36, e_coagulopathy_h36, e_depression_h36, e_diabcomp_h36, e_diabuncomp_h36, e_drugabuse_h36, e_fluid_h36, e_htcomp_h36, e_htuncomp_h36, e_hypothyroid_h36, e_liver_h36, e_lymphoma_h36, e_neuroother_h36, e_obesity_h36, e_pepticnob_h36, e_psychoses_h36, e_pulmcirc_h36, e_renalfail_h36, e_rheumarth_h36, e_stumournomets_h36, e_valvular_h36, e_weightloss_h36, ec_chf_h36, ec_cpd_h36, ec_plegia_h36, ec_stumourmets_h36, f_cogimpair_h36, f_depend_h36, f_fallsfract_h36, f_incont_h36, f_mobprob_h36, f_pulcers_h36, i_mi_h36, i_cvd_h36, i_dementia_h36, i_cogndysf_h36, offset(log(studylength))
Emergency admissions	Negative binomial	All baseline characteristics*	intervention, imd15quint, locality, ethnwou, findexdateq, male, age, ru11rural, res_home, smihhist_h36, mihhist_h36, i_charlson_h36, nr_frailty_h36, nr_elix_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, em_h24m12, emcacs_h24m12, emucs_h24m12, emlosnm_h12, e_alcabuse_h36, e_anaemiabloss_h36, e_anaemiadef_h36, e_arrhythmias_h36, e_coagulopathy_h36, e_depression_h36, e_diabcomp_h36, e_diabuncomp_h36, e_drugabuse_h36, e_fluid_h36, e_htcomp_h36, e_htuncomp_h36, e_hypothyroid_h36, e_liver_h36, e_lymphoma_h36, e_neuroother_h36, e_obesity_h36, e_pepticnob_h36, e_psychoses_h36, e_pulmcirc_h36, e_renalfail_h36, e_rheumarth_h36, e_stumournomets_h36, e_valvular_h36, e_weightloss_h36, ec_chf_h36, ec_cpd_h36, ec_plegia_h36, ec_stumourmets_h36, f_cogimpair_h36, f_depend_h36, f_fallsfract_h36, f_incont_h36, f_mobprob_h36, f_pulcers_h36, i_mi_h36, i_cvd_h36, i_dementia_h36, i_cogndysf_h36, offset(log(studylength))
Chronic ACS emergency admissions	Negative binomial	Baseline characteristics most predictive of outcome	intervention, male, age, emcacs_h12, emucs_h12, emcacs_h2, em_h24m12, emcacs_h24m12, e_weightloss_h36, ec_cpd_h36, offset(log(studylength))
Urgent care sensitive emergency admissions	Negative binomial	Baseline characteristics most predictive of outcome	intervention, male, age, emucs_h12, em_h24m12, offset(log(studylength))

Table A5. Continued

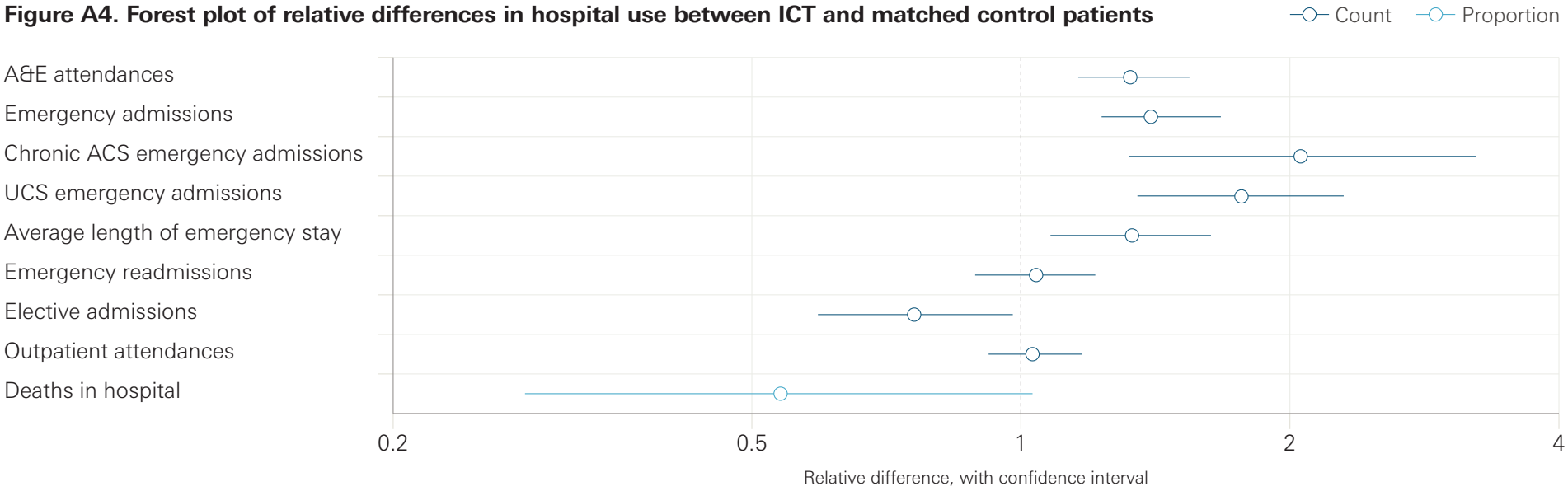
Outcome	Model	Set of variables adjusted for	List of variables adjusted for
Average length of stay following emergency admission	Negative binomial	Core baseline characteristics	intervention, findexdateq, male, age, mihhist_h36, i_charlson_h36, nr_frailty_h36, nr_elix_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, emlosnm_h12, imd15quint, locality, offset(log(offsetemlos_end))
Emergency readmissions within 30 days of discharge	Poisson	Baseline characteristics most predictive of outcome	intervention, male, age, nr_frailty_h36, nr_elix_h36, em_h12, emucs_h12, em_h24m12, emucs_h24m12, e_rheumarth_h36, offset(log(offsetreadm_end))
Emergency hospital bed days	Negative binomial	No adjustement	intervention, offset(log(studylength))
Elective admissions	Negative binomial	Core baseline characteristics	intervention, findexdateq, male, age, mihhist_h36, i_charlson_h36, nr_frailty_h36, nr_elix_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, emlosnm_h12, imd15quint, locality, offset(log(studylength))
Average length of stay following elective admissions	Negative binomial	No adjustement	intervention, offset(log(offsetelodlos_end))
Elective hospital bed days	Negative binomial	No adjustement	intervention, offset(log(studylength))

Table A5. Continued

Outcome	Model	Set of variables adjusted for	List of variables adjusted for
Outpatient attendances	Negative binomial	Baseline characteristics most predictive of outcome	intervention, ethnwou, male, age, ru11rural, ae_h12, elod_h12, op_h12, opmiss_h12, em_h2, emucs_h2, e_alcabuse_h36, e_drugabuse_h36, e_fluid_h36, e_lymphoma_h36, e_obesity_h36, e_psychoses_h36, e_pulmcirc_h36, e_weightloss_h36, ec_stumourmets_h36, f_cogimpair_h36, f_fallsfract_h36, f_incont_h36, f_mobprob_h36, f_pulcers_h36, imd15quint, locality, offset(log(studylength))
Deaths in hospital	Logit	Baseline characteristics most predictive of outcome	intervention, ethnwou, findexdateq, male, age, mihhist_h36, i_charlson_h36, nr_frailty_h36, nr_elix_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, emlosnm_h12, e_alcabuse_h36, e_stumournomets_h36, f_depend_h36, imd15quint, locality
Deaths	Logit	Core baseline characteristics	intervention, imd15quint, locality, age, male, mihhist_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, emlosnm_h12, i_charlson_h36, nr_elix_h36, nr_frailty_h36, findexdateq

*All baseline characteristics includes all variables specified in the statistical analysis protocol with the exception of two variables that were omitted due to multicollinearity: 'average length of stay following elective admission in the prior 12 months' (highly correlated with total elective bed nights in the prior 12 months) and the frailty variable 'anxiety and depression' (highly correlated with the Elixhauser variable depression).

Figure A4. Forest plot of relative differences in hospital use between ICT and matched control patients

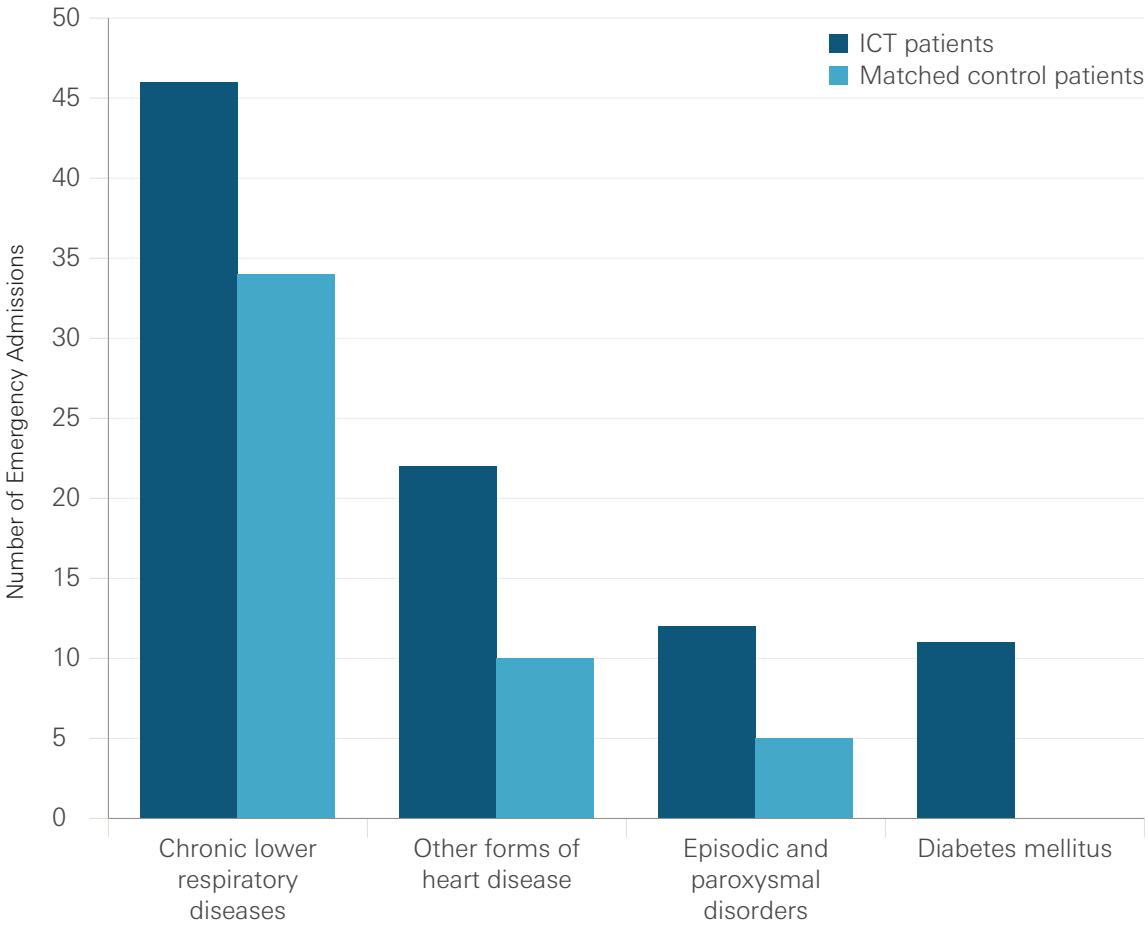


Note: Plots show the relative difference, i.e. rate ratio (for count variables) and odds ratio (for proportions) between the ICT group and matched control group, and the 95% confidence interval. Only adjusted relative differences are presented in this figure; for unadjusted differences see Table A4.

Table A6. Crude rates of emergency hospital use by same-day and overnight admissions

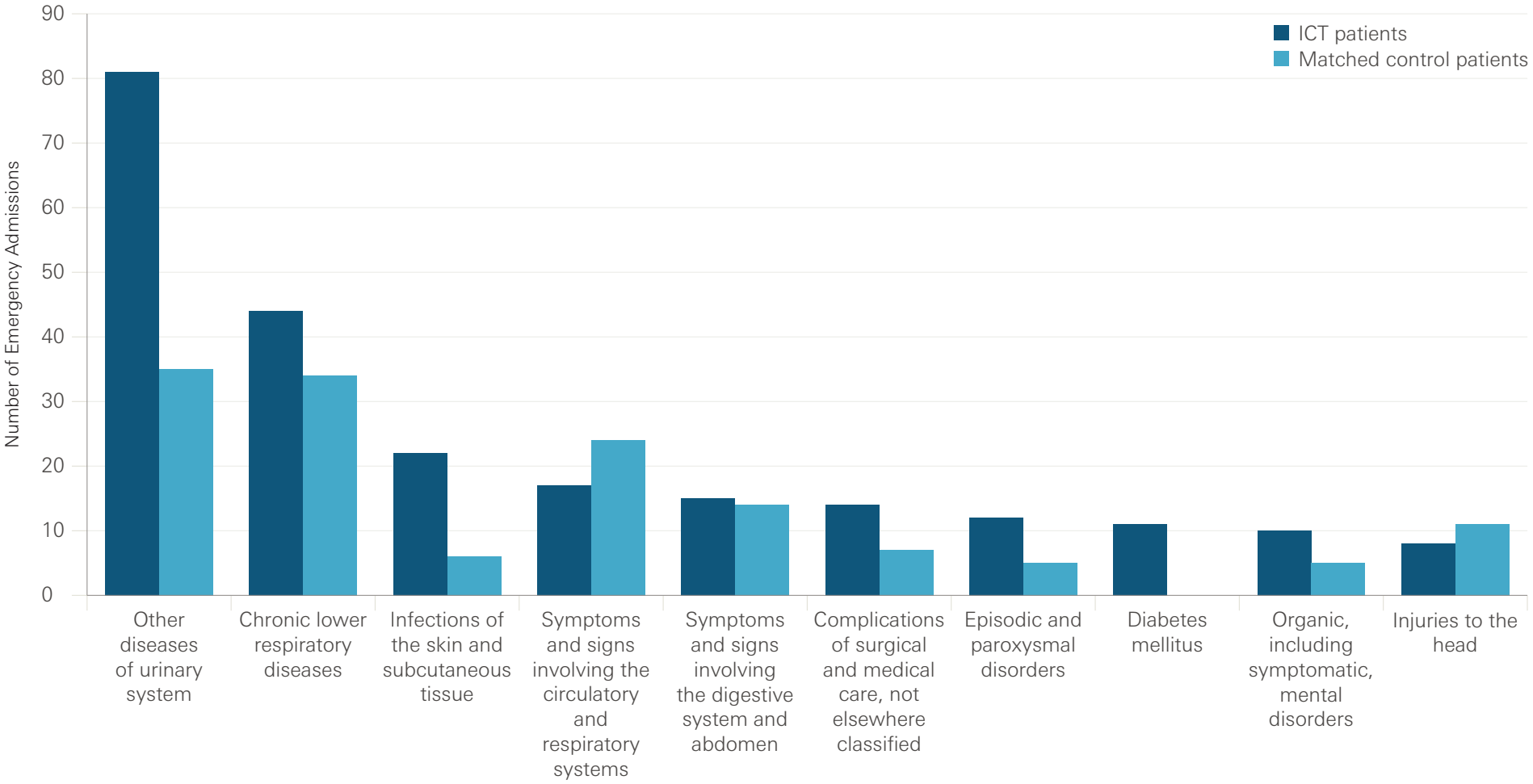
	ICT patients					Matched control patients				
	Same day admission		Overnight admission		Proportion of admissions that were same day admissions	Same day admission		Overnight admission		Proportion of admissions that were same day admissions
	Events	Crude rates (number per person per year)	Events	Crude rates (number per person per year)		Events	Crude rates (number per person per year)	Events	Crude rates (number per person per year)	
Total number of patient records	774		774			774		774		
Total number of unique patients	774		774			731		731		
Person-years of follow-up	428.1		428.1			486.8		486.8		
Emergency admissions	151	0.35	698	1.63	18%	135	0.28	463	0.95	23%
CACS admissions	13	0.03	89	0.21	13%	10	0.02	49	0.10	17%
UCS admissions	47	0.11	208	0.49	18%	48	0.10	107	0.22	31%

Figure A5. Primary diagnosis at emergency admission for chronic ambulatory care sensitive conditions



Note: This figure shows a breakdown of primary diagnosis International Classification of Diseases, 10th revision (ICD-10) sub-chapters for emergency admissions for chronic ambulatory care sensitive conditions that occurred following referral. Only conditions for which at least 10 people were admitted in either group are presented. Conditions for which there were less than five admissions are not shown.

Figure A6. Primary diagnosis at emergency admission for urgent care sensitive conditions



Note: This figure shows a breakdown of primary diagnosis International Classification of Diseases, 10th revision (ICD-10) sub-chapters for emergency admissions for urgent care sensitive conditions that occurred following referral. Only conditions for which at least 10 people were admitted in either group are presented. Conditions for which there were less than five admissions are not shown.

Subgroup analyses

Table A7. Baseline characteristics by locality after matching

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Total number of people	174	169	264	246	151	141	85	81	100	94
Total number of unique records	174	173	264	264	151	148	85	85	100	98
Total number of records	174	174	264	264	151	151	85	85	100	100
Age, median [IQR]	78.00 [68.00, 85.75]	74.00 [62.25, 84.00]	81.00 [69.75, 87.00]	78.00 [67.00, 85.00]	83.00 [78.00, 89.00]	82.00 [73.00, 90.50]	82.00 [76.00, 87.00]	80.00 [74.00, 85.00]	82.00 [77.00, 87.00]	79.50 [70.00, 86.00]
Male	44.8%	41.4%	42.8%	38.3%	41.1%	41.7%	48.2%	37.6%	39.0%	39.0%
Ethnicity - white	80.5%	86.2%	86.7%	91.7%	75.5%	77.5%	89.4%	90.6%	90.0%	93.0%
Ethnicity - other	8.0%	6.3%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Ethnicity - unknown	11.5%	7.5%	10.6%	6.4%	22.5%	21.2%	freq <10	freq <10	freq <10	freq <10
IMD quintile 1 (most deprived)	9.8%	9.8%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
IMD quintile 2	26.4%	29.9%	21.6%	23.9%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
IMD quintile 3	20.1%	20.7%	21.6%	19.3%	freq <10	freq <10	freq <10	freq <10	11.0%	10.0%
IMD quintile 4	29.9%	25.9%	21.6%	18.6%	35.8%	40.4%	11.8%	freq <10	freq <10	freq <10
IMD quintile 5 (least deprived)	13.8%	13.8%	33.0%	36.7%	56.3%	56.3%	88.2%	89.4%	85.0%	89.0%

Table A7. Continued

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Rural setting	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Residence - care home	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Study start date quarter										
1	16.1%	12.6%	freq <10	5.3%	freq <10	6.6%	freq <10	freq <10	freq <10	freq <10
2	8.6%	14.9%	freq<10	7.6%	freq <10	6.0%	freq <10	freq <10	freq <10	freq <10
3	6.3%	10.3%	8.7%	10.2%	freq <10	9.3%	freq <10	freq <10	freq <10	freq <10
4	13.8%	13.8%	28.0%	14.4%	15.9%	11.9%	14.1%	15.3%	12.0%	12.0%
5	16.1%	17.2%	22.7%	20.1%	29.1%	21.9%	29.4%	16.5%	28.0%	14.0%
6	14.9%	14.4%	18.9%	18.2%	25.2%	14.6%	29.4%	22.4%	27.0%	15.0%
7	24.1%	12.1%	20.1%	15.2%	23.2%	22.5%	23.5%	16.5%	32.0%	32.0%
8	freq <10	freq <10	freq <10	9.1%	freq <10	7.3%	freq <10	12.9%	freq <10	freq <10
History of mental ill health	55.2%	47.1%	50.8%	43.2%	66.9%	51.0%	50.6%	49.4%	55.0%	51.0%
History of serious mental ill health	freq <10	freq <10	5.7%	5.7%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Charlson index	1.86 (1.74)	1.65 (1.64)	2.07 (2.07)	1.88 (2.05)	1.77 (1.73)	1.58 (1.69)	2.07 (2.23)	1.86 (1.87)	2.14 (1.94)	1.75 (1.80)
Number of frailty comorbidities	1.16 (1.22)	1.05 (1.32)	1.29 (1.27)	1.14 (1.23)	1.60 (1.32)	1.42 (1.29)	1.40 (1.39)	1.34 (1.31)	1.40 (1.36)	1.14 (1.17)

Table A7. Continued

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Cognitive impairment	27.6%	23.0%	27.3%	21.6%	43.0%	34.4%	37.6%	38.8%	44.0%	40.0%
Anxiety or depression	23.0%	19.0%	22.0%	20.8%	23.8%	24.5%	17.6%	12.9%	18.0%	16.0%
Functional dependence	freq <10	freq <10	6.8%	6.8%	8.6%	7.3%	freq <10	freq <10	freq <10	freq <10
Fall or significant fracture	32.8%	31.6%	39.8%	37.1%	39.7%	43.7%	40.0%	38.8%	39.0%	30.0%
Incontinence	freq <10	freq <10	5.3%	freq <10	6.6%	freq <10	freq <10	freq <10	freq <10	freq <10
Mobility problems	18.4%	16.1%	19.3%	17.0%	28.5%	24.5%	22.4%	22.4%	18.0%	16.0%
Pressure ulcers	5.7%	5.7%	8.3%	7.6%	9.3%	freq <10	freq <10	freq <10	freq <10	freq <10
Number of Elixhauser comorbidities	3.45 (2.22)	3.14 (2.00)	3.44 (2.09)	3.08 (1.98)	3.63 (2.21)	3.11 (1.87)	3.39 (2.44)	3.08 (2.08)	3.30 (2.31)	2.72 (2.01)
Alcohol abuse	8.6%	8.0%	9.1%	5.7%	7.3%	freq <10	freq <10	freq <10	freq <10	freq <10
Arrhythmias	28.2%	27.6%	30.7%	28.8%	43.0%	42.4%	32.9%	36.5%	32.0%	29.0%
Blood loss anaemia	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Chronic pulmonary disease	30.5%	27.0%	31.1%	28.4%	25.2%	19.9%	28.2%	27.1%	29.0%	20.0%
Coagulopathy	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Congestive heart failure	20.7%	21.3%	17.0%	16.3%	22.5%	19.2%	17.6%	12.9%	16.0%	11.0%
Deficiency anaemia	6.9%	freq <10	5.7%	freq <10	9.3%	freq <10	freq <10	freq <10	freq <10	freq <10
Depression	20.1%	16.7%	18.2%	17.8%	20.5%	19.2%	12.9%	freq <10	15.0%	13.0%

Table A7. Continued

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Diabetes, complicated	freq <10	freq <10	3.8%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Diabetes, uncomplicated	31.0%	28.2%	23.5%	21.6%	25.8%	20.5%	23.5%	18.8%	31.0%	22.0%
Drug abuse	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Fluid/electrolyte disorders	27.0%	28.7%	30.3%	26.5%	29.1%	25.2%	28.2%	35.3%	19.0%	17.0%
Hemiplegia or paraplegia	freq <10	freq <10	3.8%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Hypertension, complicated	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Hypertension, uncomplicated	66.7%	60.3%	60.2%	61.0%	68.9%	68.9%	60.0%	60.0%	72.0%	65.0%
Hypothyroidism	11.5%	11.5%	7.2%	5.3%	13.2%	10.6%	freq <10	freq <10	14.0%	11.0%
Liver disease	freq <10	freq <10	4.2%	3.8%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Lymphoma	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Metastatic cancer	freq <10	freq <10	7.2%	7.2%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Obesity	freq <10	freq <10	4.2%	4.5%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Other neurological disorders	13.8%	9.2%	18.2%	12.9%	18.5%	14.6%	27.1%	20.0%	17.0%	15.0%
Peptic ulcer disease	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10

Table A7. Continued

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Psychoses	freq <10	freq <10	3.8%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Pulmonary circulation disorder	freq <10	freq <10	3.8%	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10	freq <10
Renal failure	21.3%	16.7%	24.2%	23.9%	21.9%	18.5%	18.8%	17.6%	22.0%	21.0%
Rheumatoid arthritis	6.3%	6.3%	5.7%	6.1%	6.6%	freq <10	freq <10	freq <10	freq <10	freq <10
Solid tumour without metastasis	9.2%	8.6%	14.8%	13.6%	6.6%	freq <10	16.5%	11.8%	10.0%	11.0%
Valvular disease	9.8%	10.3%	9.8%	7.6%	13.9%	9.9%	freq <10	freq <10	freq <10	freq <10
Weight loss	freq <10	freq <10	4.2%	freq <10	9.9%	freq <10	freq <10	freq <10	freq <10	freq <10
Other comorbidities predictive of emergency admissions										
Myocardial infarction	13.8%	9.2%	12.5%	10.6%	17.9%	13.9%	17.6%	14.1%	11.0%	freq <10
Cardiovascular disease	14.9%	10.9%	20.5%	14.0%	19.2%	19.9%	17.6%	freq <10	24.0%	18.0%
Dementia	14.9%	13.2%	11.4%	10.6%	23.2%	21.2%	21.2%	29.4%	32.0%	28.0%
Miscalleneous cognitive dysfunction	25.9%	19.0%	26.1%	22.0%	37.1%	29.1%	28.2%	23.5%	30.0%	30.0%
Previous hospital use										
Emergency admissions in prior 2 months	0.62 (0.76)	0.56 (0.67)	0.66 (0.97)	0.55 (0.75)	0.84 (1.02)	0.70 (0.80)	0.82 (1.08)	0.74 (0.87)	0.63 (0.69)	0.47 (0.59)

Table A7. Continued

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Emergency admissions in prior year	1.72 (1.93)	1.51 (1.64)	1.94 (2.49)	1.71 (2.16)	2.07 (2.10)	1.79 (1.72)	2.35 (2.64)	2.07 (2.15)	1.68 (1.69)	1.36 (1.37)
Emergency admissions in year before prior year	0.98 (1.63)	0.71 (1.26)	0.79 (1.41)	0.61 (1.18)	1.13 (1.73)	0.81 (1.18)	0.72 (1.24)	0.53 (0.81)	0.82 (1.69)	0.57 (1.06)
Emergency chronic acute care sensitive admissions in prior 2 months	0.09 (0.29)	0.09 (0.29)	0.07 (0.28)	0.05 (0.26)	0.10 (0.34)	0.07 (0.31)	0.12 (0.45)	0.12 (0.45)	0.09 (0.29)	0.08 (0.27)
Emergency chronic acute care sensitive admissions in prior year	0.23 (0.62)	0.22 (0.59)	0.20 (0.61)	0.16 (0.60)	0.23 (0.78)	0.18 (0.67)	0.32 (1.09)	0.27 (0.90)	0.16 (0.44)	0.11 (0.35)
Emergency chronic acute care sensitive admissions in year before prior year	0.16 (0.55)	0.13 (0.53)	0.08 (0.34)	0.03 (0.22)	0.08 (0.39)	0.03 (0.16)	0.07 (0.26)	0.04 (0.19)	0.08 (0.44)	0.04 (0.32)
Emergency urgent care sensitive admissions in prior 2 months	0.15 (0.46)	0.13 (0.35)	0.19 (0.54)	0.17 (0.44)	0.23 (0.52)	0.23 (0.52)	0.22 (0.52)	0.20 (0.53)	0.20 (0.45)	0.13 (0.34)
Emergency urgent care sensitive admissions in prior year	0.42 (1.01)	0.34 (0.78)	0.53 (1.21)	0.48 (0.90)	0.64 (1.19)	0.56 (1.19)	0.75 (1.40)	0.60 (1.13)	0.43 (0.81)	0.27 (0.49)
Emergency urgent care sensitive admissions in year before prior year	0.29 (0.75)	0.25 (0.67)	0.16 (0.46)	0.14 (0.47)	0.30 (0.79)	0.25 (0.77)	0.22 (0.50)	0.15 (0.36)	0.15 (0.58)	0.13 (0.46)

Table A7. Continued

	Aldershot ICT patients	Aldershot matched control patients	Farnborough ICT patients	Farnborough matched control patients	Farnham ICT patients	Farnham matched control patients	Fleet ICT patients	Fleet matched control patients	Yateley ICT patients	Yateley matched control patients
Elective admissions in prior year	0.65 (1.02)	0.57 (0.96)	0.62 (1.14)	0.58 (1.10)	0.43 (0.81)	0.43 (0.75)	0.47 (0.75)	0.59 (0.85)	0.52 (1.08)	0.47 (0.85)
A&E attendances in prior year	2.24 (3.05)	1.89 (2.54)	2.47 (4.50)	2.09 (3.23)	2.74 (3.89)	2.05 (2.14)	2.75 (3.10)	2.41 (2.77)	2.04 (1.98)	1.53 (1.52)
Outpatient attendances in prior year	8.24 (10.62)	7.64 (8.38)	7.60 (9.44)	7.92 (11.70)	7.48 (9.93)	7.82 (8.66)	5.78 (5.13)	8.27 (9.06)	7.47 (9.97)	6.29 (7.71)
Missed outpatient appointments in prior year	1.22 (2.73)	0.89 (1.87)	0.78 (1.40)	0.53 (1.04)	1.49 (2.04)	1.16 (1.56)	0.80 (1.50)	0.56 (0.99)	0.90 (1.64)	0.55 (1.11)
Emergency readmission within 30 days in prior year	0.73 (1.31)	0.77 (1.13)	0.97 (1.97)	1.00 (1.60)	1.03 (1.41)	0.97 (1.16)	1.13 (1.80)	1.14 (1.49)	0.88 (1.19)	0.75 (1.02)
Emergency bed days in prior year	17.33 (24.77)	15.02 (23.54)	20.21 (29.61)	16.57 (25.29)	21.04 (28.67)	18.44 (29.68)	18.61 (24.29)	17.08 (23.77)	19.56 (33.39)	14.74 (26.46)
Elective bed days in prior year	1.12 (5.35)	0.39 (2.29)	1.56 (6.95)	1.44 (7.86)	1.84 (10.10)	1.83 (10.83)	1.02 (7.07)	1.08 (5.12)	3.53 (15.64)	1.65 (10.17)
Average length of stay following emergency admissions in prior year	13.74 (18.35)	12.09 (18.44)	14.24 (17.55)	11.98 (15.47)	16.09 (23.24)	12.47 (17.60)	12.36 (17.30)	10.69 (13.66)	13.04 (14.83)	13.20 (17.88)
Average length of stay following ordinary elective admissions in prior year	1.82 (5.06)	0.94 (3.74)	2.48 (6.30)	3.15 (10.29)	7.32 (19.92)	5.93 (18.72)	2.39 (11.69)	1.77 (6.35)	10.59 (27.30)	4.84 (17.68)

Note: Numbers presented are either mean (standard deviation), median [interquartile range] or percentage.

When there is an underlying frequency of less than 10 or where a value is disclosive when viewed in conjunction with another value the percentage is not shown.

IMD: Index of Multiple Deprivation (2015).

Plots of the standardised mean differences for each locality are available on request.

Table A8. Crude rates of hospital use by locality

	Aldershot				Farnborough				Farnham				Fleet				Yateley			
	ICT patients		Matched control patients		ICT patients		Matched control patients		ICT patients		Matched control patients		ICT patients		Matched control patients		ICT patients		Matched control patients	
	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates
Total number of patient records	174		174		264		264		151		151		85		85		100		100	
Total number of unique patients	174		169		264		246		151		141		85		81		100		94	
Person-years of follow-up	119.9		139		141.9		161.1		75.7		85.9		45.2		46.6		45.3		54.2	
A&E attend-ances	273	2.28	194	1.4	348	2.45	281	1.74	205	2.71	139	1.62	157	3.47	117	2.51	109	2.41	73	1.35
Emergency admissions	219	1.83	147	1.06	280	1.97	197	1.22	149	1.97	109	1.27	117	2.59	86	1.85	84	1.85	59	1.09
Chronic ACS emergency admissions	30	0.25	18	0.13	30	0.21	10	0.06	16	0.21	freq <10	freq <10	16	0.35	22	0.47	10	0.22	freq <10	freq <10
Urgent care sen-sitive emergency admissions	69	0.58	32	0.23	74	0.52	50	0.31	52	0.69	29	0.34	36	0.8	33	0.71	24	0.53	11	0.2
Average length of stay following emergency ad-mission, days*	211	13.14 (17.64)	147	9.11 (17.91)	273	13.35 (16.06)	191	9.48 (15.26)	142	10.82 (13.18)	107	14.82 (23.39)	110	9.99 (9.32)	81	11.07 (11.98)	84	11.02 (13.52)	55	13.71 (28.38)
Emergency readmissions within 30 days of discharge**	102	0.34	64	0.25	125	0.32	112	0.34	79	0.32	53	0.27	60	0.38	44	0.33	30	0.24	30	0.31

Table A8. Continued

	Aldershot				Farnborough				Farnham				Fleet				Yateley			
	ICT patients		Matched control patients		ICT patients		Matched control patients		ICT patients		Matched control patients		ICT patients		Matched control patients		ICT patients		Matched control patients	
	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates	Events	Crude rates
Emergency hospital bed days***	16.8 (29.4)	0.09 (0.167)	9.3 (21.6)	0.058 (0.15)	16.8 (27.5)	0.114 (0.189)	8.9 (20.9)	0.061 (0.155)	15.6 (32.1)	0.109 (0.194)	10.7 (25.3)	0.061 (0.143)	16.1 (28.5)	0.101 (0.173)	8.8 (15.9)	0.074 (0.16)	13.2 (26.8)	0.086 (0.161)	10.7 (26.2)	0.071 (0.158)
Elective admissions	46	0.38	83	0.6	74	0.52	111	0.69	30	0.4	54	0.63	19	0.42	25	0.54	19	0.42	22	0.41
Average length of stay following elective admissions, days*	44	5.35 (15.47)	83	1.64 (5.18)	74	2.20 (6.61)	111	1.97 (7.72)	30	9.91 (17.75)	54	3.54 (9.90)	19	11.56 (20.55)	25	1.67 (4.37)	19	1.29 (3.86)	22	1.94 (4.55)
Elective hospital bed days***	1.2 (8.1)	0.007 (0.064)	0.5 (2.9)	0.003 (0.022)	0.4 (3)	0.003 (0.019)	1.1 (7.4)	0.01 (0.074)	1.7 (7.6)	0.021 (0.098)	1 (5.8)	0.007 (0.038)	2.4 (10.5)	0.015 (0.073)	0.3 (1.9)	0.002 (0.012)	0.3 (2.8)	0.001 (0.012)	0.3 (2)	0.002 (0.012)
Outpatient attendances	1032	8.61	909	6.54	938	6.61	1461	9.07	592	7.82	698	8.12	292	6.46	304	6.53	380	8.39	318	5.87
Deaths in hospital (% of all deaths)	15	50%	16	61.50%	31	44.30%	23	57.50%	13	52%	15	65.20%	freq <10	freq <10	freq <10	freq <10	10	90.90%	freq <10	freq <10
Deaths (% of all records)	30	17.20%	26	14.90%	70	26.50%	40	15.20%	25	16.60%	23	15.20%	13	15.30%	15	17.60%	11	11%	18	18%

*Average length of stay is presented as the mean (standard deviation) of average length of stay (in 'crude rate' column). The number of admissions (in the 'events' column) are those admissions for which the entire hospital stay was within the follow-up period.

**Readmission rates are calculated as the number of readmissions over the number of all possible admissions that could result in a readmission (in 'crude rate' column).

***Bed days are presented as mean (standard deviation) of the absolute number of bed days (in 'events' column) and of bed days as a proportion of their time in the study (in 'crude rate' column).

Table A9. Results of regression modelling, unadjusted and adjusted, by locality

	Unadjusted model			Adjusted model		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
Aldershot						
A&E attendances	1.55	(1.13, 2.12)	0.005	1.40	(1.06, 1.84)	0.016
Emergency admissions	1.78	(1.30, 2.44)	<0.001	1.71	(1.29, 2.27)	<0.001
Chronic ACS emergency admissions	1.73	(0.64, 4.69)	0.246	0.92	(0.34, 2.46)	0.866
Urgent care sensitive emergency admissions	2.20	(1.22, 4.00)	0.007	1.89	(1.06, 3.38)	0.026
Average length of stay following emergency admission	1.44	(0.96, 2.15)	0.074	NA	NA	NA
Emergency readmissions within 30 days of discharge	1.37	(1.00, 1.88)	0.050	1.24	(0.89, 1.73)	0.207
Emergency hospital bed days	1.58	(0.92, 2.69)	0.091	NA	NA	NA
Elective admissions	0.65	(0.40, 1.05)	0.079	NA	NA	NA
Average length of stay following elective admissions	3.28	(0.84, 15.04)	0.093	NA	NA	NA
Elective hospital bed days	2.20	(0.45, 10.85)	0.308	NA	NA	NA
Outpatient attendances	1.29	(0.98, 1.69)	0.071	1.07	(0.84, 1.36)	0.557
Deaths in hospital	0.63	(0.21, 1.80)	0.388	NA	NA	NA
Deaths	1.19	(0.67, 2.11)	0.560	NA	NA	NA

Table A9. Continued

	Unadjusted model			Adjusted model		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
Farnborough						
A&E attendances	1.42	(1.09, 1.84)	0.009	1.33	(1.03, 1.72)	0.025
Emergency admissions	1.68	(1.29, 2.19)	<0.001	1.55	(1.23, 1.96)	<0.001
Chronic ACS emergency admissions	3.41	(1.72, 7.33)	<0.001	2.89	(1.38, 6.51)	0.007
Urgent care sensitive emergency admissions	1.78	(1.11, 2.85)	0.016	1.68	(1.09, 2.63)	0.021
Average length of stay following emergency admission	1.41	(0.99, 1.98)	0.051	1.28	(0.87, 1.86)	0.180
Emergency readmissions within 30 days of discharge	0.95	(0.77, 1.18)	0.667	0.94	(0.75, 1.17)	0.570
Emergency hospital bed days	1.87	(1.21, 2.89)	0.005	2.84	(1.80, 4.50)	<0.001
Elective admissions	0.79	(0.51, 1.24)	0.310	NA	NA	NA
Average length of stay following elective admissions	1.12	(0.32, 4.16)	0.861	NA	NA	NA
Elective hospital bed days	0.26	(0.07, 0.98)	0.039	NA	NA	NA
Outpatient attendances	0.73	(0.58, 0.92)	0.009	0.86	(0.69, 1.08)	0.173
Deaths in hospital	0.59	(0.27, 1.28)	0.184	0.37	(0.11, 1.15)	0.092
Deaths	2.02	(1.32, 3.14)	0.001	2.07	(1.20, 3.65)	0.010

Table A9. Continued

	Unadjusted model			Adjusted model		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
Farnham						
A&E attendances	1.65	(1.18, 2.31)	0.003	1.36	(0.96, 1.91)	0.081
Emergency admissions	1.55	(1.09, 2.20)	0.014	1.24	(0.86, 1.77)	0.243
Chronic ACS emergency admissions	2.02	(0.91, 4.77)	0.092	1.47	(0.56, 3.90)	0.430
Urgent care sensitive emergency admissions	2.02	(1.05, 3.91)	0.038	1.95	(1.04, 3.74)	0.040
Average length of stay following emergency admission	0.73	(0.46, 1.14)	0.171	0.82	(0.50, 1.32)	0.377
Emergency readmissions within 30 days of discharge	1.19	(0.89, 1.60)	0.253	1.02	(0.71, 1.47)	0.917
Emergency hospital bed days	1.77	(0.99, 3.17)	0.051	1.86	(1.07, 3.27)	0.024
Elective admissions	0.74	(0.39, 1.40)	0.367	NA	NA	NA
Average length of stay following elective admissions	2.80	(0.57, 15.21)	0.196	NA	NA	NA
Elective hospital bed days	3.08	(0.54, 17.59)	0.181	NA	NA	NA
Outpatient attendances	1.11	(0.81, 1.51)	0.509	0.97	(0.71, 1.33)	0.855
Deaths in hospital	0.58	(0.18, 1.83)	0.355	NA	NA	NA
Deaths	1.10	(0.59, 2.06)	0.753	NA	NA	NA

Table A9. Continued

	Unadjusted model			Adjusted model		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
Fleet						
A&E attendances	1.48	(0.92, 2.37)	0.107	1.71	(1.11, 2.66)	0.015
Emergency admissions	1.48	(0.93, 2.35)	0.099	1.37	(0.90, 2.10)	0.132
Chronic ACS emergency admissions	1.05	(0.36, 2.99)	0.933	NA	NA	NA
Urgent care sensitive emergency admissions	1.12	(0.59, 2.15)	0.723	1.92	(0.87, 4.36)	0.112
Average length of stay following emergency admission	1.26	(0.81, 2.02)	0.319	0.99	(0.53, 1.91)	0.986
Emergency readmissions within 30 days of discharge	1.17	(0.80, 1.74)	0.426	0.91	(0.47, 1.80)	0.790
Emergency hospital bed days	1.37	(0.65, 2.89)	0.395	NA	NA	NA
Elective admissions	0.81	(0.39, 1.65)	0.557	NA	NA	NA
Outpatient attendances	0.97	(0.65, 1.45)	0.890	1.01	(0.68, 1.48)	0.970
Deaths in hospital	0.75	(0.16, 3.34)	0.705	NA	NA	NA
Deaths	0.84	(0.37, 1.90)	0.679	NA	NA	NA

Table A9. Continued

	Unadjusted model			Adjusted model		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
Yateley						
A&E attendances	1.79	(1.33, 2.41)	<0.001	1.58	(1.09, 2.31)	0.016
Emergency admissions	1.70	(1.22, 2.38)	0.002	1.73	(1.13, 2.68)	0.013
Urgent care sensitive emergency admissions	2.61	(1.22, 6.05)	0.018	1.98	(0.91, 4.59)	0.094
Average length of stay following emergency admission	0.81	(0.44, 1.47)	0.488	1.32	(0.70, 2.43)	0.357
Emergency readmissions within 30 days of discharge	0.77	(0.51, 1.18)	0.228	0.73	(0.46, 1.15)	0.177
Emergency hospital bed days	1.22	(0.56, 2.66)	0.608	NA	NA	NA
Elective admissions	1.03	(0.55, 1.91)	0.918	0.93	(0.47, 1.84)	0.842
Average length of stay following elective admissions	0.68	(0.04, 14.52)	0.770	NA	NA	NA
Elective hospital bed days	0.74	(0.04, 14.08)	0.820	NA	NA	NA
Outpatient attendances	1.33	(0.93, 1.89)	0.115	1.37	(0.97, 1.96)	0.062
Deaths	0.56	(0.24, 1.25)	0.163	NA	NA	NA

*CI: confidence interval.

Note: For some outcomes and localities, it was not possible to fit a model.

Where possible, all baseline characteristics were adjusted for; however this was not always possible due to multicollinearity (i.e. where two or more variables are interrelated) and/or sparse data (see Table A8). Outpatient attendances in Aldershot were adjusted for all baseline characteristics that were not highly interrelated. All other adjusted models adjusted for a subset of baseline characteristics, either considered 'core' (see statistical analysis protocol) or most predictive of the outcomes. A list of baseline characteristics that were adjusted for in each regression is available on request.

Table A10. Adjusted absolute differences, by locality

	Absolute difference (per person per year, adjusted)*		
	Point estimate	**95% CI****	**p-value**
Aldershot			
A&E attendances	0.56	(0.08, 1.18)	0.016
Emergency admissions	0.75	(0.31, 1.35)	0.000
Chronic ACS emergency admissions	-0.01	(-0.09, 0.19)	0.866
Urgent care sensitive emergency admissions	0.20	(0.01, 0.55)	0.026
Emergency readmissions within 30 days of discharge	0.06	(-0.03, 0.18)	0.207
Outpatient attendances	0.46	(-1.05, 2.35)	0.557
Farnborough			
A&E attendances	0.57	(0.05, 1.25)	0.025
Emergency admissions	0.67	(0.28, 1.17)	0.000
Chronic ACS emergency admissions	0.11	(0.02, 0.33)	0.007
Urgent care sensitive emergency admissions	0.21	(0.03, 0.51)	0.021
Average length of stay following emergency admission	2.65	(-1.23, 8.15)	0.180
Emergency readmissions within 30 days of discharge	-0.02	(-0.09, 0.06)	0.570
Emergency hospital bed days	0.11	(0.05, 0.21)	0.000
Outpatient attendances	-1.27	(-2.81, 0.73)	0.173
Deaths in hospital	-0.36	(-0.51, 0.09)	0.092
Farnham			
A&E attendances	0.58	(-0.06, 1.47)	0.081
Emergency admissions	0.30	(-0.18, 0.98)	0.243
Chronic ACS emergency admissions			
Urgent care sensitive emergency admissions	0.32	(0.01, 0.93)	0.040
Average length of stay following emergency admission	-2.67	(-7.41, 4.74)	0.377
Emergency readmissions within 30 days of discharge	0.01	(-0.08, 0.13)	0.917
Emergency hospital bed days	0.05	(0.00, 0.14)	0.024
Outpatient attendances	-0.24	(-2.35, 2.68)	0.855

Table A10. Continued

	Absolute difference (per person per year, adjusted)*		
	Point estimate	**95% CI****	**p-value**
Fleet			
A&E attendances	1.78	(0.28, 4.17)	0.015
Emergency admissions	0.68	(-0.19, 2.04)	0.132
Urgent care sensitive emergency admissions	0.65	(-0.09, 2.39)	0.112
Average length of stay following emergency admission	-0.11	(-5.20, 10.07)	0.986
Emergency readmissions within 30 days of discharge	-0.03	(-0.17, 0.26)	0.790
Outpatient attendances	0.07	(-2.09, 3.13)	0.970
Yateley			
A&E attendances	0.78	(0.12, 1.77)	0.016
Emergency admissions	0.80	(0.14, 1.83)	0.013
Urgent care sensitive emergency admissions	0.20	(-0.02, 0.72)	0.094
Average length of stay following emergency admission	4.39	(-4.11, 19.61)	0.357
Emergency readmissions within 30 days of discharge	-0.08	(-0.17, 0.05)	0.177
Elective admissions	-0.03	(-0.22, 0.34)	0.842
Outpatient attendances	2.17	(-0.18, 5.64)	0.062

*Absolute difference is calculated by first calculating the relative difference (see technical appendix table A4), then multiplying the relative difference with the crude rate in the matched control group, and then comparing the resulting rate to the crude rate.

**CI: confidence interval.

Note: For some outcomes and localities, it was not possible to fit an adjusted model.

Table A11. Hospital outcomes where there were statistically significant differences between localities

Outcome	Relative difference ICT vs matched control patients (unadjusted rate ratio)		Interaction p-value	List of variables adjusted for in the interaction model
	Aldershot	Farnham		
Average length of stay following emergency admission	1.44	0.73	0.019	intervention, findexdateq, male, age, mihhist_h36, i_charlson_h36, nr_frailty_h36, nr_elix_h36, em_h12, emcacs_h12, emucs_h12, ae_h12, embedn_h12, emreadm_h12, elod_h12, op_h12, opmiss_h12, elodbedn_h12, em_h2, emcacs_h2, emucs_h2, emlosnm_h12, imd15quint, locality, intervention:locality, offset(log(offsetemlos_end))

Note: Baseline characteristics that were adjusted for in the comparison between localities may differ from those adjusted for in the individual locality subgroup analyses. Only comparisons where it was possible to adjust for baseline characteristics in the interaction model are presented. The number of patients in each locality was too small to allow for a robust comparison of percentage of deaths in hospital.

Figure A7. Forest plot of relative differences in hospital use between ICT and matched control patients, by locality

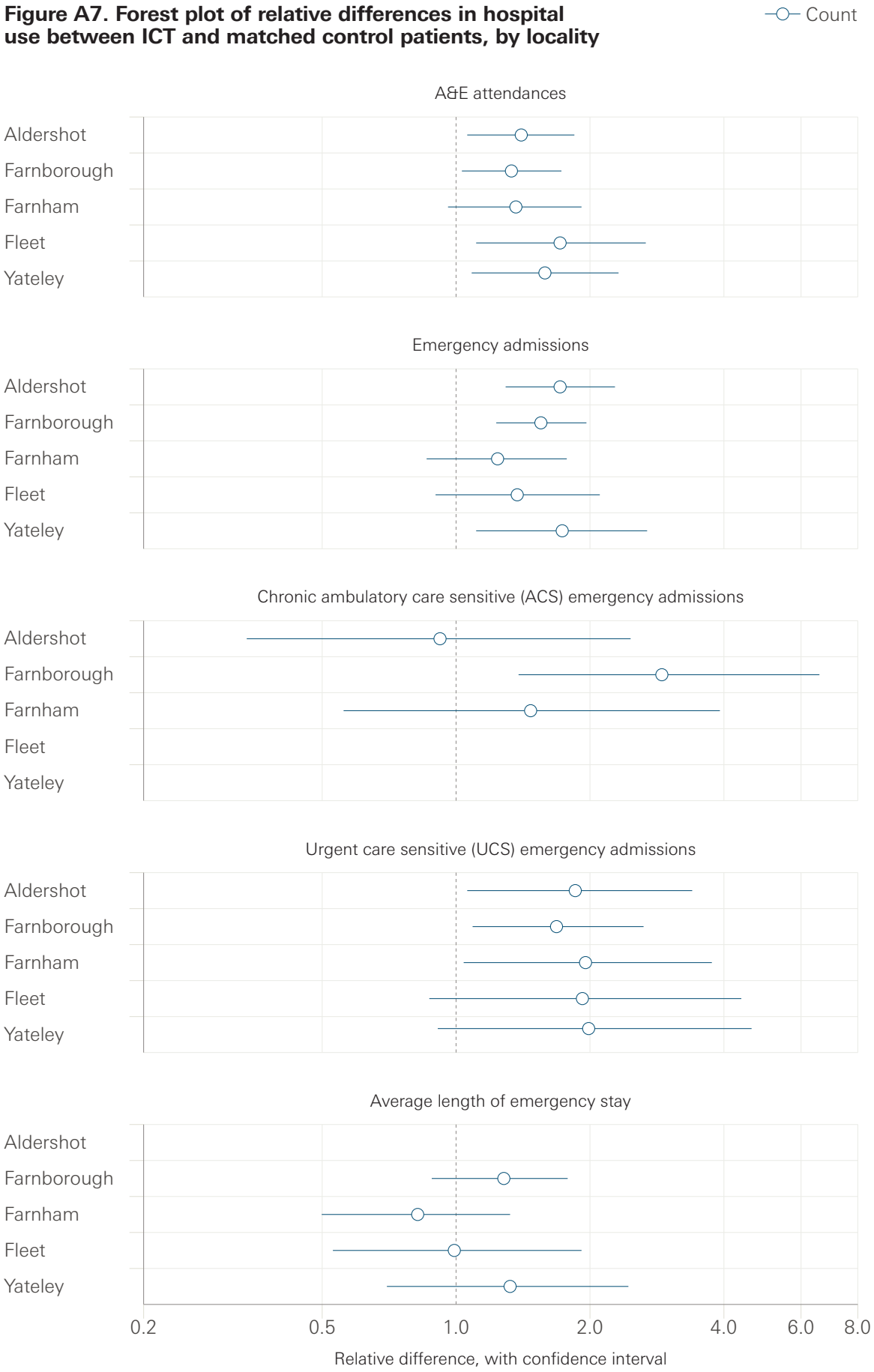
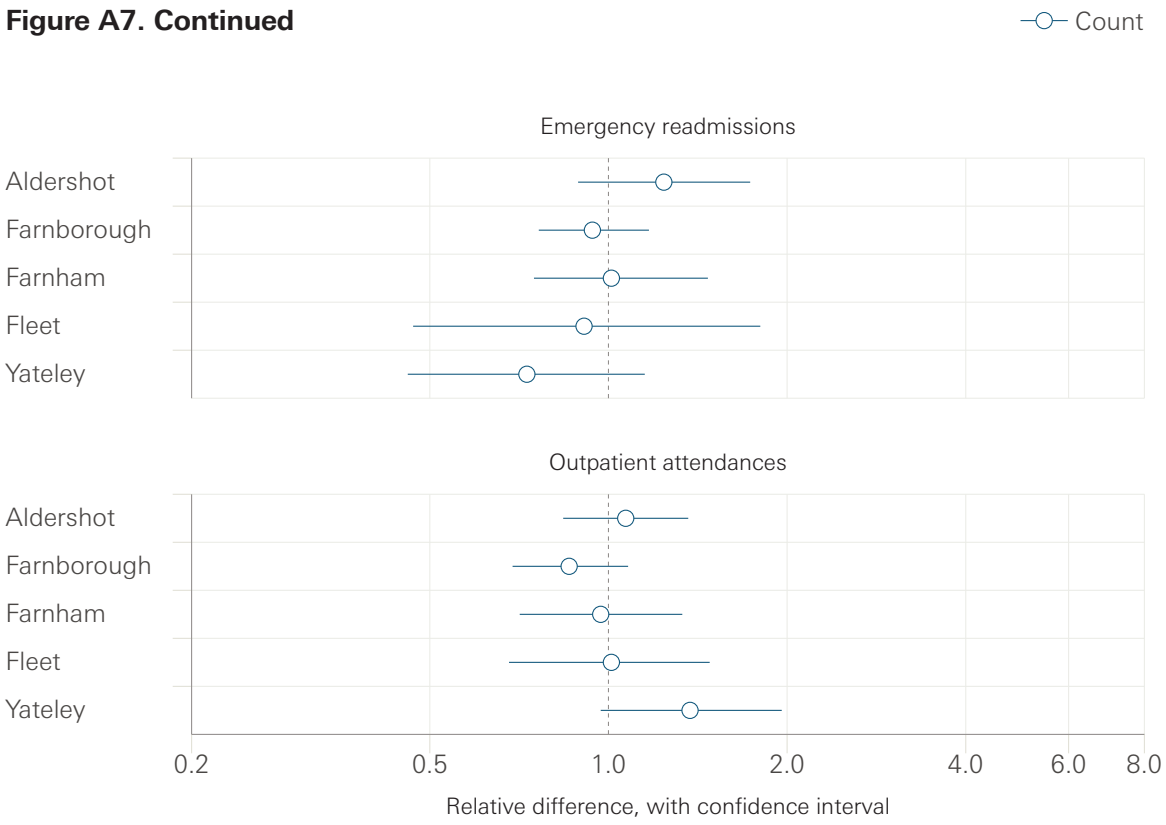


Figure A7. Continued



Note: Plots show the relative difference (adjusted rate ratio) between the ICT group and matched control group at each location, and the 95% confidence interval. Only adjusted relative differences are presented.

Table A12. Baseline characteristics for patients with a history of mental ill health after matching

	ICT patients with history of mental ill health	Matched control patients with history of mental ill health
Total number of people	429	339
Total number of unique records	429	361
Total number of records	429	366
Age, median [IQR]	79.00 [69.00, 86.00]	79.00 [65.00, 87.00]
Male	41.3%	38.5%
Ethnicity - white	82.8%	89.6%
Ethnicity - other	3.7%	freq <10
Ethnicity - unknown	13.5%	9.6%
IMD quintile 1 (most deprived)	3.3%	3.3%
IMD quintile 2	15.6%	17.8%
IMD quintile 3	14.5%	15.3%
IMD quintile 4	20.7%	20.8%
IMD quintile 5 (least deprived)	45.9%	42.9%
Locality		
Aldershot	22.4%	22.4%
Farnborough	31.2%	31.1%
Farnham	23.5%	21.0%
Fleet	10.0%	11.5%
Yately	12.8%	13.9%
Rural setting	2.3%	3.0%
Residence - care home	freq <10	freq <10
Study start date quarter		
1	4.7%	10.9%
2	2.8%	10.1%
3	4.9%	7.9%
4	19.1%	12.3%
5	24.5%	17.8%
6	23.3%	15.6%

Table A12. Continued

	ICT patients with history of mental ill health	Matched control patients with history of mental ill health
7	20.7%	17.2%
8	freq <10	8.2%
History of serious mental ill health	7.2%	7.1%
Charlson index	2.20 (1.91)	2.01 (1.84)
Number of frailty comorbidities	1.84 (1.32)	1.85 (1.29)
Cognitive impairment	50.3%	53.0%
Anxiety or depression	38.9%	41.5%
Functional dependence	9.3%	8.2%
Fall or significant fracture	43.6%	46.2%
Incontinence	8.2%	6.8%
Mobility problems	24.2%	24.9%
Pressure ulcers	9.6%	4.4%
Number of Elixhauser comorbidities	3.84 (2.29)	3.27 (2.03)
Alcohol abuse	14.0%	10.9%
Arrhythmias	32.6%	30.1%
Blood loss anaemia	freq <10	freq <10
Chronic pulmonary disease	31.9%	27.0%
Coagulopathy	freq <10	freq <10
Congestive heart failure	18.4%	16.1%
Deficiency anaemia	8.6%	5.2%
Depression	32.6%	34.7%
Diabetes, complicated	4.4%	2.7%
Diabetes, uncomplicated	27.5%	18.3%
Drug abuse	freq <10	freq <10
Fluid/electrolyte disorders	31.9%	29.5%
Hemiplegia or paraplegia	3.5%	freq <10
Hypertension, complicated	freq <10	freq <10
Hypertension, uncomplicated	64.8%	59.0%
Hypothyroidism	11.4%	9.3%

Table A12. Continued

	ICT patients with history of mental ill health	Matched control patients with history of mental ill health
Liver disease	5.1%	3.8%
Lymphoma	2.6%	freq <10
Metastatic cancer	2.6%	2.7%
Obesity	5.1%	4.1%
Other neurological disorders	23.5%	19.9%
Peptic ulcer disease	2.6%	freq <10
Psychoses	3.7%	3.3%
Pulmonary circulation disorder	4.0%	freq <10
Renal failure	21.2%	18.9%
Rheumatoid arthritis	5.4%	3.8%
Solid tumour without metastasis	9.8%	7.4%
Valvular disease	10.7%	8.7%
Weight loss	6.3%	5.5%
Other comorbidities predictive of emergency admission		
Myocardial infarction	15.4%	10.4%
Cardiovascular disease	23.3%	18.3%
Dementia	32.2%	36.6%
Miscalleneous cognitive dysfunction	39.2%	37.2%
Previous hospital use		
Emergency admissions in prior 2 months	0.77 (0.98)	0.66 (0.81)
Emergency admissions in prior year	2.29 (2.53)	2.09 (2.25)
Emergency admissions in year before prior year	1.13 (1.80)	0.88 (1.37)
Emergency chronic acute care sensitive admissions in prior 2 months	0.10 (0.35)	0.09 (0.35)
Emergency chronic acute care sensitive admissions in prior year	0.26 (0.82)	0.23 (0.76)
Emergency chronic acute care sensitive admissions in year before prior year	0.12 (0.49)	0.07 (0.40)
Emergency urgent care sensitive admissions in prior 2 months	0.25 (0.59)	0.22 (0.51)

Table A12. Continued

	ICT patients with history of mental ill health	Matched control patients with history of mental ill health
Emergency urgent care sensitive admissions in prior year	0.72 (1.37)	0.65 (1.16)
Emergency urgent care sensitive admissions in year before prior year	0.31 (0.76)	0.28 (0.73)
Elective admissions in prior year	0.57 (1.04)	0.39 (0.79)
A&E attendances in prior year	2.94 (4.48)	2.60 (3.42)
Outpatient attendances in prior year	7.82 (9.74)	6.98 (8.92)
Missed outpatient appointments in prior year	1.29 (2.33)	0.97 (1.69)
Emergency readmission within 30 days in prior year	1.19 (1.94)	1.21 (1.67)
Emergency bed days in prior year	24.00 (32.02)	20.39 (28.57)
Elective bed days in prior year	1.86 (9.82)	1.38 (8.59)
Average length of stay following emergency admissions in prior year	15.73 (19.93)	12.92 (16.81)
Average length of stay following elective admissions in prior year	4.55 (15.38)	4.15 (15.52)

Note: Numbers presented are either mean (standard deviation), median [interquartile range] or percentage

When there is an underlying frequency of less than 10 or where a value is disclosive when viewed in conjunction with another value the percentage is not shown

IMD: Index of Multiple Deprivation (2015)

Figure A8. Assessment of balance before and after matching for patients with history of mental ill health: standardised mean differences between ICT and matched control patients (note, standardised differences within +/- 10% are taken to imply adequate balance)

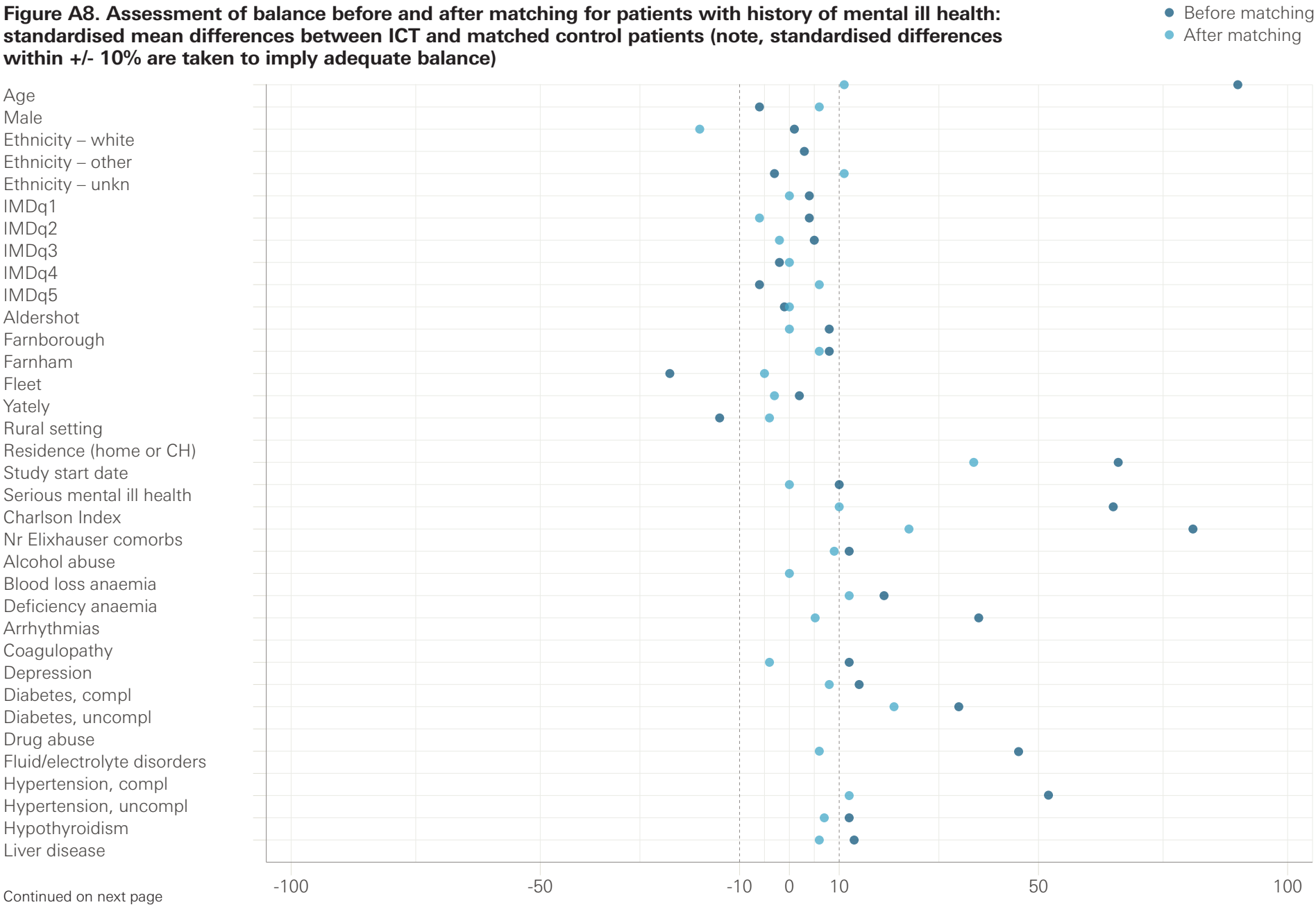


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Figure A8. Continued

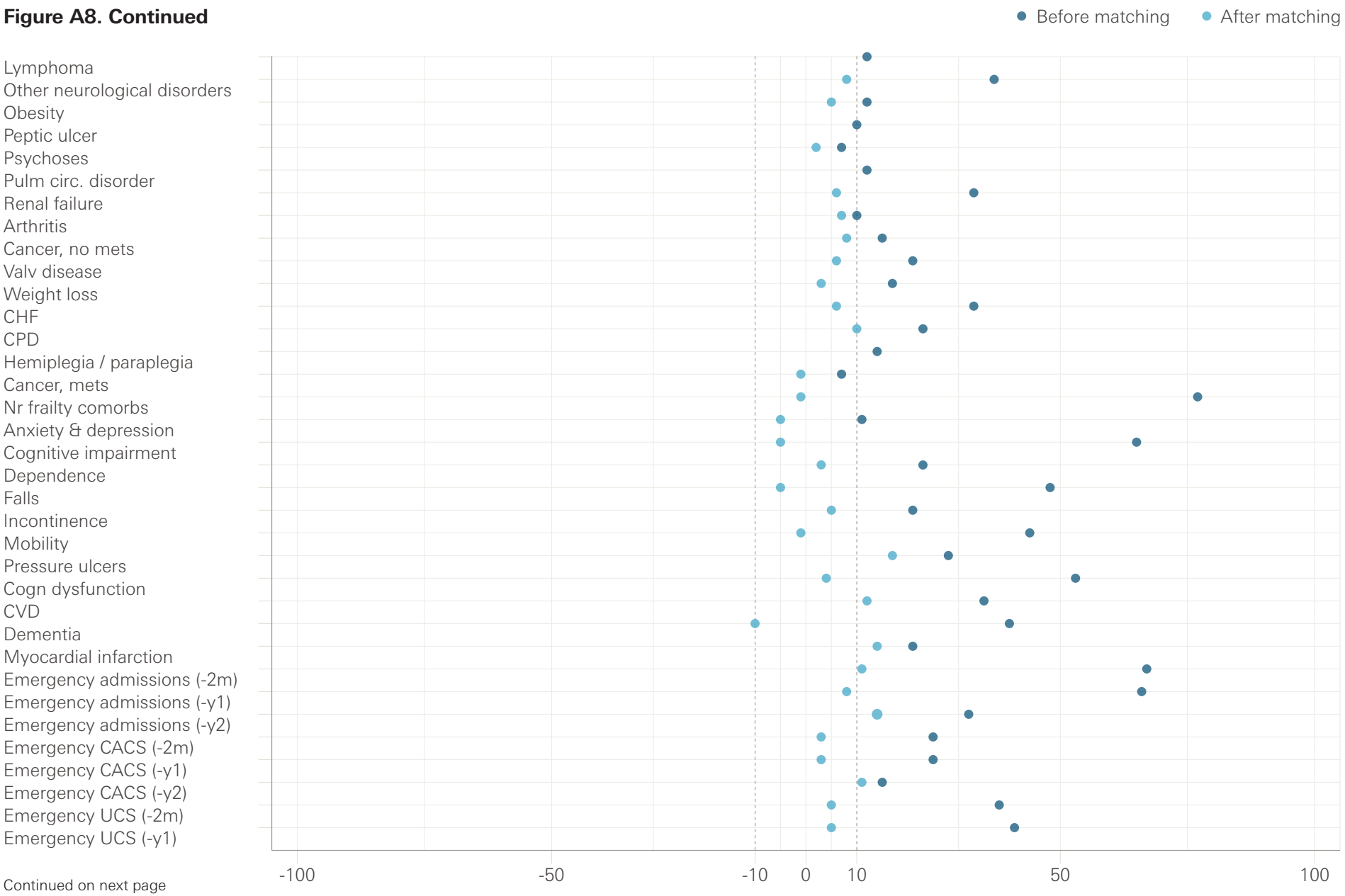

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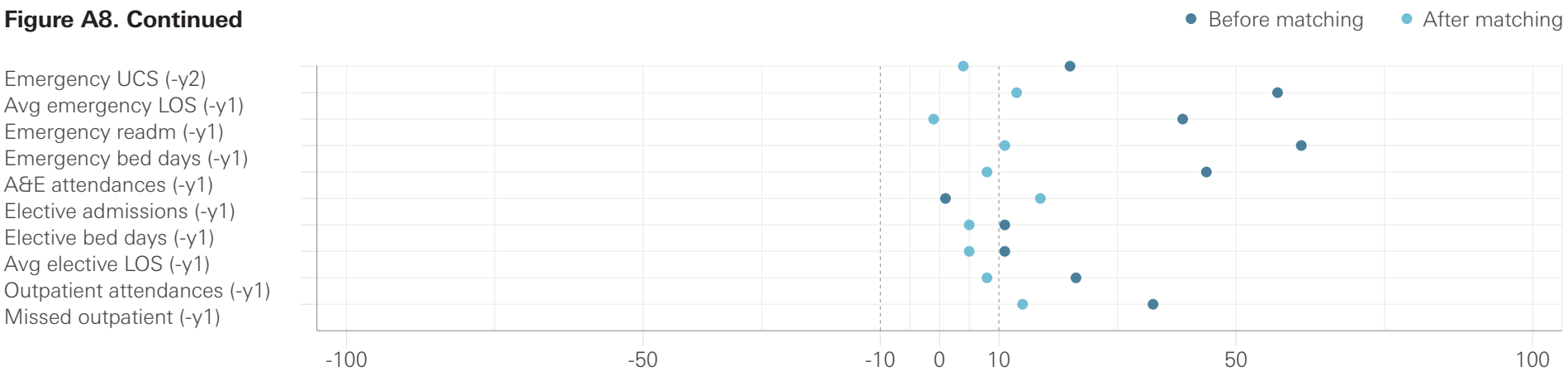
Figure A8. Continued



Note: A standardised mean difference of 0 indicates no difference between the groups. A negative standardised difference indicates that ICT patients had a smaller average value than the matched control group, while the opposite is true for a positive value. Vertical dotted lines denote the +/– 10% threshold assumed to describe adequate balance; any values between these lines are considered balanced.

Some standardised mean differences are not shown. For variables coagulopathy, drug abuse, complicated hypertension, lymphoma, peptic ulcer, pulmonary circulatory disorder, plegia, other ethnicity and residence, this is due to there being counts below 10. For any other variables, this is due to standardised mean difference values exceeding 100.

Table A13. Crude rates of hospital use and adjusted absolute differences, for patients with a history of mental ill health

	ICT Patients		Matched control patients		Absolute difference (per person per year, adjusted)#	
	Events	**Crude rates**	**Events**	**Crude rates**	**Point estimate**	**95% CI~**
Total number of patient records	429		366			
Total number of unique patients	429		339			
Person-years of follow-up	241.6		221.5			
A&E attendances	721	2.98	494	2.23	0.62	(0.13, 1.18)
Emergency admissions	520	2.15	334	1.51	0.41	(0.05, 0.85)
Chronic ACS emergency admissions	65	0.27	41	0.19	0.07	(-0.03, 0.23)
Urgent care sensitive emergency admissions	167	0.69	106	0.48	0.05	(-0.08, 0.22)
Average length of stay following emergency admission, days*	502	12.63 (15.85)	325	10.54 (15.82)	3.79	(0.32, 8.43)
Emergency readmissions within 30 days of discharge**	255	0.34	168	0.32	0.00	(-0.05, 0.06)
Emergency hospital bed days***	19.1 (33.2)	0.115 (0.192)	11 (21.4)	0.079 (0.17)	0.05	(0.01, 0.10)
Elective admissions	96	0.40	101	0.46	-0.06	(-0.19, 0.14)
Average length of stay following elective admissions, days*	95	5.40 (13.25)	101	1.81 (6.57)	NA	NA
Elective hospital bed days***	1.0 (6.2)	0.008 (0.059)	0.3 (2.6)	0.002 (0.016)	0.00	(0.00, 0.02)
Outpatient attendances	1971	8.16	1520	6.86	1.23	(-0.21, 2.95)

Table A13. Continued

	ICT Patients		Matched control patients		Absolute difference (per person per year, adjusted)#	
	Events	**Crude rates**	**Events**	**Crude rates**	**Point estimate**	**95% CI~**
Deaths in hospital (% of all deaths)	40	51.9%	46%	59.0%	-0.21	(-0.44, 0.38)
Deaths (% of all records)	77	17.9%	78%	21.3%	-0.07	(-0.12, -0.00)

#Absolute difference is calculated by first calculating the relative difference (see technical appendix table A14), then multiplying the relative difference with the crude rate in the matched control group, and then comparing the resulting rate to the crude rate. No adjustment was possible for average length of stay following elective admission. The corresponding p-values are displayed in Appendix Table A14.

~CI: confidence interval.

*Average length of stay is presented as the mean (standard deviation) of average length of stay (in 'crude rate' column). The number of admissions (in the 'events' column) are those admissions for which the entire hospital stay was within the follow-up period.

**Readmission rates are calculated as the number of readmissions over the number of all possible admissions that could result in a readmission (in 'crude rate' column).

***Bed days are presented as mean (standard deviation) of the absolute number of bed days (in 'events' column) and of bed days as a proportion of their time in the study (in 'crude rate' column).

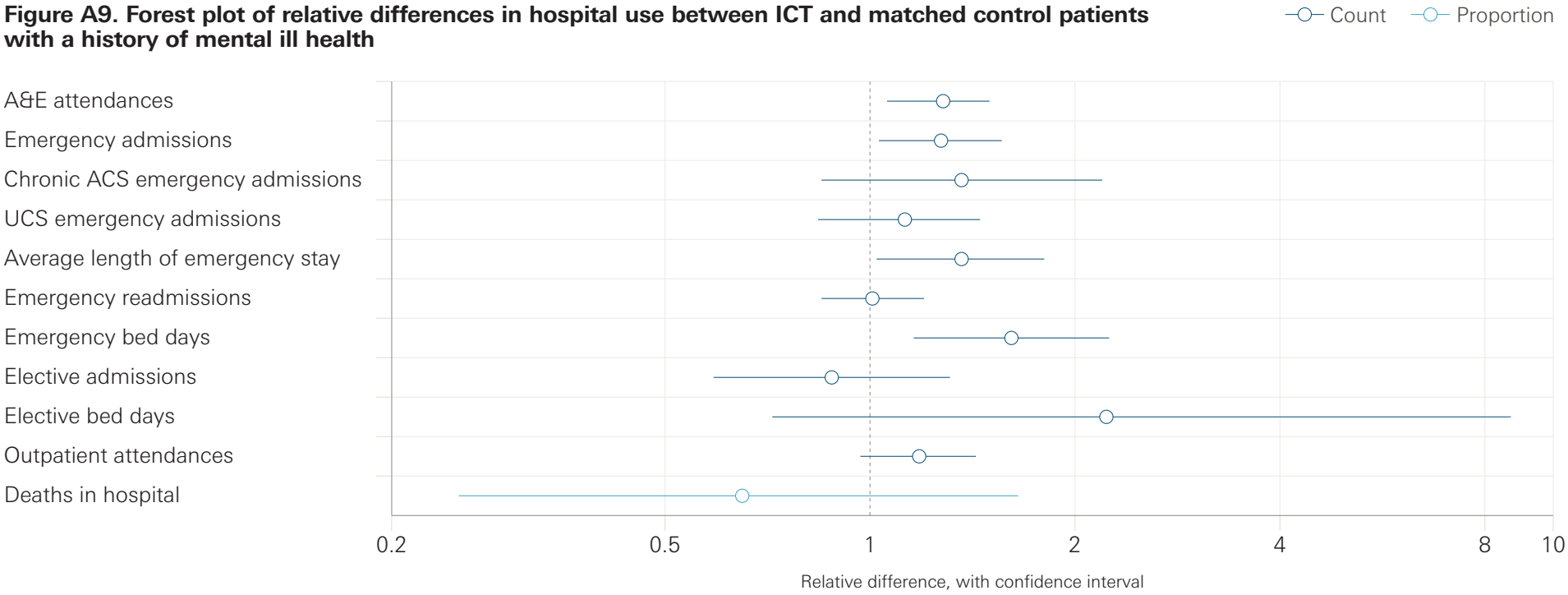
Table A14. Results of regression modelling, unadjusted and adjusted, for patients with history of mental ill health

	Unadjusted			Adjusted		
	Point estimate	**95% CI***	**p-value**	**Point estimate**	**95% CI***	**p-value**
A&E attendances	1.27	(1.04, 1.57)	0.021	1.28	(1.06, 1.53)	0.008
Emergency admissions	1.40	(1.13, 1.72)	0.002	1.27	(1.03, 1.56)	0.022
Chronic ACS emergency admissions	1.45	(0.86, 2.51)	0.169	1.36	(0.85, 2.19)	0.201
Urgent care sensitive emergency admissions	1.44	(1.06, 1.98)	0.021	1.10	(0.84, 1.45)	0.493
Average length of stay following emergency admission	1.20	(0.92, 1.57)	0.177	1.36	(1.03, 1.8)	0.022
Emergency readmissions within 30 days of discharge	1.07	(0.91, 1.26)	0.434	1.01	(0.85, 1.20)	0.921
Emergency hospital bed days	1.47	(1.05, 2.06)	0.025	1.61	(1.16, 2.24)	0.003
Elective admissions	0.96	(0.63, 1.44)	0.836	0.88	(0.59, 1.31)	0.531
Average length of stay following elective admissions	3.01	(0.98, 9.07)	0.046	NA	NA	NA
Elective hospital bed days	3.65	(0.94, 22.87)	0.094	2.22	(0.72, 8.67)	0.197
Outpatient attendances	1.21	(0.98, 1.48)	0.074	1.18	(0.97, 1.43)	0.093
Deaths in hospital	0.75	(0.40, 1.42)	0.379	0.65	(0.25, 1.65)	0.366
Deaths	0.81	(0.57, 1.15)	0.233	0.65	(0.42, 1.00)	0.048

*CI: confidence interval.

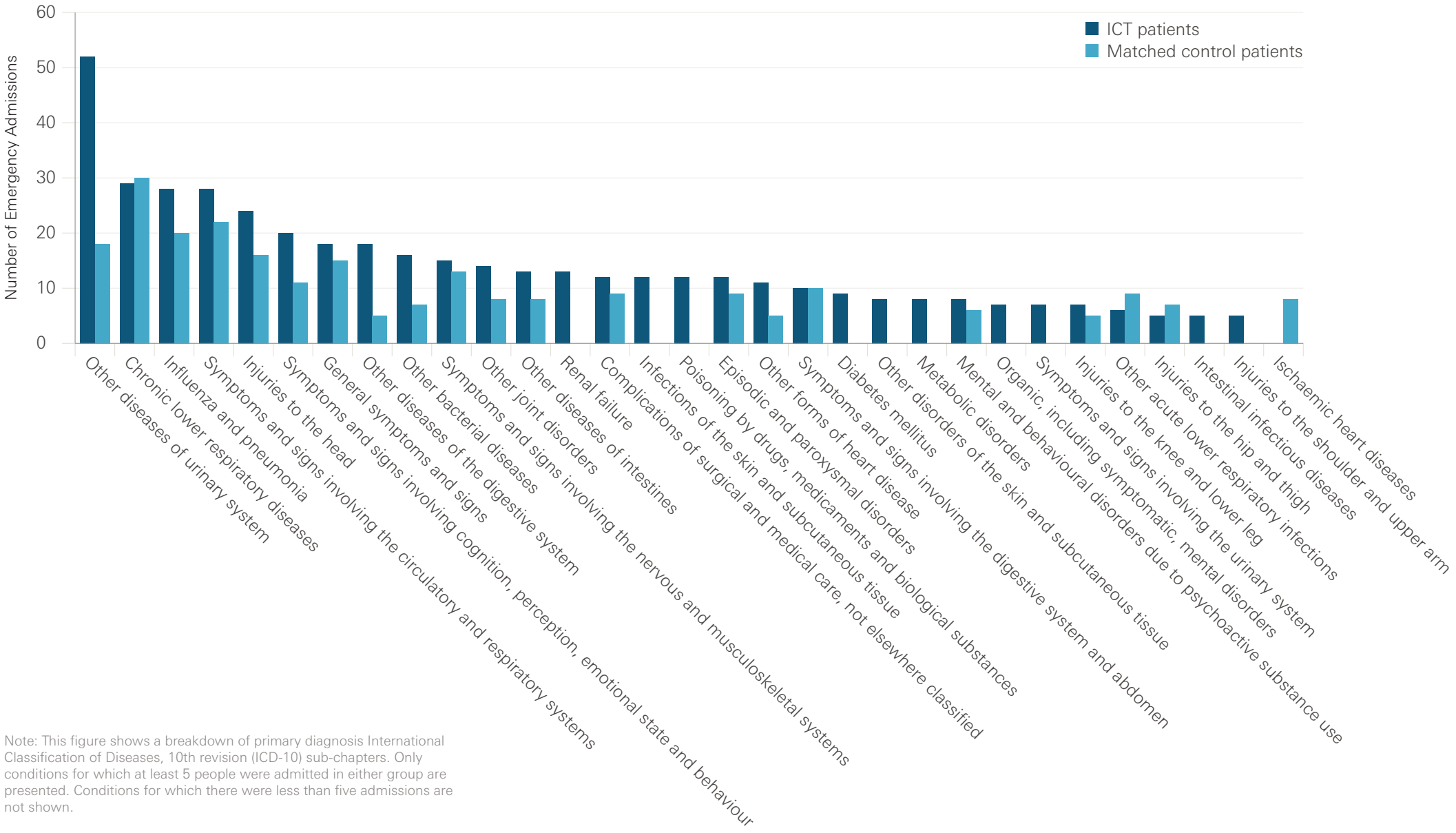
Note: Where possible, all baseline characteristics were adjusted for; however this was not always possible due to multicollinearity (i.e. where two or more variables are interrelated) and/or sparse data (see Table A12). Outpatient attendances were adjusted for all baseline characteristics that were not highly interrelated. All other adjusted models adjusted for a subset of baseline characteristics, either considered 'core' (see statistical analysis protocol) or most predictive of the outcomes. A list of baseline characteristics that were adjusted for in each regression is available on request.

Figure A9. Forest plot of relative differences in hospital use between ICT and matched control patients with a history of mental ill health



Note: Plots show the relative difference, i.e. rate ratio (for count variables) and odds ratio (for proportions) between the ICT group and matched control group, and the 95% confidence interval. Only adjusted relative differences are presented.

Figure A10. Primary diagnosis at emergency admission for patients with a history of mental ill health



Note: This figure shows a breakdown of primary diagnosis International Classification of Diseases, 10th revision (ICD-10) sub-chapters. Only conditions for which at least 5 people were admitted in either group are presented. Conditions for which there were less than five admissions are not shown.

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Errors or omissions remain the responsibility of the authors alone.

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