

Technical appendix: The impact of providing enhanced support for care home residents in Wakefield

Emma Vestesson, Therese Lloyd, Filipe Santos, Martin Caunt
and Adam Steventon

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/publications/reports/impact-of-enhanced-support-for-wakefield-care-home-residents

The supplemental results included in this technical appendix 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.

Table A1. Baseline characteristics

Variable	Intervention	Matched controls	Potential controls
Total number of unique records	526	318	1096
Total number of records	526	526	1096
Age, median [IQR]	85.00 [79.00, 90.00]	85.00 [81.00, 89.00]	85.00 [80.00, 90.00]
Male	36.70%	33.70%	33.40%
Rural setting	0.26 (0.44)	0.20 (0.40)	0.07 (0.26)
White	87.30%	90.50%	88.70%
Study start Jan–Mar	46.00%	47.30%	37.60%
Study start Apr–June	11.60%	10.60%	8.50%
Study start Jul–Sep	25.10%	29.10%	37.30%
Study start Oct–Dec	0.17 (0.38)	0.13 (0.34)	0.17 (0.37)
Month in CH before start of study, median [IQR]	0.00 [0.00, 5.75]	0.00 [0.00, 7.00]	0.00 [0.00, 9.00]
Charlson Index	2.70 (2.06)	2.54 (1.83)	2.41 (1.96)
Nursing home	83.70%	83.70%	39.40%
Number of beds	78.48 (41.95)	56.98 (21.36)	44.47 (21.85)
Care home registered as caring for older people only	77.00%	72.80%	79.40%
A&E attendances in prior year	2.18 (1.76)	2.13 (1.53)	2.46 (2.10)
Emergency admissions in prior year	1.65 (1.40)	1.66 (1.25)	1.82 (1.57)
Elective admissions in prior year	0.36 (1.83)	0.18 (0.90)	0.37 (1.44)
Potentially avoidable emergency admissions in prior year	0.54 (0.86)	0.58 (0.72)	0.57 (0.96)
Outpatient appointments in prior year	1.42 (2.83)	1.43 (2.59)	2.15 (3.34)
Emergency bed days in prior year	45.47 (52.33)	39.68 (41.93)	39.36 (45.01)
Ordinary elective bed days in prior year	1.50 (16.02)	0.12 (1.08)	0.96 (9.87)
Emergency admissions in year before prior year	0.73 (1.20)	0.58 (1.02)	0.72 (1.28)
Emergency hospital bed days in year before prior year	10.27 (25.04)	6.75 (16.56)	9.82 (25.44)
Number of frailty co-morbidities	2.15 (1.45)	2.03 (1.50)	2.01 (1.49)

Variable	Intervention	Matched controls	Potential controls
Congestive heart failure	19.60%	16.90%	17.30%
Chronic pulmonary disease	25.90%	21.90%	24.70%
Dementia (PARR)	53.60%	52.70%	46.90%
Diabetes with chronic complications	3.80%	3.20%	2.80%
Hemiplegia or paraplegia	8.90%	8.70%	7.20%
Moderate or severe liver disease	freq <10	freq <10	freq <10
Other liver disease	freq <10	freq <10	2.60%
Peripheral vascular disease	8.40%	7.60%	8.90%
Renal disease	22.60%	29.30%	22.50%
Metastatic cancer with solid tumour	4.00%	4.00%	3.30%
Other malignant cancer	12.20%	9.30%	11.90%
Anxiety or depression	22.20%	22.60%	24.50%
Cognitive impairment	58.70%	54.80%	55.10%
Functional dependence	20.00%	19.00%	17.30%
Fall or significant fracture	49.40%	48.90%	47.90%
Incontinence	8.00%	5.70%	6.20%
Mobility problems	27.20%	29.10%	25.70%
Pressure ulcers	13.10%	8.20%	11.00%

Table A2. Rates of hospital use over time: number of patients contributing to crude rates in each quarter in Figure 4 of the briefing

Follow-up quarter	Number of vanguard residents	Number of matched control residents
1	526	526
2	328	330
3	161	173
4	126	138

Table A3. Crude rates of hospital use

	Events vanguard residents	Crude rates vanguard residents	Events matched control group	Rates matched control group
Number of analysis records	526		526	
Number of people	526		249	
Person-years of follow-up	251.5		261.4	
Emergency admissions	256	1.02	253	0.97
A&E attendances	427	1.7	459	1.76
Potentially avoidable emergency admissions	105	0.42	123	0.47
Elective admissions	40	0.16	20	0.08
Emergency hospital bed days*	4.6 (11)	0.042 (0.12)	5.4 (12.9)	0.052 (0.139)
Ordinary elective hospital bed days*	0.2 (4.7)	0.001 (0.016)	0.7 (8.5)	0.004 (0.058)

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
Emergency admissions	1.05	(0.84, 1.3)	0.667	0.99	(0.81, 1.22)	0.956
A&E attendances	0.96	(0.8, 1.16)	0.701	0.97	(0.81, 1.16)	0.709
Potentially avoidable emergency admissions	0.89	(0.68, 1.15)	0.368	0.73	(0.55, 0.98)	0.034
Emergency bed days	0.8	(0.55, 1.17)	0.242	0.77	(0.53, 1.11)	0.151
Deaths	0.95	(0.72, 1.24)	0.682	0.87	(0.64, 1.18)	0.359
Deaths in hospital	0.93	(0.57, 1.53)	0.787	1.2	(0.69, 2.08)	0.518

* 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 A5. List of baseline characteristics adjusted for in models that did not adjust for all baseline characteristics

Outcome	Model	List of variables adjusted for
Emergency admissions	negbin	intervention, age, male, ru11rural, cohort_group, imd15quint, white, findexdateseason_1, findexdateseason_2, findexdateseason_3, findexdateseason_4, prestudylength_months, charlson_h36, chnursing, chelderlyonly, ae_h12, em_h12, el_h12, avem_h12, op_h12, embedn_h12, elodbedn_h12, em_h24m12, embedn_h24m12, nr_frailty_h36, p_conheart_h36, p_chrpulm_h36, p_dementia_h36, p_diabetesc_h36, p_hempara_h36, p_livoth_h36, p_pervasc_h36, p_renal_h36, p_mets_h36, p_cancother_h36, f_anxdep_h36, f_cogimpair_h36, f_dep_endence_h36, f_fallsfract_h36, f_incont_h36, f_mobprob_h36, f_pulcers_h36, offset(log(studylength))
A&E attendances	negbin	intervention, age, male, ru11rural, cohort_group, imd15quint, white, findexdateseason_1, findexdateseason_2, findexdateseason_3, findexdateseason_4, prestudylength_months, charlson_h36, chnursing, chelderlyonly, ae_h12, em_h12, el_h12, avem_h12, op_h12, embedn_h12, elodbedn_h12, em_h24m12, embedn_h24m12, nr_frailty_h36, p_conheart_h36, p_chrpulm_h36, p_dementia_h36, p_diabetesc_h36, p_hempara_h36, p_livoth_h36, p_pervasc_h36, p_renal_h36, p_mets_h36, p_cancother_h36, f_anxdep_h36, f_cogimpair_h36, f_dep_endence_h36, f_fallsfract_h36, f_incont_h36, f_mobprob_h36, f_pulcers_h36, offset(log(studylength))
Potentially avoidable emergency admissions	Poisson	intervention, age, male, ru11rural, white, findexdateseason, prestudylength_months, charlson_h36, chnursing, ae_h12, em_h12, el_h12, avem_h12, op_h12, embedn_h12, elodbedn_h12, em_h24m12, nr_frailty_h36, p_chrpulm_h36, p_diabetesc_h36, p_hempara_h36, p_livoth_h36, p_pervasc_h36, p_renal_h36, p_mets_h36, p_cancother_h36, f_dep_endence_h36, f_incont_h36, f_pulcers_h36, imd15quint, offset(log(studylength))
Emergency bed days	negbin	intervention, age, male, prestudylength_months, ae_h12, em_h24m12, p_livoth_h36, p_pervasc_h36, offset(log(studylength))
Deaths	logit	intervention, age, male, ru11rural, cohort_group, imd15quint, white, findexdateseason_1, findexdateseason_2, findexdateseason_3, findexdateseason_4, prestudylength_months, charlson_h36, chnursing, chelderlyonly, ae_h12, em_h12, el_h12, avem_h12, op_h12, embedn_h12, elodbedn_h12, em_h24m12, embedn_h24m12, nr_frailty_h36, p_conheart_h36, p_chrpulm_h36, p_dementia_h36, p_diabetesc_h36, p_hempara_h36, p_livoth_h36, p_pervasc_h36, p_renal_h36, p_mets_h36, p_cancother_h36, f_anxdep_h36, f_cogimpair_h36, f_dep_endence_h36, f_fallsfract_h36, f_incont_h36, f_mobprob_h36, f_pulcers_h36
Deaths in hospital	logit	intervention, age, male, avem_h12, p_livoth_h36, p_pervasc_h36, p_mets_h36, p_cancother_h36, f_anxdep_h36, imd15quint

Subgroup analysis

Table A6. Crude rates of hospital use by residents in the study for at least three months

	Vanguard residents		Matched control residents	
	Events	Rates	Events	Rates
Total number of patient records	371		356	
Total number of unique patients	371		161	
Person-years of follow-up	233.7		243.2	
Emergency admissions	218	0.93	219	0.9
A&E attendances	375	1.6	408	1.68
Potentially avoidable emergency admissions	91	0.39	113	0.46
Elective admissions	35	0.15	17	0.07
Emergency hospital bed days*	5.3 (12)	0.029 (0.07)	6.3 (14.4)	0.036 (0.101)
Ordinary elective hospital bed days*	0.3 (5.6)	0.001 (0.018)	1 (10.3)	0.007 (0.071)
Deaths in hospital (% of all deaths)	32	35.20%	26	32.9%
Deaths (% of all records)	91	24.5%	79	22.2%

Table A7. Results of regression modelling, unadjusted and adjusted for residents in the study for at least three months

	Unadjusted model			Adjusted model		
	Point estimate	95% CI	p-value	Point estimate	95% CI	p-value
Emergency admissions	1.02	(0.81, 1.29)	0.842	0.95	(0.76, 1.18)	0.624
A&E attendances	0.95	(0.77, 1.16)	0.587	0.92	(0.76, 1.13)	0.424
Potentially avoidable emergency admissions	0.84	(0.63, 1.1)	0.21	0.62	(0.46, 0.84)	0.002
Emergency bed days	0.8	(0.52, 1.21)	0.288	0.72	(0.46, 1.13)	0.132
Deaths	1.14	(0.81, 1.61)	0.457	1.08	(0.74, 1.59)	0.678
Deaths in hospital	1.11	(0.59, 2.1)	0.757	NA	NA	NA

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

Table A8. Crude rates of hospital use by new and existing residents

	New residents				Existing residents			
	Vanguard residents		Control residents		Vanguard residents		Control residents	
	Events	Rates	Events	Rates	Events	Rates	Events	Rates
Total number of patient records	314		277		212		249	
Total number of unique patients	314		146		212		128	
Person-years of follow-up	112.9		93.6		138.7		167.8	
Emergency admissions	136	1.2	111	1.19	120	0.87	142	0.85
A&E attendances	220	1.95	203	2.17	207	1.49	256	1.53
Potentially avoidable emergency admissions	53	0.47	53	0.57	52	0.37	70	0.42
Elective admissions	13	0.12	10	0.11	27	0.19	10	0.06
Emergency hospital bed days*	3.9 (9.3)	0.044 (0.124)	5.8 (14.2)	0.067 (0.162)	5.7 (13.1)	0.039 (0.114)	5 (11.2)	0.035 (0.105)
Deaths in hospital (% of all deaths)	24	28.20%	33	37.90%	20	32.30%	15	22.70%
Deaths (% of all records)	85	27.10%	87	31.40%	62	29.20%	66	26.50%

Table A9. Results of regression modelling, unadjusted and adjusted existing residents

	Unadjusted model			Adjusted model		
	Point estimate	95% CI	p-value	Point estimate	95% CI	p-value
Emergency admissions	0.97	(0.71, 1.32)	0.842	1.05	(0.79, 1.39)	0.741
A&E attendances	0.93	(0.71, 1.22)	0.591	0.93	(0.72, 1.21)	0.589
Potentially avoidable emergency admissions	0.9	(0.63, 1.28)	0.561	0.82	(0.55, 1.19)	0.298
Deaths	1.15	(0.76, 1.72)	0.513	1.07	(0.68, 1.68)	0.773
Deaths in hospital	1.62	(0.74, 3.59)	0.228	NA	NA	NA

* 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 A10. Results of regression modelling, unadjusted and adjusted new residents

	Unadjusted model			Adjusted model		
	Point estimate	95% CI	p-value	Point estimate	95% CI	p-value
Emergency admissions	1.06	(0.78, 1.45)	0.681	1.02	(0.76, 1.38)	0.902
A&E attendances	0.94	(0.73, 1.21)	0.635	1	(0.78, 1.3)	0.972
Potentially avoidable emergency admissions	0.83	(0.57, 1.21)	0.335	0.8	(0.53, 1.19)	0.266
Emergency bed days	0.65	(0.39, 1.06)	0.085	0.87	(0.5, 1.54)	0.578
Deaths	0.81	(0.57, 1.16)	0.247	0.84	(0.57, 1.23)	0.365
Deaths in hospital	0.64	(0.34, 1.22)	0.178	NA	NA	NA

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Errors or omissions remain the responsibility of the authors alone.

The Health Foundation
90 Long Acre, London WC2E 9RA
T +44 (0)20 7257 8000
E info@health.org.uk
🐦 [@HealthFdn](https://twitter.com/HealthFdn)
www.health.org.uk

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