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Transforming health care in nursing homes

An evaluation of a dedicated primary care
service in outer east London

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About the report

Residents in care homes in England generally receive their care from visiting GPs and other primary and community-based professionals. However, care provided by GPs in care homes is often reactive to people's stated needs, with little proactive or anticipatory care – and little in the way of continuity. The Nuffield Trust was commissioned by the Barking and Dagenham, Havering and Redbridge Clinical Commissioning Groups to evaluate a new primary care service that was being piloted in four nursing homes in the London Borough of Havering that had previously had difficulty accessing GP services.

The service's main features were the assignment of a single GP practice to all residents; access to health care professionals with expertise in caring for older people with complex needs; extended access beyond normal GP hours; care guidance to nursing home staff; improved medicines management; and new approaches for managing people who are at the end of life. The evaluation suggests that there are benefits in providing proactive primary care for nursing homes, delivered by a consistent GP within a service that specialises in older people with complex care needs. This report assesses the impact of the new service on hospital attendance, and details the experiences and views of staff in the nursing homes and health care professionals delivering the new service.

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Executive summary

Background

People residing in care homes generally have more complex health care needs than the average older adult, yet their experiences of health care services are of variable quality (British Geriatrics Society, 2012). In particular, the provision of primary care to care homes is too often reactive, with little in the way of continuity (Robbins and others, 2013). As a result, residents often have a poor experience, receive sub-optimal medication and have frequent unplanned admissions to hospital. In fact, care home residents have between 40% and 50% more emergency admissions than the general population aged over 75 (Smith and others, 2015).

Because care homes often provide services that fall under both the NHS and social care systems, the commissioning of those services is too often considered in isolation and not as part of overall joined-up service provision in a locality (Humphries and others, 2016).

Where residents within a single nursing home are registered with several different general practitioners (GPs), it can be difficult for staff to establish relationships with GPs in order to gain timely access to advice and to proactively manage risks. This can lead to greater use of emergency services and inefficient use of medicines.

The Nuffield Trust was commissioned by the Barking and Dagenham, Havering and Redbridge Clinical Commissioning Groups (BHR CCGs) to evaluate a new primary care service (Health 1000) that was being piloted in four nursing homes in the London Borough of Havering which previously had difficulty accessing GP services. Among the features of this service were: the assignment of a single GP practice to all residents in a home; access to health care professionals with expertise in caring for older people with complex needs; extended access beyond normal GP hours; care guidance to nursing home staff; improved medicines management; and new approaches for

managing people who are at the end of life. The aims of the evaluation were to assess the impact of the new service on staff and the use of hospital services.

Methods

We employed a mixed methods approach, incorporating retrospective cohort analysis and semi-structured interviews conducted with staff.

For the cohort analysis, we analysed changes in use of hospital services by 431 residents of the four nursing homes selected for the intervention, before and after registration with the new service. These were compared with outcomes over the same period for 1,495 residents of a set of similar nursing homes that were chosen as controls. Hospital services included inpatient spells and bed days, attendance at accident and emergency (A&E) departments, and outpatient appointments. These were further evaluated at the end of life.

For the qualitative element of the evaluation, we undertook interviews with 14 nursing home staff, managers and GPs, which we coded and thematically analysed. These interviews offered an insight into the impact of the new service on staff members' working lives and how they manage risk.

Experiences before Health 1000

The majority of the nursing home staff we spoke to described a poor experience of working with primary care before the introduction of the Health 1000 service, both in terms of their ability to access primary care services on behalf of residents and the decision-making support they themselves received. This appears to have been driving risk-averse behaviours within the homes, such as immediately sending residents to A&E.

Staff suggested it had also led to behaviours that could be construed as an inefficient use of resources: for instance, residents being sent to hospital unnecessarily and nursing home staff spending large amounts of time on administrative tasks because they had to liaise with multiple GPs. This could also impact on quality of care, for example in relation to how medications

were managed. Despite this, nursing home staff recognised that local GPs were under pressure and sympathised with their situation.

Impact of the new service on staff

The most frequent improvements since the new services mentioned by nursing home staff related to access: to the GPs themselves and to clinical advice, both for triaging and ongoing learning support. There was a view that GPs spending more time in the homes face-to-face with residents had improved care quality. Also, several staff indicated that their own approach to risk sharing had improved as a result of having better access to GPs.

There were also noted improvements in medicines management, enabling quicker access to medicines. Reductions in polypharmacy (concurrent use of multiple medications by a patient) and waste were achieved through medicines reviews and deleting unnecessary repeat prescriptions.

However, staff mentioned risks associated with potential discrepancies in notes, where Health 1000 and the nursing homes operate different systems. There were also difficulties in implementing Health 1000 policies where these conflicted with nursing homes' own policies, for example, in terms of the paperwork and checklists that staff are required to complete. As nursing homes are usually privately run and are often sub-units of large chains, there appears to be a potential for conflict where parent companies' protocols diverge from the Health 1000 operating approach. For example, one GP expressed frustration that they were required to complete forms for the nursing home company that were not directly relevant to the patient's care.

Impact on use of hospital services

The improvements in the service have coincided with a reduction in emergency admission of 36% compared to a 4% reduction observed among the comparator homes over the same period. After accounting for differences in case mix, the marginal reduction associated with the Health 1000 service was 35% (95% confidence interval, 6% to 55%). Also, total bed days following emergency admission fell by 53% compared to no reduction among the

comparator homes. After accounting for differences in case mix, the marginal reduction in bed days was 50% (95% confidence interval, 10% to 72%). Reductions in emergency admissions were most notable during the last three months of a person's life.

There were also reductions in A&E attendance associated with Health 1000, but these were not statistically significant. Outpatient attendance increased by 45%, although this was strongly influenced by a very small number of individuals from one of the nursing homes attending multiple times for anti-coagulation.

Implications

This study suggests that Health 1000 has had a positive impact on the working experience of staff, has reduced emergency admissions and has potential to improve the quality of care for nursing home residents.

However, the four nursing homes selected for the intervention were chosen because they had difficulties with primary care access. This may mean that there has been greater potential for change within these homes and an equivalent scale of change may not be seen in nursing homes where there are fewer problems.

Our findings from this evaluation are broadly consistent with findings from the limited number of other studies in this area and with emerging findings from NHS England's care home vanguard sites, most of which are demonstrating mixed impacts; highlighting the complexities of implementation.

Whether the results of this scheme can be replicated elsewhere is likely to depend on the context in which it is being implemented. Success will depend on the quality and continuity of relationships between the GPs and nursing homes, and it will take time to establish such relationships where they do not already exist. This will be more difficult in areas where there are staffing shortages or high numbers of temporary staff, and may be further exacerbated by provider instability in the nursing homes market. It is also important to note that Health 1000 was driven forward by a group of committed individuals who were instrumental in designing and implementing the service.

The ability of an initiative to overcome the challenges that arise from operating across both the NHS and social care will be a crucial determinant of success. Successful implementation may be easier where there is a system-wide commitment to integrated working in which nursing homes are seen to be an integral part.

Key points

- The Health 1000 service provides proactive primary care, operated from a single practice, to four nursing homes in the London Borough of Havering that previously had difficulty accessing GP services.
- The service includes expertise in caring for older people with complex health needs, and features include enabling access to primary care for extended hours, providing advice and support to nursing home staff, medicines reviews, and new approaches for managing people at the end of life.
- Since registration with the Health 1000 service, emergency inpatient admissions fell by 36%, and emergency bed days by 53%. After adjusting for case mix, these are all significantly larger reductions than observed among a control group of similar nursing homes in the area, although there is a reasonably large margin of error. The biggest reductions occurred towards the end of a person's life.
- There were significant increases in outpatient appointments since registration with Health 1000, but this seemed to be influenced by a very small number of residents in one of the homes attending multiple times for anti-coagulation.
- Previous lack of timely access to primary care appeared to have been driving risk-averse behaviour at the homes, which meant that staff were more likely to send residents to A&E than to call the GP.
- Staff reported feeling more supported and more confident in managing risk as a result of having quick access to GP advice via phone and the certainty of a regular weekly visit from a GP who knew the home, staff and residents.
- Staff, managers and GPs said it was important to develop a trusting relationship between professionals, as that provided confidence, support and a sense of shared responsibility.
- Staff and managers observed improvements in the proactive management of medications and in end-of-life planning, but said there was still room for improvement in both these areas.

Introduction

Background

There are 329,000 older people living in care homes in England (Care Quality Commission, 2017). Relative to the general population of those aged over 75, care home residents have complex health needs, with multi-morbidity, limited mobility and multiple medication needs. Yet, it is well known that people in care homes experience variable quality of, and poor access to, health care services (Bayliss and Perks-Baker, 2017; British Geriatrics Society, 2012; Smith and others, 2015). Because care homes often provide services that fall under both the NHS and social care systems, the commissioning of those services is too often considered in isolation and not as part of overall joined-up service provision in a locality (Humphries and others, 2016).

Care home residents generally receive care from visiting general practitioners (GPs) and other primary care and community-based professionals (Gordon and others, 2018). However, research has found that the care provided by GPs in care homes is too often organised to provide a reactive service, with little proactive or anticipatory care, and little in the way of continuity (NHS England, 2016; Robbins and others, 2013). Provision of proactive care has been found to be highly dependent on the development of effective relationships between care home staff and GPs, and their ability to establish shared ways of working (Gordon and others, 2018; Robbins and others, 2013). Many care homes work with multiple GPs. A survey carried out in 2012 found that nearly 80% of care homes in the sample worked with more than one GP (Gage and others, 2012), which can mean that homes struggle to find time to build relationships. This is a particular issue in the current context where the care home sector and general practice are suffering serious workforce shortages (Bayliss and Perks-Baker, 2017).

One of the consequences of this poor access to primary care is a high rate of unnecessary unplanned and avoidable admissions to hospital (NHS England, 2016). Research has also found that high rates of admission can be explained

by uncertainty among care home staff about what services are available; a lack of consensus among care home staff and GPs about what constitutes an inappropriate admission; and differing perceptions of risk (Harrison and others, 2016).

There is relatively little research into care homes and what factors might be driving their residents' use of health care services. However, this is a growing area of interest for researchers and policymakers alike. One study found that care home residents have between 40% and 50% more emergency admissions than the general over-75 population (Smith and others, 2015). So, with the older population projected to continue to grow, it is likely that the care home population will rise, along with an associated increase in hospital usage. That increase is potentially costly and means care home residents have a poor health care experience.

The Five Year Forward View responded to concerns about the standard of, and access to, health care among care home residents by establishing six vanguard sites that focused on enhancing health care in care homes (NHS England, 2016). NHS England developed a framework that sought to enable homes to work together with health services to overcome the widespread fragmentation of care provision. This framework comprises seven elements that encourage proactive primary care support, the use of multi-disciplinary team working, collaboration across health and social care, and improved dementia and end-of-life care.

The six vanguard sites are pursuing a variety of different approaches, some of which are showing promising signs (Jacques, 2017). There is also some evidence emerging from other models in the UK and abroad that more joined-up proactive care can have a positive impact on resource use and quality (Roche and Wyatt, 2017). This report examines one such approach: the use of a complex care hub (Health 1000) to provide health care to four nursing homes in Barking and Dagenham, Havering and Redbridge (BHR).

The Health 1000 service

Health 1000 was borne out of the Long Term Conditions Year of Care programme, for which BHR was an early implementer site, and was supported by the Prime Minister's Challenge Fund.

Traditional models of care for older people focus on a single condition, even though there is growing prevalence of comorbidities. This means that health care costs are increasing. Recognising this, and the fact that a significant proportion of care takes place outside of formal health delivery settings, in the patients' own homes or care homes, BHR Clinical Commissioning Groups (CCGs) set out to develop a new model of care based on Wagner's chronic care model (Wagner and others, 2001). In 2014, the Health 1000 pilot was established as a 'one-stop-practice' for patients with complex health needs: defined as having five or more chronic conditions, including coronary heart disease, high blood pressure, heart failure, stroke or mini stroke, diabetes, chronic obstructive pulmonary disease (COPD), depression and dementia. A dedicated multi-disciplinary team of NHS health care and voluntary sector professionals were recruited into the practice, including GPs, specialist doctors, nurses, physiotherapists, occupational therapists, pharmacists, key workers and social workers. The organisation initially focused on supporting the long-term condition cohort, however it was agreed that the provider, Health 1000, could support a new nursing home programme in 2016.

The CCGs across BHR have implemented a range of initiatives to improve care in nursing homes. The borough of Havering has always had a significant challenge with nursing home and residential care home residents; in 2015 Havering had the highest proportion of older people across the 32 London boroughs, as well as the fastest growing older population in London. At the time Health 1000 was implemented, it was predicted that by 2023 the number of older people residing in Havering would grow by 49%.

The population in Havering is supported by 51 GP practices working in six localities. In December 2015, Havering CCG commissioned a Care Home Alignment service to address the fragmented care received by patients residing in nursing homes. The new service aligned general practices to specific nursing homes, to maintain and enhance the quality of health care by providing optimal health care cover in a consistent manner. It was felt this would lead to improved relationships with nursing homes across the borough, a reduction in acute admissions, an increase in people dying in their preferred place of death, and a more consistent approach to care.

Four nursing homes were situated in geographically difficult locations and were unable to be aligned with a suitable general practice. To address this, Havering CCG asked the Health 1000 practice to consider taking on these homes as a new research programme, to evaluate the impact of having a dedicated team.

Particular features of the service provided by Health 1000 are described in Box 1. Health 1000 managers and the nursing home managers met at the beginning of the enrolment process to build a strong cultural relationship, which was maintained through face-to-face contact as appropriate.

Box 1: Features of the Health 1000 care home service

- A geriatrician is available to support GPs and families, including supporting family members when a patient is approaching the end of life.
- Comprehensive medicines reviews.
- A named clinician and key workers as dedicated contacts for each nursing home.
- Support to the nursing homes from 8am to 8pm, seven days a week.
- Support to the nursing homes for providing end-of-life care.
- During ward rounds at the nursing homes, staff are given advice and/or are educated in more appropriate or better care techniques.
- Acute assessments are provided by Health 1000 for nursing home patients with acute presentations and are carried out while still residing in the nursing home. Responses to such assessments may be advice to send the patient to hospital, to arrange a Health 1000 clinical visit or to prescribe appropriate medication.

The Nuffield Trust was commissioned by the BHR CCGs to evaluate this service for the four nursing homes.

The evaluation sought to address the impact of the new service on hospital attendance, and to assess the experiences and views of staff in nursing homes and health care professionals delivering the new service.

Methods

We adopted a mixed methods approach, combining an assessment of the impact of the new service on the use of hospital care, with experiences and views of staff delivering the care at the four nursing homes.

Data on care home residents and outcomes

Data on individuals, and their use of primary and secondary care services, came from individual electronic care records. These covered all individuals registered with GP practices within the areas under the responsibility of the BHR CCGs from 1 October 2013. Records for individuals could be linked across the different sources of data using a unique patient identifier. We had hospital attendance records up to 30 April 2017.

The data also included sets of fields derived from the primary data, such as comorbidities, combined risk score, the date a patient was registered dead or moved from the area, and the date of registration with Health 1000.

For a comparator group we selected local nursing homes across BHR that were registered with the Care Quality Commission (CQC) for similar services to the Health 1000 homes. Among the data that were provided was a list of identifiers for residents, and the dates they entered the home and, if relevant, left or died. These residents had been identified by postcode and address. This included all residents in the four nursing homes since registration with Health 1000, but it had not been possible to find everyone resident in these homes on earlier dates, or to find every resident at the homes used as comparators. Where we did not have information on the date someone entered the nursing home, we excluded them.

Inpatient visits were analysed by date of discharge or death, rather than date of admission. Since admissions are not reported in the data until a spell is complete, this avoided the problems of missing admissions where the spells were incomplete by the end of the follow-up period.

Information from staff

We interviewed staff from three of the four Health 1000 nursing homes (staff at the fourth home were unavailable). We interviewed three staff members with managerial responsibilities, six staff in carer roles, three nurses and two GPs. Three staff had been in post for less than a year, three for between one and two years, and eight for longer than two years.

Interviews were recorded and transcribed before being coded and analysed using a thematic analysis approach. Because of the small number of interviewees involved, we did not analyse interview data on a care home by care home basis.

Analysis of impact on the use of health care services

We analysed monthly hospital attendance rates before and after each home registered with Health 1000, and compared changes observed across these homes with changes among the group of comparator homes. To allow time for any impact of Health 1000 to take effect, we ignored the first three months since registration. Each home registered on different dates from April to June 2016, and we chose the mean of these as the corresponding date for the comparator homes.

Additionally, for people we knew had died, we analysed the use of services within the last three months of life. In contrast, we also analysed outcomes that did not occur during a person's last three months of life. For this analysis, if a person was still alive at the end of follow-up, then their last three months of data were excluded, as we would not know when they would have died.

We carried out separate analyses for four types of hospital visit: elective inpatient, emergency inpatient, outpatient appointments and attendance at accident and emergency (A&E) departments. Comparisons of numbers of visits and bed days between the Health 1000 homes and the comparator group were carried out using Poisson regression using the following explanatory variables:

- A binary indicator reflecting residency at a Health 1000 or comparator home.
- A binary indicator identifying whether the visit was before or after registration with Health 1000 (or the corresponding date for the comparator homes).
- The interaction between these two binary variables to enable us to assess the impact of any specific changes at the Health 1000 homes that do not also occur within the comparator homes.
- Whether the person had dementia.

The dementia indicator was chosen because of the significant differences in the prevalence of dementia between the Health 1000 residents and residents of the comparator homes.

We also developed further models that included a resident's average age over their follow-up period and their gender, but these added little explanatory power and had no effect on the statistical significance of our results.

If an individual was resident in a home both before and after registration, the before and after observations were treated as repeated measures. Any individuals that, at different times, were resident in both Health 1000 and comparator homes were excluded. Different follow-up times were handled by treating them as an offset variable in the model.

For our analysis of bed days, we trimmed the highest 5% of observations of bed days per person day to the minimum of these values, to avoid cases of very long lengths of stay distorting the results.

To analyse the impact on cost, we used a log normal regression of cost per visit using the same explanatory variables and combined with the attendance models to evaluate overall costs per person per year. With the cost per visit model, we trimmed outliers defined by the upper and lower 5% of observations.

For emergency inpatient attendance, we carried out some further analysis limited to visits where the primary diagnosis was from a pre-defined set of ambulatory care sensitive (ACS) conditions (Bardsley and others, 2013). A full list of these conditions is provided in Appendix 1.

All the statistical analysis was conducted using SAS statistical software version 9.4.

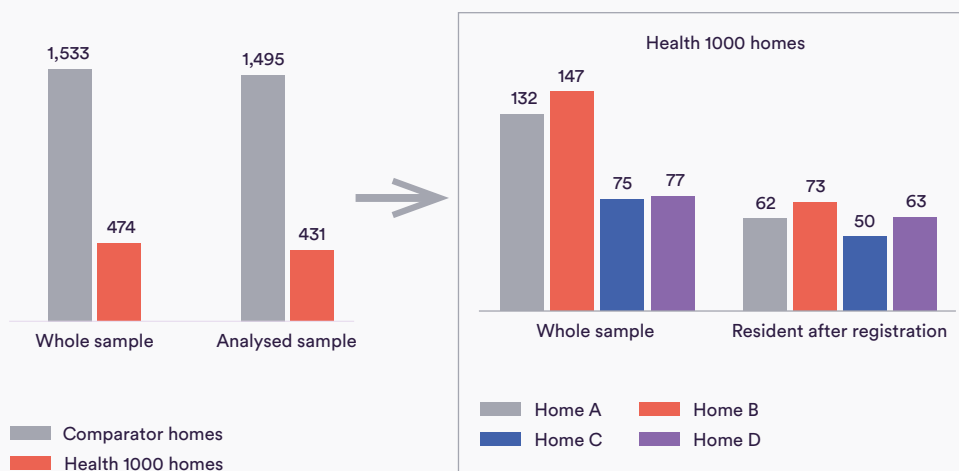
Results

Cohorts of residents

Numbers of residents available for analysis

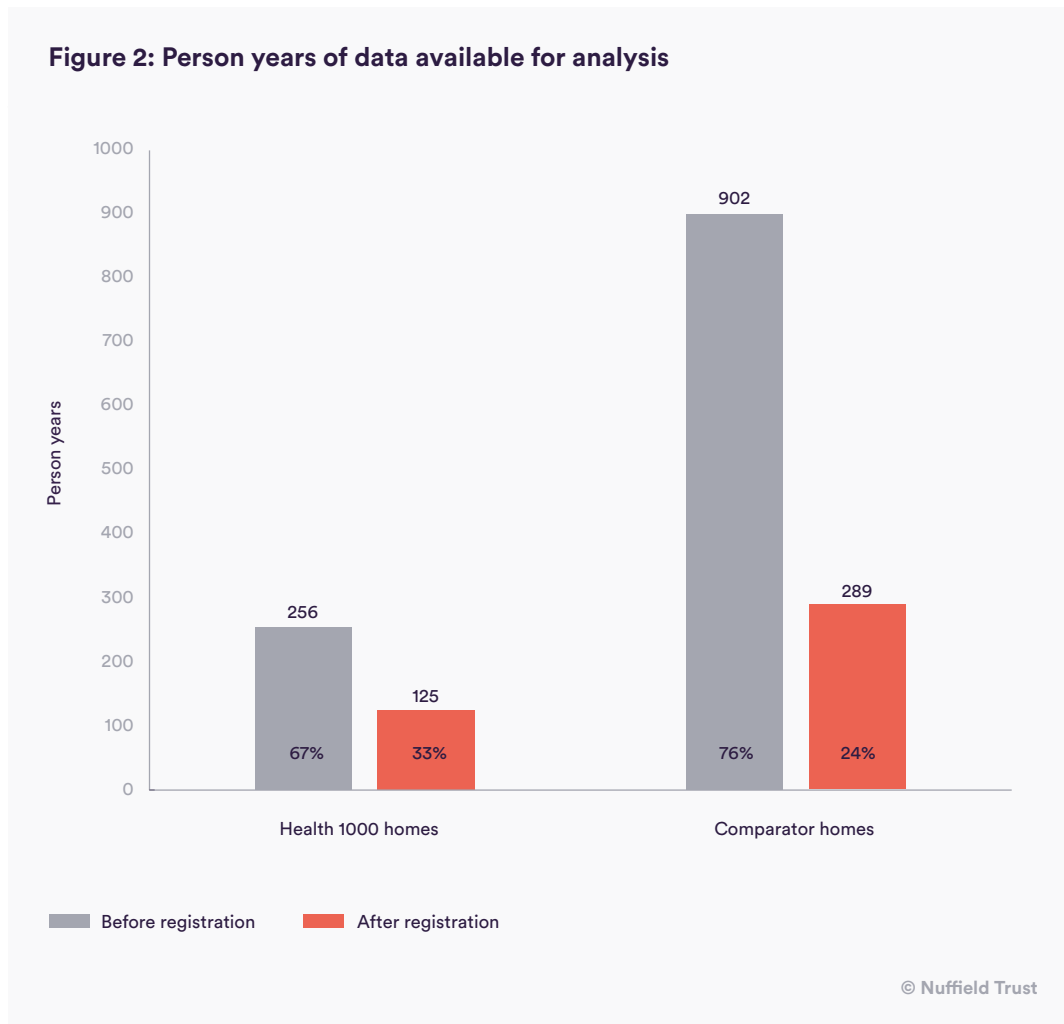
We initially had a sample of 2,007 residents across the Health 1000 and comparator homes for whom we knew the dates they entered the home. For our analysis, we excluded 81 of these either because they entered the nursing home after 30 April 2017, they were resident only during the three-month period following registration (or the equivalent period for the comparator homes), or they appeared in both the Health 1000 and comparator homes at different times. This left us with a total of 1,926 residents: 431 within the Health 1000 homes and 1,495 among the comparator homes (see Figure 1). Our comparator sample comprised residents of 19 different nursing homes. Samples by each of the four homes are shown in Figure 1. Although they were reasonably balanced after registration, comparatively fewer residents of Homes C and D could be identified before registration.

Figure 1: Residents selected for analysis



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In terms of person years, proportionately more of the comparator home data came from before registration (76% compared to 67% for the Health 1000 cohort; see Figure 2). These were our denominators for rates of hospital attendance.



Characteristics of nursing home residents

Characteristics of residents on entry to Health 1000 nursing homes before and after the homes were registered are compared in Table 1. Against these characteristics there is no evidence that the type of people coming to the homes has changed.

Table 1: Characteristics of residents on entry to Health 1000 nursing homes before and after registration with Health 1000

Characteristic	Before (n=154)	After (n=64)	P-value of difference
Mean age	83.1	83.8	0.53
Mean combined risk score	38.9	36.7	0.56
% female	58%	59%	1.00
% stroke	19%	17%	0.85
% coronary heart disease	18%	19%	0.85
% heart failure	6%	9%	0.38
% hypertension	58%	58%	1.00
% dementia	31%	45%	0.06
% depression	17%	8%	0.09
% diabetes	19%	2%	0.58
% COPD	12%	20%	0.14

Differences between residents at the Health 1000 homes and the comparator homes six months before registration are shown in Table 2. There are significantly more residents with dementia within the comparator homes (63% compared to 46%), but no evidence of any other difference.

Table 2: Characteristics of residents at Health 1000 and comparator homes six months before registration

Characteristic	Health 1000 homes (n=114)	Comparator homes (n=388)	P-value of difference
Mean age	83.5	83.8	0.78
Mean combined risk score	33.6	36.9	0.19
% female	68%	71%	0.58
% stroke	20%	23%	0.49
% coronary heart disease	18%	23%	0.18
% heart failure	7%	9%	0.59
% hypertension	50%	59%	0.10
% dementia	46%	63%	0.002
% depression	17%	16%	0.86
% diabetes	17%	23%	0.10
% COPD	15%	12%	0.50

Use of hospital services

Differences in rates of hospital attendance between residents of the Health 1000 and comparator homes are shown in Tables 3 and 4, and illustrated in Figure 3. The visit rates per person year are calculated by dividing by the denominators shown in Figure 2.

Table 3: Emergency inpatient spells and visits to A&E for residents of the Health 1000 and comparator homes before and after registration

		Emergency inpatient spells		A&E attendance	
		Health 1000	Comparators	Health 1000	Comparators
Number of visits	Before registration	213	942	284	1,069
	After registration	66	289	139	391
Visit rate per person per year	Before registration	0.83	1.04	1.11	1.19
	After registration	0.53	1.00	1.12	1.35
	% change*	-36%	-4%	0.4%	14%
	Marginal change associated with Health 1000 (95% confidence interval)**	-35% (-55% to -6%)		-14% (-39% to +20%)	
	P-value for marginal change	0.02		0.37	

* Negative changes represent reductions

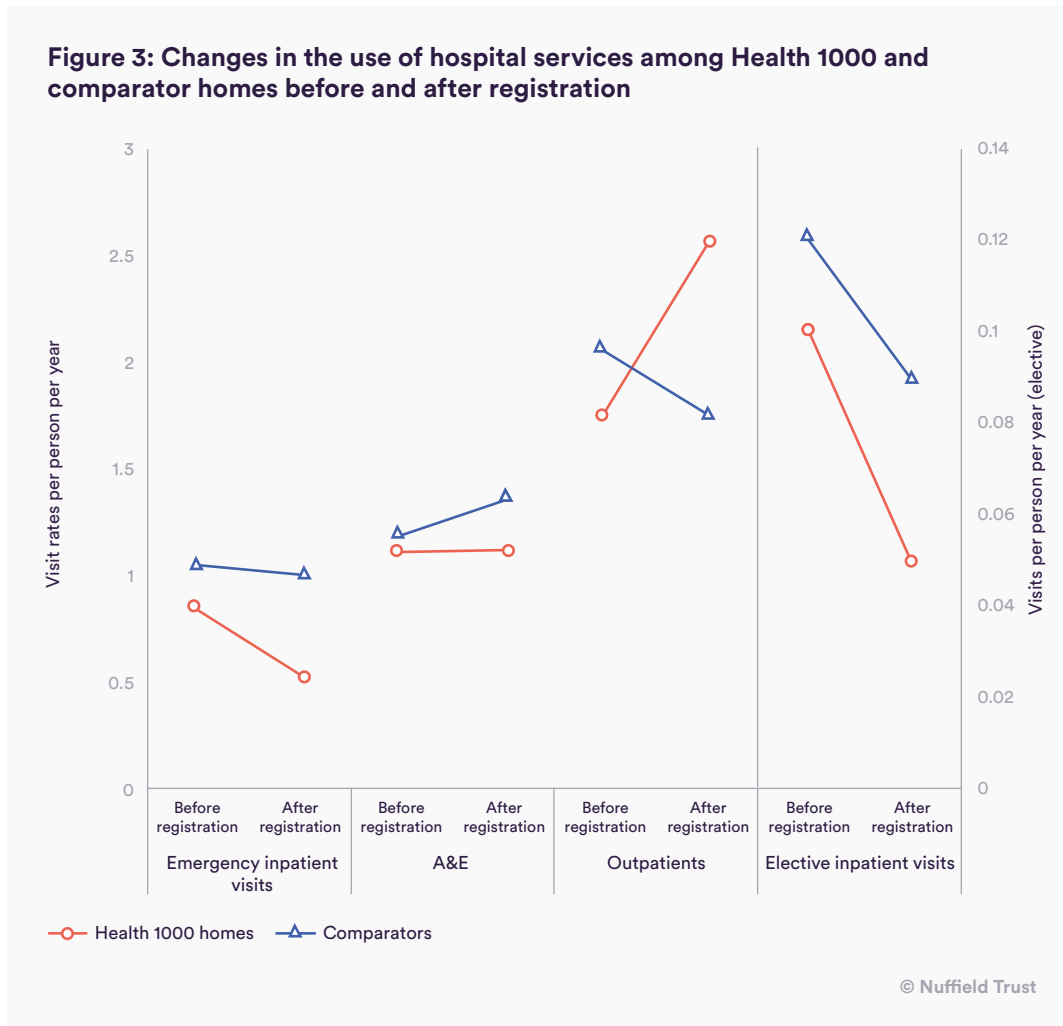
** Adjusting for case mix

Table 4: Elective inpatient spells and outpatient appointments for residents of the Health 1000 and comparator homes before and after registration

		Elective inpatient spells		Outpatient appointments	
		Health 1000	Comparators	Health 1000	Comparators
Number of visits	Before registration	24	109	450	1,850
	After registration	6	24	317	508
Visit rate per person per year	Before registration	0.10	0.12	1.76	2.05
	After registration	0.05	0.09	2.54	1.76
	% change*	-44%	-29%	45%	-14%
	P-value for marginal change		0.68		0.01

* Negative changes represent reductions

Figure 3: Changes in the use of hospital services among Health 1000 and comparator homes before and after registration



Before registration, rates of emergency inpatient attendance from the comparator homes was 25% higher than the Health 1000 homes. However, after registration, these rates dropped by 36% among the Health 1000 homes, compared to only a 4% drop among the comparator homes. After accounting for differences in case mix, the marginal reduction associated with the Health 1000 service relative to the comparator homes is 35% (95% confidence interval, 6% to 55%; $p=0.02$).

A&E attendance remained almost static for the Health 1000 homes, whereas it rose by 14% among the comparator homes. These changes in rates are a combination of reduced inpatient admissions following A&E attendance and reported increases in A&E visits that were not followed by an admission. Among the latter attendances, reported increases were lower among the

Health 1000 group than the comparators (30% compared to 49% increases, respectively). Overall, the relative change between these groups of homes is not statistically significant (p = 0.37).

Table 5: Emergency inpatient visits – bed days and costs to commissioners

		Health 1000	Comparators
Bed days per person year	Before registration	13.0	15.6
	After registration	6.2	15.6
	% change*	-53%	0%
	Marginal change associated with Health 1000 (95% confidence interval)**	-50% (-72% to -10%)	
	P-value for marginal change	0.02	
Cost per person year	Before registration	£2,925	£3,757
	After registration	£1,760	£3,347
	% change*	-40%	-11%
	Marginal change associated with Health 1000 (95% confidence interval)**	-£1,022 (-£30 to -£1,673)	
	P-value for marginal change	0.04	

* Negative changes represent reductions

** Adjusting for case mix

Numbers of elective inpatient visits after registration are too small to enable robust comparisons, however, we observed a 45% increase in outpatient attendance among residents of the Health 1000 homes, in contrast to a 14% drop elsewhere.

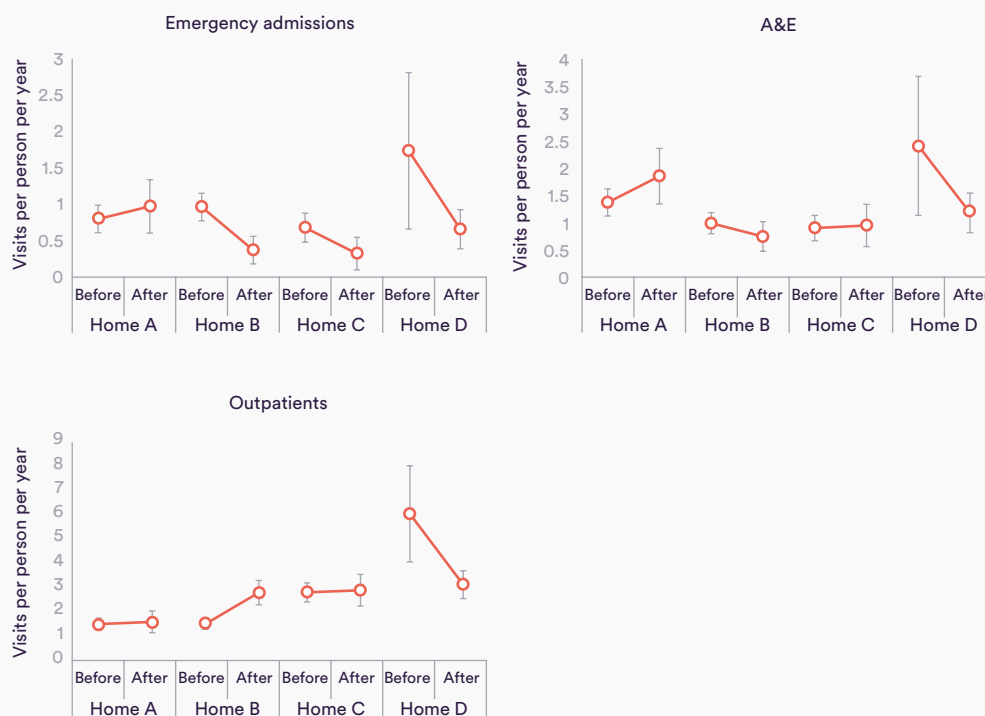
Total bed days following emergency admission fell by 53%, compared with no reduction among the comparator homes (Table 5). After case-mix adjustment, the marginal reduction in bed days relative to the comparator homes was of 50% (95% confidence interval 10% to 72%; $p = 0.02$). We estimate the monetary value of these marginal reductions in emergency hospital use to be in the order of £1,022 per person per year – but with a wide margin of error, ranging from £30 to £1,673.

It should be emphasised that these monetary values are not necessarily directly equivalent to actual cash savings for either commissioners or providers, as no account has been made of any additional costs in providing the Health 1000 service, and it cannot be presumed that providers would realise the full saving from a marginal reduction in activity.

Comparisons between homes

Differences in hospital attendance between the four Health 1000 homes are illustrated in Figure 4. The wide confidence interval for Home D before registration reflects the relatively small sample of individuals that we had data for during that period. Although there were overall reductions in emergency admissions, there was increase at one home (Home A). Also, the overall increase in outpatient visits appeared to be due to just one home (Home B). A closer look at outpatient visits for residents of this home shows that the increase in appointments could be isolated to very few (fewer than six) individuals with multiple visits for anti-coagulation services, and visits to trauma and orthopaedics following previous admissions for fractures. Indeed, these make up around one quarter of outpatient visits from the home.

Figure 4: Hospital attendance among the four Health 1000 homes before and after registration. Error bars are 95% confidence intervals



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Admissions for ambulatory care sensitive conditions

Before registration, ACS conditions were primary diagnoses for 33% of emergency admissions from the comparator homes and 27% from the Health 1000 homes (see Table 6). Changes in rates of admission for ACS conditions were close in value to the changes in overall emergency admissions, with the reduction among Health 1000 homes being significantly different to the comparators. However, proportions of admissions for ACS conditions remained very similar before and after registration within both groups of homes, which suggested that any influence the new service had on admission rates was not just confined to ACS conditions. Changes in ACS admissions appeared not to be focused on just a few conditions, although numbers are too small to make reliable judgements. Of the ACS conditions on admission, 70% were for urinary tract infections (UTIs) or pneumonia.

Table 6: Emergency admissions for ambulatory care sensitive (ACS) conditions

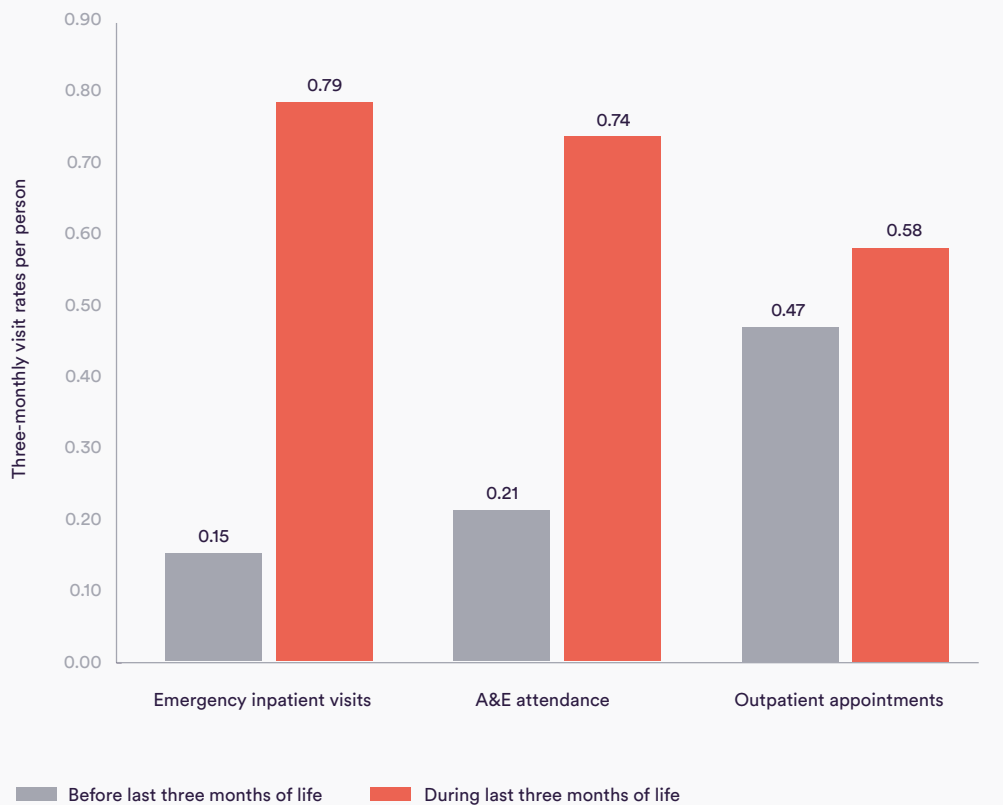
		All ACS conditions	
		Health 1000 (% all emergency admissions)	Comparators (% all emergency admissions)
Number of visits	Before registration	57 (27%)	307 (33%)
	After registration	17 (26%)	95 (33%)
Visit rate per person per year	Before registration	0.22	0.34
	After registration	0.14	0.33
	% change*	-39%	-3%
P-value for marginal change		0.002	

* Negative changes represent reductions

Use of hospital services at end of life

During the last three months of a person's life there was a marked increase in use of emergency services across all the Health 1000 and comparator nursing homes (Figure 5). For example, emergency inpatient admissions increased by more than five times.

Figure 5: Use of hospital services before and during the last three months of life



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Table 7 shows how the rates of emergency inpatient visits before and during the last three months of life changed within both the Health 1000 and comparator groups. Compared to the comparator group, the Health 1000 group saw greater reductions in visit rates and bed days both before and during the last three months of life. However, changes during the last three months were more substantial and statistically significant.

Table 7: Emergency inpatient spells before and during the last three months of life

		Before last three months		During last three months	
		Health 1000	Comparators	Health 1000	Comparators
Number of visits	Before	122	480	90	392
	After	30	112	26	134
	Before	0.13	0.16	0.85	0.77
	After	0.09	0.15	0.49	0.82
	% change*	-34%	-5%	-43%	6%
Visit rate per person per three months	Marginal change associated with Health 1000 (95% confidence interval)**	-31% (-60% to +19%)		-47% (-67% to -15%)	
	P-value for marginal change	0.18		0.01	

* Negative changes represent reductions

** Adjusting for case mix

A&E and outpatient attendance are compared in Table 8, and illustrated alongside changes in emergency admissions in Figures 6 and 7. There were relative reductions in A&E attendance among the Health 1000 homes compared to the rest, but these were not significant. The increase in outpatient visits among the Health 1000 homes was most notable before the last three months of life. The numbers of elective admissions, particularly at the end of life, were too small for us to make robust comparisons.

Table 8: A&E and outpatient attendance before and during the last three months of life

		Before last three months of life		During last three months of life		
		Health 1000	Comparators	Health 1000	Comparators	
A&E	Number of visits	Before	217	624	75	377
		After	70	179	47	149
	Visit rate per person per three months	Before	0.24	0.21	0.71	0.74
		After	0.21	0.24	0.73	0.91
		% change*	-13%	17%	4%	22%
	P-value for relative change		0.15		0.41	
Outpatients	Number of visits	Before	384	1,462	60	297
		After	232	299	47	112
	Visit rate per person per three months	Before	0.42	0.48	0.56	0.59
		After	0.68	0.40	0.73	0.68
		% change*	61%	-17%	30%	17%
	P-value for relative change		0.003		0.78	

* Negative changes represent reductions

Figure 6: Changes in use of hospital resources before and after registration: before last three months of life

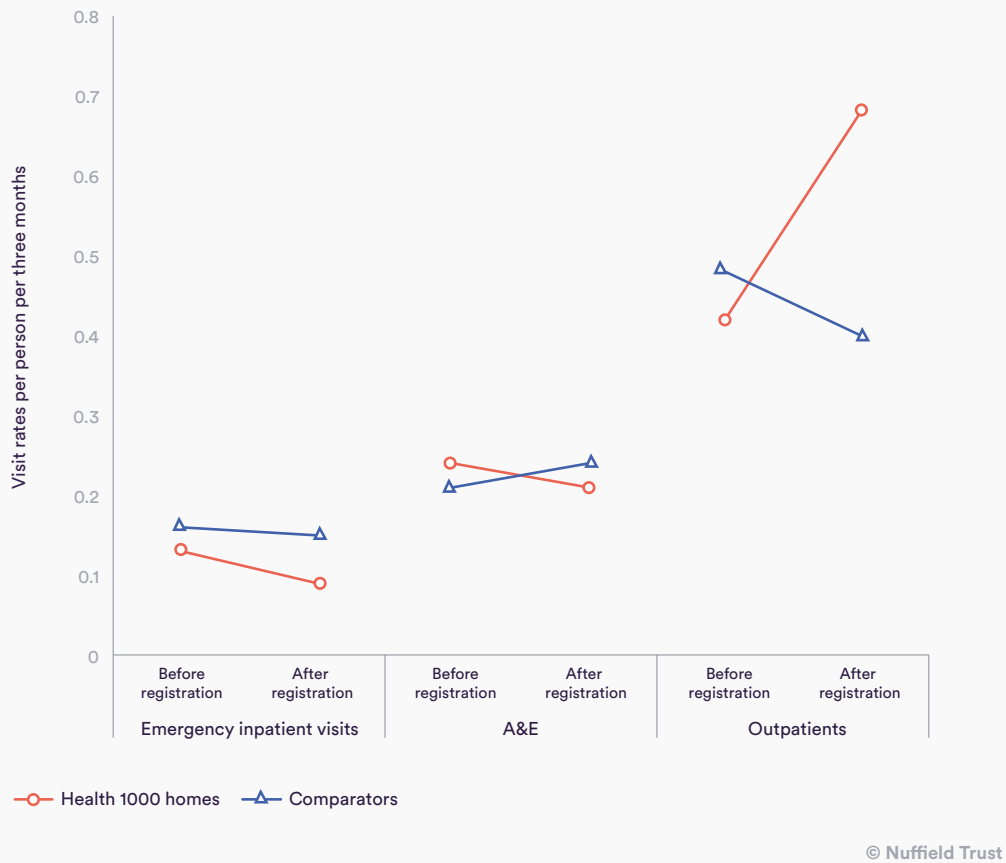
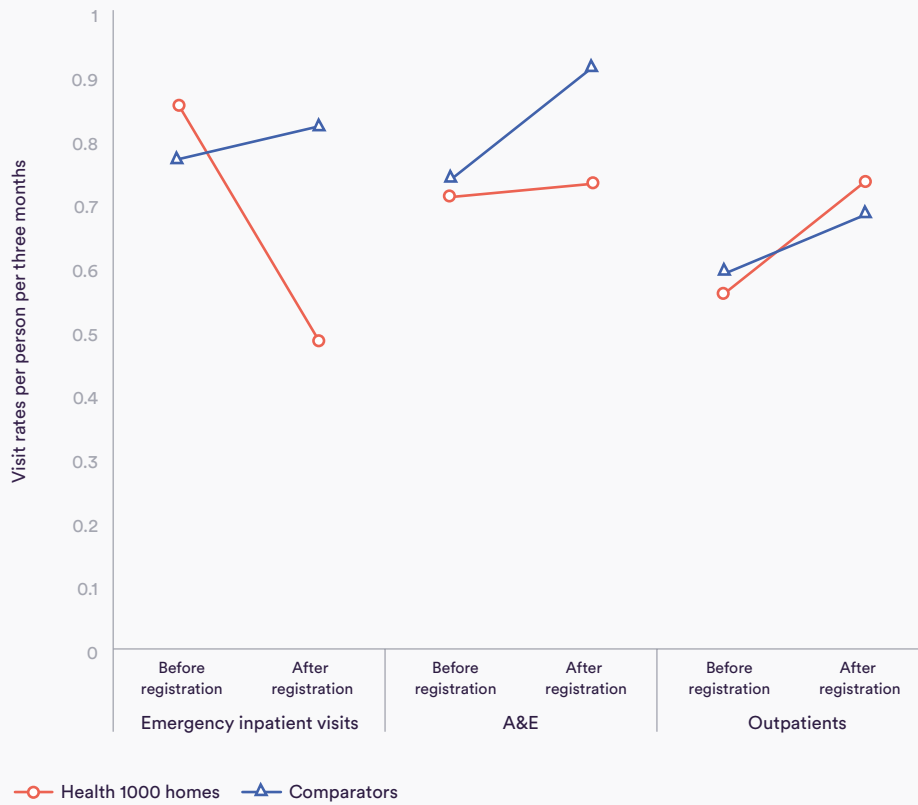


Figure 7: Changes in use of hospital resources before and after registration: during last three months of life



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Outcomes from staff interviews

Having analysed the transcripts of the interviews we conducted with staff, we identified the following themes:

- How staff perceived their previous experience of working in the sector before Health 1000 was introduced (both in the nursing homes now served by Health 1000 and in nursing homes elsewhere).
- What staff consider the purpose of Health 1000 to be.
- What material changes staff have noticed now care is provided under the Health 1000 approach (both positive and negative).
- Specific improvements in care that staff have noticed.
- Problems with Health 1000 (both those that have been resolved and those that still exist).
- Changes in staff experience arising as a result of the introduction of Health 1000.

Previous experience

The majority of staff interviewed described a poor experience of working with primary care services prior to the introduction of the Health 1000 care home scheme. Nursing home staff said they had experienced difficulties in accessing both primary care services and opinions in hours and out of hours. One carer spoke of “making bids” for residents to be seen by GPs, adding:

“Sometimes you had to run after [the GP] because they’d even not bother coming in here and I had to run after them.”

A manager said staff had been “made to feel intimidated and be made to feel that, actually, it’s not right to contact the doctor”.

Nursing home staff described how this lack of access could result in risk-averse behaviours within homes. In some cases, interviewees were able to link poor access to primary care support directly to higher hospital admissions. For instance, one carer said:

“At first, when we were with the other practice, maybe because of the lack of enthusiasm, most of the time we used to bypass them and go straight to A&E...”

Related to these issues of poor access to primary care and A&E overuse was the problem of risk-sharing. One manager spoke of how doctors would pass risk back to the home, rather than taking on responsibility for making decisions about whether or not residents' conditions required further intervention. A GP also highlighted this issue in relation to unsatisfactory end-of-life care arrangements, where under the previous system, as soon as a patient was deemed to be dying, they were “shuttled into hospital”.

Nursing home staff spoke of a high volume of administrative tasks resulting from needing to liaise with multiple practices where residents were registered with different GPs.

Delays in the availability of medicines were also a significant problem experienced by staff that we interviewed. Three interviewees spoke of delays in getting medications to patients, and two highlighted that a lack of medication reviews was resulting in increased waste. In some cases, this also resulted in poor care, where patients' drug-related symptoms were not being addressed quickly enough.

In terms of the individual relationships between nursing home staff and previous GPs, nursing home staff were often sympathetic to the pressures the GPs faced, but sometimes felt that GPs no longer wanted to work with nursing homes.

Staff views on the purpose of Health 1000

Unsurprisingly, given the issues raised above, when asked about the purpose of Health 1000, interviewees said it was to broaden access to primary care and to improve processes around medicines. Only one GP stated that the purpose was to reduce pressure on A&E and one nurse said the only element of the scheme she thought was different to previous practice was the emphasis on end-of-life planning.

Material changes in provision

The main material changes in provision (actual changes in systems or processes) noted by interviewees were:

- Having one GP as a single point of access in hours.
- Having access to the Health 1000 service during extended hours.
- Having anticipatory medicine available.
- A new end-of-life care approach, including having ‘do not resuscitate’ notices where appropriate, peace plans and availability of syringe drives on site.
- Medicines reviews.

One interviewee highlighted a change in protocol allowing nursing home staff to do diagnostic tests for UTIs as having sped up the treatment of these conditions for residents. In addition, two interviewees mentioned new service areas – prevention and wellness, and a weight-loss programme respectively – that they had been implementing following the introduction of Health 1000.

As a result of these changes, staff said they noticed both improvements and problems, as described below.

Improvements

The greatest number of improvements mentioned by interviewees were in the area of access. Interviewees reported easier access to GPs themselves, and said GPs spending more time in the homes face-to-face with patients had improved the quality of care:

“... just having that GP come in every week, you’d be surprised how much that stops it escalating at the weekends as well. [...] They see side effects; they can implement something prior to it even happening.”

Manager

Several interviewees highlighted easier access for nursing home staff to clinical advice as being a particular benefit, both from the perspective of triaging residents more effectively and also as a way for nursing home staff to receive both formal and informal learning support to help them perform

better in their roles. A further improvement highlighted by one interviewee was better access to specialists, particularly in the field of diabetes.

Related to the points above, interviewees also noted better relationships between GPs and residents, and between GPs and staff. Among the points made were that a familiar GP face was very beneficial for people with dementia; that having 'doctor days' when the GP routinely visited the home was helpful for both patients and carers; and that there was better teamwork and a more supportive relationship between nursing home staff and GPs. Two interviewees related the improved access to primary care to a reduction in use of A&E and other emergency services. One had initially been concerned that less use of A&E would result in poorer care for patients, but had subsequently been reassured:

“At first, when she said it, I felt bad because I thought that maybe they were going to be like the other practice, so if it's going to be like that, and we don't have the right to run to A&E, I was thinking 'somebody's going to die here'. But when you see the rate at which they run in then you know it's OK...”

Care worker

Improved procedures around medicines were highlighted by multiple interviewees. Improvements included quicker access to medicines such as antibiotics, and reductions in polypharmacy (concurrent use of multiple medications by a patient) and waste by reviewing medicines and deleting unnecessary repeat prescriptions.

Several interviewees felt that nursing home staff were better able to manage risk themselves as a result of the new ways of working. Reasons they gave included: that they felt more comfortable in monitoring residents' conditions themselves in between GP visits because they could be sure a GP would visit once a week; that they were gaining a better understanding of what was acute and what could wait, as a result of better support from GPs; that their self-confidence was improving; and that an atmosphere of mutual trust had been created, where GPs could advise courses of action over the phone, based on nursing home staff descriptions of symptoms. That said, one care worker said better access to GPs meant they could ask about a larger number of problems, including those that were “minute” or “a scratch”:

“Certain things, they were so minute that it’s like you are disturbing. But now I’m really confident I can call even for a scratch, I’m telling you. Yes.”

Care worker

Problems

In addition to the improvements noted, some interviewees also highlighted problems with the Health 1000 service. Some of these issues had been partly or fully resolved; others were ongoing.

A GP interviewee identified that a difficulty around administering repeat prescriptions had arisen when the switch was made to Health 1000, but that this had largely been resolved. However, three interviewees based in nursing homes raised ongoing concerns about the prescription ordering process. Issues included prescriptions not arriving at the pharmacy, and specific issues around ordering supplements.

Two interviewees from one nursing home wanted more action on end-of-life care, stating that end-of-life planning should be more proactive, that end-of-life planning meetings were being scheduled too late in patients’ pathways, and that ‘emergency health care plans’ were sometimes not in place.

There was some concern around note keeping and whether nursing home records matched up with GP records. One nursing home manager said they had no notes of GPs’ discussions with residents’ family members about ‘do not attempt CPR’ notices. A nurse was worried that GPs’ own notes might not match notes kept in house by nursing home staff, and described how they would make notes at the same time as the GP during a conversation about a resident’s condition. The nurse was very concerned that GP notes and nursing home notes were separate, and raised this in the context of potential legal action:

“So I don’t know whether it’s the same... Do you understand? Because this is... We’ve only got information: it can’t be used up in court. So, if I’m writing my own and the GP is writing her own...”

Nurse

There were also some concerns about the implications of using bank staff at nursing homes operating the Health 1000 system. A GP spoke of having difficulties initially with bank staff as they did not know patients well enough to be able to make some of the risk-sharing decisions that were a benefit of the scheme. Related to this point, a GP was concerned that working with private nursing home providers could be challenging where Health 1000 processes differed from processes mandated by the parent company:

“I can only talk about [care home name redacted], but they have their own paperwork and protocols and tick boxes that they need to do, and I have my own and sometimes that clashes, if that makes sense. So they would want me to do, I don’t know, silly things [...] which to be honest they should be doing themselves. [...] I want to be patient-centred, make sure the best care for them is there and not to tick off boxes for care home protocols.”

GP

One nursing home manager raised overuse of A&E services as an ongoing issue, stating that A&E attendances were higher than in her previous place of employment. The manager attributed this at least in part to the out-of-hours service operating in the area, saying: “from my experience, every time we’ve called out-of-hours, the residents have gone to hospital”. A nursing home worker at a different home mentioned that when the out-of-hours service was called, the visiting GP would only see one patient before departing and would then expect to be called out again.

Other issues raised included a problem with booked patient transport not arriving, and a question over whether GPs working for the service were sufficiently aware of specific CQC regulatory requirements for care homes.

Staff experience

Nursing home staff were generally very positive about the experience of working under the Health 1000 programme. Several interviewees spoke of feeling positive about the changes resulting from the new approach. Examples of comments from staff working in nursing homes were that they felt more involved in decision making, better supported, and that their workload had improved.

“It’s like when I’m calling [the GP] I don’t get any butterflies. I know she’ll give me an answer, not like before – you think somebody will be rude to you on the phone.”

Care worker

“...but we do have quite a good relationship. We’ve had an issue this morning and she was happy to raise it with us today. Rather than put it in an email or write us a letter, she brought the issue to me, we’ve discussed it with her and we’ll move on from that issue.”

Manager

Two staff members (a care worker and a manager) expressed their support for the initiative, the former via a hope the scheme continued, and the latter via concern about the consequences of stopping it: “I do think losing that [Health 1000] would be quite an impact on this home”.

One GP interviewed spoke of an initial very high workload that had improved once new systems such as medicines reviews had been implemented. Another suggested that working in a nursing home environment was less professionally rewarding than mainstream general practice:

“I don’t know if it is rewarding. You know like when your patients come in, you have a consultation and it’s nice and neatly wrapped up and then they go away and you feel as if you’ve achieved something. Some of the times, in the nursing home, it is such an ongoing laborious process that you don’t sometimes get to reflect as much and I think that sense of achievement, now I’ve got it, eight to nine weeks after starting but it’s not as rewarding as a normal practice.”

GP

Discussion

What has the service achieved?

Our evaluation suggests that there are benefits in providing proactive primary care for nursing homes, delivered by a consistent GP within a service that specialises in older people with complex care needs. Staff talked about the largely positive impact it has had on their working lives. Importantly, the initiative has given nursing home staff access to GP advice by phone and extra training, which has given them the confidence to make more appropriate decisions about a resident's care. The shift towards a proactive model of care enacted via regular weekly visits from a known GP at a set time appeared to be a powerful factor in enabling nursing home staff to be less risk averse. Crucially, the development of a continuous relationship and trust between the GP and nursing home staff and managers has underpinned these changes in behaviour.

Nursing home staff observed a marked improvement following the introduction of Health 1000 in both the standard of care delivered to residents and in their experience of working with primary care. Staff acknowledged that the previous service drove risk-averse behaviours where they would quickly escalate a situation. For example, staff described scenarios where – in the past – they would have sent a resident to A&E that are now handled within the home.

Another clear benefit that staff and managers alike referred to was their better use of time. Where previously they would have had to communicate with multiple GPs, the new service was more streamlined and cut down the amount of time they spent on administrative tasks. The simplification of this arrangement has also allowed more time for the staff and GPs to build up a relationship, which has, partly, enabled them to clarify where responsibility lies for different tasks that had been an issue in the past.

Our analysis of hospital data identified some positive changes in service utilisation, with significant reductions in emergency admissions and bed days relative to the comparator homes, although there is a wide margin of error

associated with the extent of this change. While our analysis observed reductions in emergency hospital admissions, particularly at the end of life, outcomes were consistent across all four homes. One home did not see any reduction in emergency admissions and another had an increase in outpatient admissions that was sufficiently high to have a large influence on our overall results.

Despite the reductions in emergency inpatient visits, we observed no significant association with Health 1000 and changes in A&E attendance, although there was a relative reduction of 14% compared with the other homes. Gaining a more accurate picture of the impact on A&E would require distinguishing more severe cases, which perhaps arrive by ambulance and where there is no question about subsequent admission, from lower-risk cases. We have seen increases in A&E attendances that are not subsequently admitted across both groups of nursing homes, although the rates of increase are lower in the Health 1000 homes. It is possible that these increases in non-admitted cases could be partly due to the local hospitals taking steps themselves to reduce unnecessary admissions – an observation that has been made elsewhere (Wyatt and others, 2017).

In the light of these findings, the cause of reduced emergency admissions is difficult to confirm. The significant reductions in the last three months of a person's life points to successful delivery of one of the aims of the new service; improving end-of-life care. But there are reductions at other times (if not significant), and the fact that emergency admissions are much more likely during a person's last three months means that there is more scope for observing reductions during that period. How much some of this is due to the homes being able to carry more risk and how much is due to any improved wellbeing of residents is unclear, although the study may not have been looking far enough ahead to observe any consequences of the latter.

Room for improvement

The service has demonstrated a positive impact on staff experience and, potentially, in utilisation of some hospital services. However, that impact has not been consistent across all homes and, importantly, has not been seen in A&E attendances, which suggests there is room for improvement. Nursing home staff and managers, although largely positive, highlighted potential for

improvement. Processes around end-of-life care and proactive planning for end of life were areas that were particularly mentioned

The main downside of the Health 1000 scheme, according to staff, was the risk arising from discrepancies in notes, where Health 1000 and the nursing homes operate different systems. One care worker framed this risk in very legalistic terms, hinting at a possible culture where some staff feared they were vulnerable to legal threats.

Furthermore, a GP spoke of difficulties in implementing Health 1000 policies where these conflicted with nursing homes' own policies. As nursing homes are usually privately run and are often sub-units of large chains, there appears to be a potential for conflict where parent companies' protocols conflict with the Health 1000 operating approach.

Other studies and evidence

Published literature in this area is limited, although the research that has been undertaken is broadly consistent with our findings from Health 1000. For instance, a trial of coordinated primary care with a consistent physician in long-term care facilities in Canada (Care By Design), that shares many features of Health 1000, observed a 34% reduction in overall emergency department attendances (Marshall and others, 2016). An enhanced support scheme for older people in care homes in Nottinghamshire showed a 29% fall in A&E attendance and a 23% fall in emergency admissions (Lloyd and others, 2017).

The six English care home vanguard programmes, many of which are in early stages of development, are producing more mixed results. Even within the same vanguard programme, different areas have delivered varied impacts: in the Newcastle-Gateshead vanguard, the Newcastle area observed an overall reduction in A&E attendance, while the Gateshead area observed an increase. Both Newcastle and Gateshead experienced an increase in non-elective admissions and in outpatient appointments, but both made savings in lengths of stay (Maniatopoulos and others, 2017). In contrast, the Wakefield vanguard has observed more consistently positive impacts compared to the control group: A&E attendances have decreased by 10%; emergency admissions by 13%; and ambulance call outs by 23% (Jacques, 2017).

Because the design of the vanguard sites varies, it is difficult to identify why some might be demonstrating more positive impacts than others. One complicating aspect is the context in which care homes are operating – the pressures on care home providers varies across the country depending on: their contract with the local authority; the number of self-payers who are known to cross-subsidise local authority-funded residents; and the extent of staffing shortages in the locality (Bayliss and Perks-Baker, 2017; Humphries and others, 2016; Jarrett, 2017). As studies have shown, success of a particular scheme is extremely dependent upon the ability of care homes and health care providers to develop good relationships, and that is often partly dependent upon the local context of services, organisations and practices (Bayliss and Perks-Baker, 2017). Learning from the vanguards also suggests that leadership and culture play a part in determining success (Bayliss and Perks-Baker, 2017). The wider culture and the presence of strong leadership within the health economy is likely to play an important role – where there is a genuine commitment to delivering integrated care across the board, it may be more likely that care homes are incorporated into a wider strategy instead of being considered in isolation, as is often the case (Gordon and others, 2018).

The most extensive research in this area carried out in England looked at 12 care homes in three health economies (239 residents followed up for 12 months). This work concluded that ingredients of success included the development of trust between practitioners over time; care that is linked in with the wider health care system; and a service that offers specialist care for people with dementia. Importantly, this study found that a focus on a specific single issue (e.g. avoiding hospital admissions) ran the risk of reducing the time spent on developing relational working. This study found similar resource use despite varied approaches to health care delivery (Gordon and others, 2018).

Strengths and weaknesses

In this study we were able to use person-level data for residents of the four Health 1000 homes, as well as a ‘control’ group of comparator homes, and had access to data on residents going back some years before registration with the new service. The resident populations at the Health 1000 and comparator homes appeared broadly similar against the measures we had, and our analysis adjusted for any differences we observed: for example, with the prevalence of dementia.

Although we had a complete list of residents of the Health 1000 homes after registration and before registration, among the comparator homes we could only identify a sample of residents. For one home in particular, we could only identify a few residents before registration. Therefore, we have assumed the samples of residents are typical.

The four nursing homes selected for the intervention were chosen because they had difficulties with primary care access. This may mean that there has been greater potential for change within these homes and an equivalent scale of change may not be seen in nursing homes where there are fewer problems.

Also, the length of the period after registration for which we had hospital data covered a period of about a year. This makes it difficult to draw conclusions about the sustainability of our findings over the long term.

Our research included 14 interviews with a range of staff, managers and GPs across three of the four homes. While our sample was relatively limited in size, interviews were in-depth and offered a rich insight into the delivery and experience of the scheme.

Implications and conclusions

Our research findings suggest that Health 1000 has the potential to improve the quality of care for residents in nursing homes. It also appears to have improved the working experience for nursing home staff and has demonstrated an impact on emergency admissions. Our findings are broadly consistent with findings from the limited number of other studies in this area and with emerging findings from NHS England's vanguard sites, some of which have shown falls in emergency admissions comparable to the changes observed in this study.

Whether similar results would be achievable if the initiative was transferred to other nursing homes would likely depend on a range of contextual factors. It is important to note that the four nursing homes selected for the intervention in BHR were chosen because they had difficulties with primary care access and continuity. This may mean that there was more potential for change within these homes and an equivalent scale of change may not be seen in nursing homes where there are fewer pre-existing problems.

Evidence from previous initiatives that have aimed to introduce a new service or to integrate services suggests that the local context in which an initiative is introduced is an important determinant of success (Imison and others, 2017). Our evaluation has highlighted the importance of good communication and consistent relationships between GPs and the nursing homes, and this is mirrored in other similar studies (see, for example, Gordon and others, 2018). In BHR, these relationships developed over time and the mutual trust between those involved was cited as an important element. In areas where staff turnover is high, or where temporary staff are frequently used to fill vacancies, it may be more difficult to establish those trusting relationships. These challenges are likely to be exacerbated in areas where the care home provider market is unstable.

Health 1000 has been driven forward by a group of committed individuals and their vision and energy have been important in the successful implementation of the initiative. The presence of strong leadership and clear vision are factors that have regularly been observed in other studies examining service transformation and integration in the NHS (Ham and Walsh, 2013; Wistow and others, 2015).

A particular challenge for initiatives involving care homes is that they need to work across the NHS and social care systems. Overcoming the challenges posed by that systemic divide is likely to be an easier task in areas where there is a commitment to integrated working, and where all parts of the health and social care system are working towards aligned goals.

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Appendix 1: Ambulatory care sensitive conditions used in the study

Condition	ICD-10 codes
Acute ACS conditions	
Cellulitis	L03, L04, L08, L88, L980, L983
Dehydration	E86
Dental conditions	A690, K02-K06, K08, K098, K099, K12, K13
Ear, nose and throat infections	H66, H67, J02, J03, J06, J312
Gangrene	R02
Gastroenteritis	K522, K528, K529
Nutritional deficiencies	E40-E43, E55, E643
Pelvic inflammatory disease	N70, N73, N74
Perforated/bleeding ulcer	K250-K252, K254-K256, K260-K262, K264-K266, K270-K272, K274-K276, K280-K282, K284-K286
Urinary tract infection/pyelonephritis	N10, N11, N12, N136, N390
Chronic ACS conditions	
Angina	I20, I240, I248, I249
Asthma	J45, J46
COPD	J20, J41-J44, J47
Congestive heart failure	I110, I50, J81

Condition	ICD-10 codes
Convulsions and epilepsy	G40, G41, O15, R56
Diabetes complications	E100-E108, E110-E118, E120-E128, E130-E138, E140-E148
Hypertension	I10, I19
Iron deficiency anaemia	D501,D508,D509
Vaccine-preventable ACS conditions	
Influenza	J10, J11
Pneumonia	J13, J14, J153, J154, J157, J159, J168, J181, J188
Tuberculosis	A15, A16, A19
Other vaccine preventable	A35-A37, A80, B05, B06, B161, B169, B180, B181, B26, G000, M014

Appendix 2: Model results of the analysis of hospital attendance

Table A2.1: Emergency admissions

Parameter	Estimate	Standard error	95% confidence limits		P-value
Intercept	-5.6134	0.0663	-5.7434	-5.4834	<.0001
Time period (before registration = 0, after registration = 1)	-0.0098	0.0829	-0.1723	0.1527	0.9060
Group (comparator = 0, Health 1000 = 1)	-0.2562	0.1171	-0.4857	-0.0268	0.0286
Interaction between time period and group	-0.4339	0.1892	-0.8048	-0.0629	0.0219
Dementia	-0.4588	0.0797	-0.6151	-0.3025	<.0001

Table A2.2: Accident and emergency attendance

Parameter	Estimate	Standard error	95% confidence limits		P-value
Intercept	-5.5947	0.0751	-5.7419	-5.4475	<.0001
Time period (before registration = 0, after registration = 1)	0.1535	0.086	-0.015	0.322	0.0741
Group (comparator = 0, Health 1000 = 1)	-0.077	0.1228	-0.3176	0.1636	0.5304
Interaction between time period and group	-0.1556	0.1723	-0.4932	0.182	0.3664
Dementia	-0.2397	0.0838	-0.4041	-0.0754	0.0042

Table A2.3: Outpatient appointments

Parameter	Estimate	Standard error	95% confidence limits		P-value
Intercept	-4.8768	0.0934	-5.0599	-4.6938	<.0001
Time period (before registration = 0, after registration = 1)	-0.1148	0.0968	-0.3045	0.075	0.2360
Group (comparator = 0, Health 1000 = 1)	-0.1957	0.1465	-0.4829	0.0915	0.1817
Interaction between time period and group	0.4973	0.191	0.123	0.8717	0.0092
Dementia	-0.5926	0.1038	-0.7961	-0.3891	<.0001

Nuffield Trust is an independent health charity. We aim to improve the quality of health care in the UK by providing evidence-based research and policy analysis and informing and generating debate.

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