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The long-term impacts of new care models on hospital use: an evaluation of the North East Hampshire and Farnham Vanguard programme

Paul Seamer, Stephen O'Neill, Therese Lloyd, Stefano Conti

The Health Foundation

Key points

- This report presents the findings of an evaluation of the long-term impacts of the North East Hampshire and Farnham (NEHF) Vanguard integrated care programme over 4.5 years from its launch in August 2015 until February 2020. The programme comprised a range of initiatives, including community-based multidisciplinary teams targeted at individuals with complex health care needs and those at an increased risk of needing acute care.
- Our evaluation looked at the impact of these initiatives on the emergency hospital use of people aged 65 years and older. We compared the hospital use of the NEHF population with a carefully constructed comparison area made up of similar GP practices drawn from other areas in England. The comparison area served as a counterfactual, allowing us to compare what happened in NEHF with 'what would have happened' in the absence of the vanguard programme.
- For all emergency admissions, overnight emergency admissions and two sub-groups of potentially avoidable admissions – chronic ambulatory care sensitive conditions (ACSCs) and urgent care sensitive conditions (UCSCs) – we mostly saw no difference between NEHF and the comparison area in the first 2 years after the start of the vanguard. However, we started to see reductions in hospital use after 3 years and by year 5 all four admission-related impact metrics were significantly lower in NEHF than in the comparison area. Overall emergency admissions in year 5 were 9.8% lower (95% confidence interval (CI): -17.2 to -0.6) equivalent to 22 fewer admissions per 10,000 people per month.
- We found no lasting association between the introduction of the vanguard and a change in A&E attendances, and average length of stay for overnight emergency admissions was consistently higher in NEHF than in the comparison area.
- The evidence from this study and other recent studies of the long-term effect of vanguard programmes suggests that integrated care programmes are unlikely to reduce emergency hospital use in the short term.[1] Over a longer period, these programmes may have the potential to reduce some aspects of emergency hospital care, but as seen in NEHF this is likely to require several years at least. Therefore, while acknowledging there may be other possible benefits to patients and staff from these programmes, they should not be considered as a means to reduce hospital resources, especially in the short term.

Background

Integrated care aims to improve patient care and experience by 'joining up' care more closely between GPs, hospitals, community services and social care.[2] One of the aims of integrating health and social care has been to reduce hospital resource use, particularly for patients with complex and long-term conditions.[3,4] Evaluations of the impacts of integrated care initiatives over the past 10 or more years have produced mixed results.[5,6,7,8,9] However, many of those evaluations did not examine the long-term impacts of integrated care, and it is unclear from these evaluations whether reductions in hospital use might begin to materialise over a longer period. A long-term study of the effect of an integrated care transformation programme in Mid-Nottinghamshire showed a delayed effect on hospital use with reductions seen in A&E attendances and emergency admissions, but not until 5–6 years after the start of the programme.[10]

This report presents the findings of an evaluation of the long-term impacts on hospital activity of the North East and Hampshire (NEHF) Vanguard integrated care programme over 4.5 years from its launch in August 2015 to February 2020.

The NEHF clinical commissioning group (CCG) plans and funds health care for a population of approximately 225,000 who are registered across 24 GP practices.*

The NEHF population is a relatively young population. Life expectancy is above the national average and levels of deprivation are significantly below the national average.

Happy, Healthy at Home vanguard

In April 2015, NEHF was selected as a 'vanguard' site for the NHS England's new care models programme announced in the 2014 *Five year forward view*.[11]

Vanguard funding allowed partner organisations to implement a broad range of initiatives under the banner Happy, Healthy at Home. The most significant of these was the development of integrated care teams (ICTs) in each of the CCGs five localities (Farnborough, Farnham, Yateley, Fleet and Aldershot). The ICTs and other initiatives continued after the vanguard period ended and were still in place at the time of writing (mid-2021).

Integrated care teams (ICTs)

The ICTs were multidisciplinary teams made up of professionals from primary care, community care, mental health, social care and the voluntary sector, working together to deliver joined-up care through a single holistic care planning process. The ICTs were expected to prioritise patients with the highest need and those most at risk of an acute health crisis; and aimed to improve patients' health and wellbeing and reduce emergency hospital use.

* In April 2021, NEHF CCG merged with East Berkshire CCG and Surrey Heath CCG to form Frimley CCG. Number of practices and total population size is correct as of August 2015.

Each ICT comprised a clinical lead, team coordinator, community matron, social worker or care manager, mental health practitioner, ambulance service or community paramedic, social prescribing coordinator, dementia practitioner and pharmacist. These core members attended weekly meetings. If required, the teams were also able to draw on the expertise of other specialists, for example palliative care nurses or learning disability practitioners.

Although the core teams were in all five localities in August 2015, the pace of development was mixed, and it took a further 12 months before the teams were considered fully established.

Other initiatives

Several other initiatives targeted at urgent and emergency care were implemented during this period; a complete list of all the initiatives is included in an earlier publication.[12] Examples included:

- an enhanced recovery at home service aimed at facilitating timely discharge and a seamless transition back home following an unplanned admission to hospital
- a rapid home response service provided by specially trained community paramedics for patients at risk of hospital admission
- out-of-hours support for people having, or nearing, a mental health crisis
- an ambulatory emergency care unit at Frimley Park Hospital.

Capital investment from the vanguard programme helped create a new primary care-led urgent care centre in Yateley, which opened in February 2017. It provides urgent care appointments and advice to around 30,000 patients registered with two local GP practices, which have since merged. Walk-in appointments are not possible, but patients requiring an urgent care appointment can book into the centre and are usually seen on the same day. A similar facility opened in Farnham in June 2017.

Intended impact of interventions

These interventions were intended to kick-start a move toward a more population-based model of care, promoting closer integration of primary, community and social care services. Material reductions in the numbers of hospital admissions, bed-days, and A&E attendances were identified as desired outcomes.

About this evaluation

This evaluation was conducted by the Improvement Analytics Unit (IAU) – a partnership between the Health Foundation and NHS England and NHS Improvement that evaluates complex local initiatives in health care to support learning and improvement.

The scope of this evaluation is limited to the impact of the vanguard programme on hospital resource use, including A&E attendances, emergency admissions and average length of stay.

We adopted a population-based approach to obtain an overall picture of the effect of the vanguard programme on hospital use by the local population of those aged 65 years and older. Our study population included individuals registered with a GP in NEHF, irrespective of whether – or where – they received hospital care.

Our primary focus was hospital use of older adults (those aged 65 years and older) as this group best reflected the age profile of patients treated by the ICTs, the highest-profile vanguard initiative.[13] However, because adults younger than 65 years could be referred to the ICTs, and to understand the effect of other initiatives and wider changes linked to the vanguard, we also examined hospital use among the wider adult population (those aged 18 years and older).

We compared emergency hospital use among the population registered with a GP in NEHF with a similar population in a carefully constructed control area, created from other areas in England. The control area was designed to provide estimates of the hospital use that would have been expected in NEHF in the absence of the vanguard. This enabled us to see whether the effect of the vanguard changed over time and to test the hypothesis that it may take several years for integrated care initiatives of this sort to result in reductions in hospital activity.

The coronavirus (COVID-19) pandemic and its distorting effect on all types of hospital activity limited our ability to extend the study follow-up period beyond February 2020.

Methods

A full description of the methods used is outlined in the statistical analysis protocol for this evaluation.[14]

Sources of data

Data relating to the characteristics of CCGs and GP practices (eg population size, age distribution and deprivation levels) were collected from publicly available sources. Hospital activity data were obtained from the Secondary Uses Service, a national, person-level database closely related to the widely used Hospital Episode Statistics database. These data were collected for all patients aged 18 years and older in England. Hospital activity data were pseudonymised and aggregated across patients by GP practice. Both publicly available practice data and hospital data were structured to provide monthly series for all GP practices in England between April 2013 and February 2020. These data were used to:

- define variables for comparing CCGs and GP practices
- define impact metrics capturing hospital use by patients registered with each GP practice in England
- risk adjust our impact metrics.

Selecting the control group

We selected the 200 GP practices in England that were most similar to the GP practices in NEHF (the 'treated' practices) in the 24 months leading up to the vanguard launch in August 2015. We did this in two stages.

1. After excluding CCGs in London, other vanguard CCGs participating in the new care models programme and four neighbouring CCGs that together with NEHF were part of the Frimley Health and Care integrated care system, we identified GP practices belonging to the 50 most similar CCGs to NEHF.
2. From the pool of GP practices obtained in the previous step, we selected the 200 GP practices most similar to the NEHF treated practices.

Impact metrics

We used a range of impact metrics to test for an effect of the vanguard initiatives on emergency hospital use:

- A&E attendances to type-1 emergency departments* (rate)
- all emergency admissions (rate)
- overnight emergency admissions (rate)
- admissions for chronic ambulatory care sensitive conditions (ACSCs, rate)
- admissions for urgent care sensitive conditions (UCSCs, rate)
- average length of stay for overnight emergency admissions (days).

Admissions for chronic ACSCs and UCSCs are considered potentially avoidable with timely and effective community care. All impact metrics were analysed separately for patients aged 65 years and older and patients aged 18 years and older. Please refer to the Annex for further details on the choice of impact metrics.

Estimating the impact of the vanguard

We used the Generalised Synthetic Control (GSC) method to estimate the impact of the vanguard initiatives on emergency hospital use.[15] This method imputes synthetic controls (or counterfactuals) for each treated unit (GP practice) by combining information from a control group of similar units in a regression model.

For each treated GP practice, the impact of the vanguard on a given outcome was estimated by the difference between its observed values in the follow-up period and the concurrent synthetic control values generated by the GSC model. CCG-level estimates of the impact of the vanguard were obtained by averaging the differences across all GP practices belonging to each CCG. Estimates of the impact of the vanguard in each financial year were calculated by averaging the estimates derived across all months in the financial year.

* Type-1 emergency departments are consultant-led 24-hour services with full resuscitation facilities.

Risk adjustment

We applied model-based risk adjustment to account for time-varying differences in the (observed) characteristics of GP practice populations and patients admitted to hospital. We used different sets of risk adjustment variables depending on the impact metric. The GSC method offers some protection against bias from unobserved time-varying factors. Where such factors were identified by the models, we checked their plausibility.

Sensitivity analyses

When designing this evaluation, we made certain choices, for example the length of the pre-intervention period (2 years); what variables to include in the risk adjustment and the number of GP practices to use in the control group. We performed sensitivity analyses to check the robustness of our findings with regard to these choices.

Sensitivity analyses confirmed that our findings were robust to changes in the duration of the pre-intervention period, the timing of the intervention start date, the composition and size of the control groups used to create the synthetic controls, and the use of risk adjustment.

Results

Figure 1 shows the estimated impact of the vanguard on emergency hospital use by the NEHF population in each year of the follow-up period. This 'forest plot' shows a point estimate (marker) and 95% CI (horizontal line) for the difference between the treated NEHF population and its synthetic control for each of the impact metrics. If the marker is to the left of the vertical grey line at zero, then hospital use in the NEHF population was lower than in the synthetic control area and vice versa. These estimates are reported numerically in Table 1.

Figures 2–7 show trends in emergency hospital use for both NEHF (red line) and the synthetic control area (blue line). The two lines should ideally follow a similar path in the pre-intervention period (to the left of the grey vertical line), as we aimed to build synthetic control areas that tracked the hospital use of the NEHF population over this period. We checked that this was the case statistically, and all metrics passed the test. The difference between the two lines in the follow-up period (to the right of the grey vertical line) provides an estimate of the impact of the vanguard.

When reviewing the time-series charts it is important to remember that the synthetic control line is an estimate generated from a statistical model. For reasons of readability CIs are not shown in the figures, but this means we must be careful not to attach too much significance to small differences between values in the treated area and the synthetic control area. Trends for NEHF will typically appear more volatile than those for its synthetic control, because there are only around 20 GP practices in NEHF, but 200 GP practices in the control group.

Figure 1: Risk-adjusted estimated impact of the vanguard on emergency hospital use in the NEHF population aged 65 years and older, August 2015 to February 2020. A&E attendances and admissions metrics are rates per 10,000 persons per month; length of stay is days*

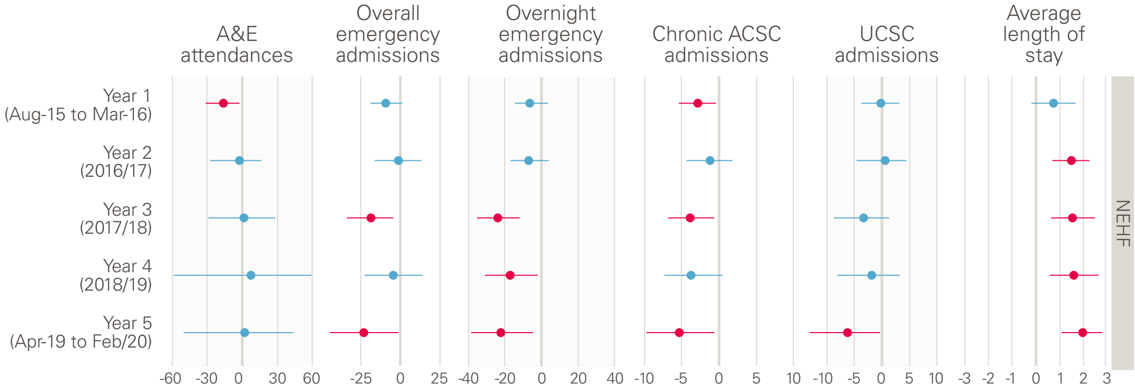


Table 1: Risk-adjusted estimated impact of the vanguard on emergency hospital use in the NEHF population aged 65 years and older, August 2015 to February 2020. Rates are per 10,000 persons per month†

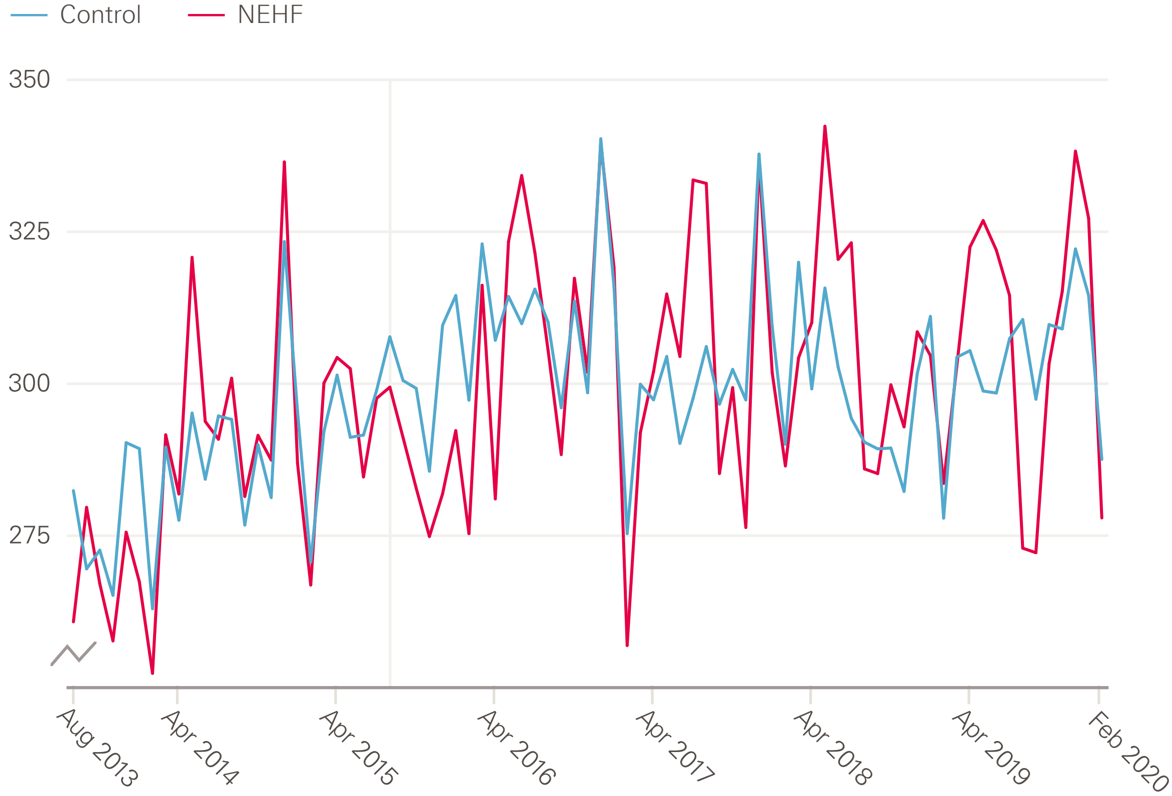
Impact metric	Year 1 Aug-15 to Mar-16	Year 2 2016/17	Year 3 2017/18	Year 4 2018/19	Year 5 Apr-19 to Feb-20
A&E visits (rate)					
Difference	**-15.4 (-30.8 to -1.3)**	-1.3 (-27.3 to 17.6)	2.4 (-28.1 to 29.7)	8.4 (-58.2 to 60.4)	2.9 (-49.5 to 44.7)
Relative difference (%)	**-5.1 (-9.6 to -0.5)**	-0.4 (-8.2 to 6.1)	0.8 (-8.4 to 10.7)	2.8 (-16.0 to 24.7)	0.9 (-13.8 to 16.9)
All emergency admissions (rate)					
Difference	-8.9 (-18.3 to 1.11)	-1.0 (-15.5 to 12.8)	**-17.7 (-32.3 to -4.1)**	-4.4 (-21.7 to 13.3)	**-22.1 (-42.4 to -1.2)**
Relative difference (%)	-4.2 (-8.3 to 0.6)	-0.5 (-7.0 to 6.6)	**-8.1 (-13.7 to -2.0)**	-2.0 (-9.2 to 6.6)	**-9.8 (-17.2 to -0.6)**
Overnight emergency admissions (rate)					
Difference	-6.3 (-14.8 to 3.7)	-6.9 (-17.0 to 4.1)	**-24.1 (-35.7 to -11.9)**	**-17.1 (-31.1 to -2.1)**	**-22.3 (-38.8 to -4.5)**
Relative difference (%)	-3.7 (-8.3 to 2.3)	-4.1 (-9.6 to 2.6)	**-14.0 (-19.4 to -7.4)**	**-10.1 (-17.0 to -1 .4)**	**-12.9 (-20.5 to -2.9)**
Chronic ACSCs admissions (rate)					
Difference	**-2.7 (-5.3 to -0.3)**	-1.1 (-4.3 to 1.9)	**-4.0 (-6.9 to -0.8)**	-3.4 (-6.9 to 0.8)	**-5.0 (-9.4 to -0.2)**
Relative difference (%)	**-12.6 (-21.8 to -1.6)**	-5.2 (-17.5 to 10.5)	**-17.8 (-27.2 to -4.2)**	-14.8 (-26.5 to 4.4)	**-19.9 (-32.0 to -1.2)**
UCSCs admissions (rate)					
Difference	-0.2 (-3.7 to 3.1)	0.6 (-4.6 to 4.5)	-3.3 (-8.7 to 1.3)	-1.8 (-8.1 to 3.3)	**-5.9 (-12.7 to 0.0)**
Relative difference (%)	-0.4 (-8.0 to 8.0)	1.4 (-9.9 to 11.9)	-8.1 (-18.6 to 3.6)	-4.4 (-16.9 to 8.9)	**-13.5 (-25.2 to 0.0)**
Average length of stay of overnight emergency admissions (days)					
Difference	0.7 (-0.2 to 1.7)	**1.5 (0.7 to 2.3)**	**1.5 (0.7 to 2.5)**	**1.6 (0.6 to 2.6)**	**2.0 (1.1 to 2.9)**
Relative difference (%)	6.7 (-1.5 to 16.3)	**13.7 (5.9 to 22.2)**	**14.4 (5.7 to 25.5)**	**16.0 (5.3 to 29.6)**	**19.9 (10.2 to 33.3)**

* Statistically significant results (p-value<0.05) are shown in red.

† Statistically significant results (p-value<0.05) are shown in bold.

Figure 2 shows that from the second year after the launch of the vanguard, rates of A&E attendances in people aged 65 years and older in NEHF followed a very similar trend to that of the synthetic control area.

Figure 2: A&E attendances in NEHF population aged 65 years and older (rates per 10,000 persons per month)



There was a consistent pattern to the effect estimates for emergency admissions. For all emergency admissions, overnight emergency admissions and the two sub-groups of potentially avoidable admissions (chronic ACSCs and UCSCs) we mostly saw no difference between NEHF and the control area in the first 2 years after the start of the vanguard. However, from year 3 onward we started to see reductions and by year 5 all four admission-related impact metrics were statistically significantly* lower in NEHF compared with the control area (Table 1). Overall emergency admissions in year 5 were 9.8% lower (95% CI: -17.2 to -0.6), which is equivalent to 22 fewer admissions per 10,000 people per month (Figures 3–6 and Table 1).

* The CIs in Table 1 show some of the uncertainty in the results. If the CI does not include 0 (ie no difference between the groups) then we say that the result is statistically significant and that we have a high level of confidence that there is an underlying difference (in this case, a reduction).

Figure 3: Overall emergency admissions in the NEHF population aged 65 years and older (rates per 10,000 persons per month)

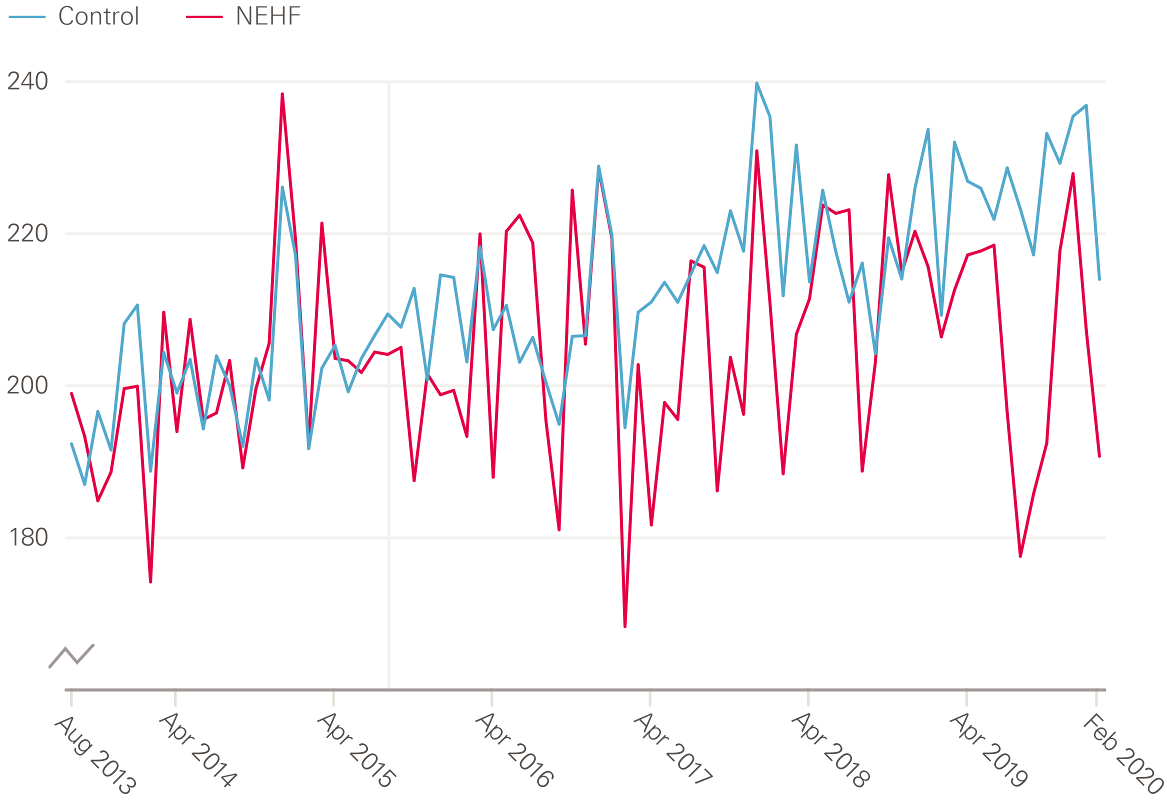


Figure 4: Overnight emergency admissions in the NEHF population aged 65 years and older (rates per 10,000 persons per month)

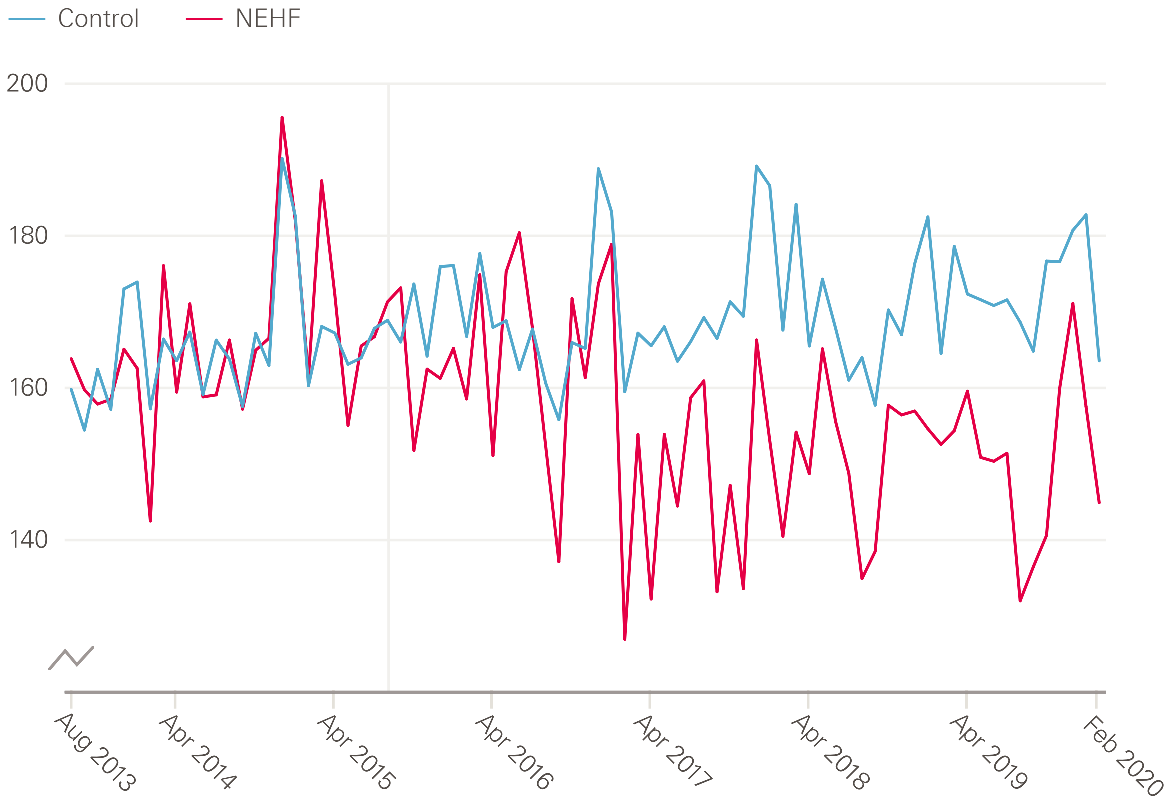


Figure 5: Admissions for chronic ACSCs in the NEHF population aged 65 years and older (rates per 10,000 persons per month)

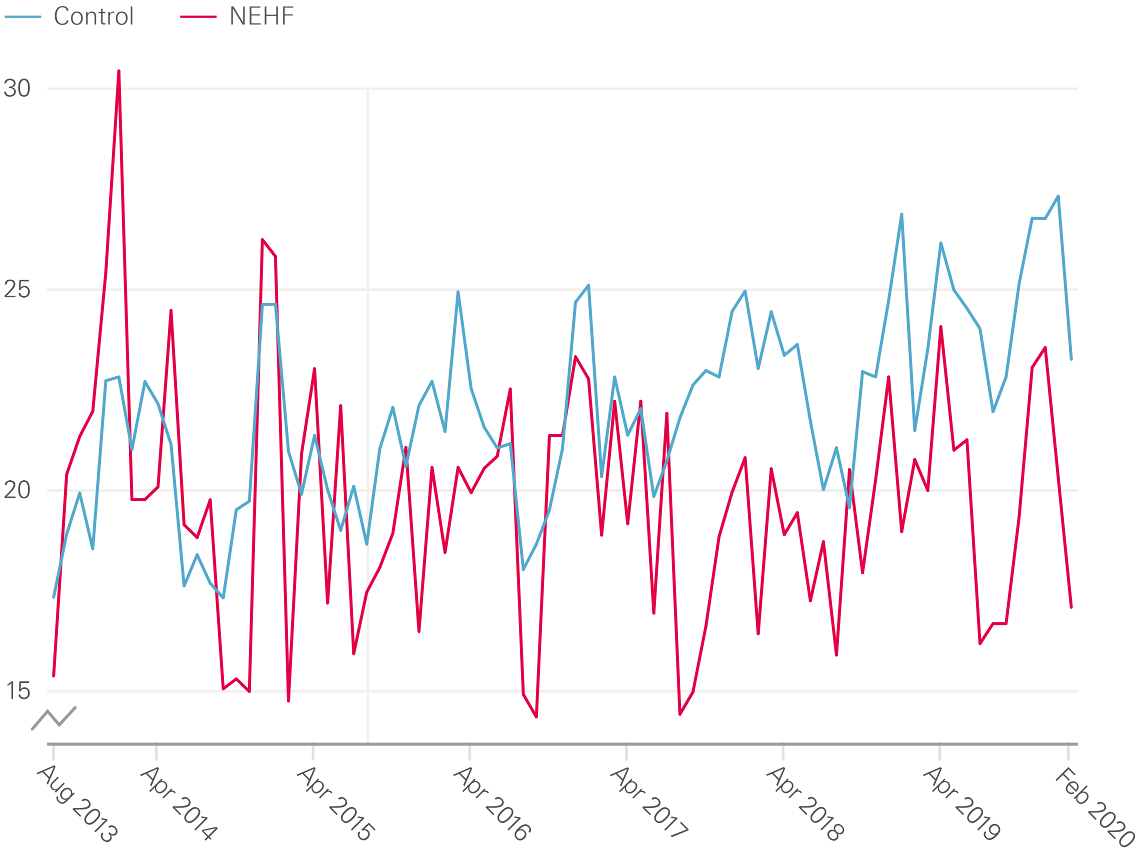


Figure 6: Admissions for UCSCs in the NEHF population aged 65 years and older (rates per 10,000 persons per month)

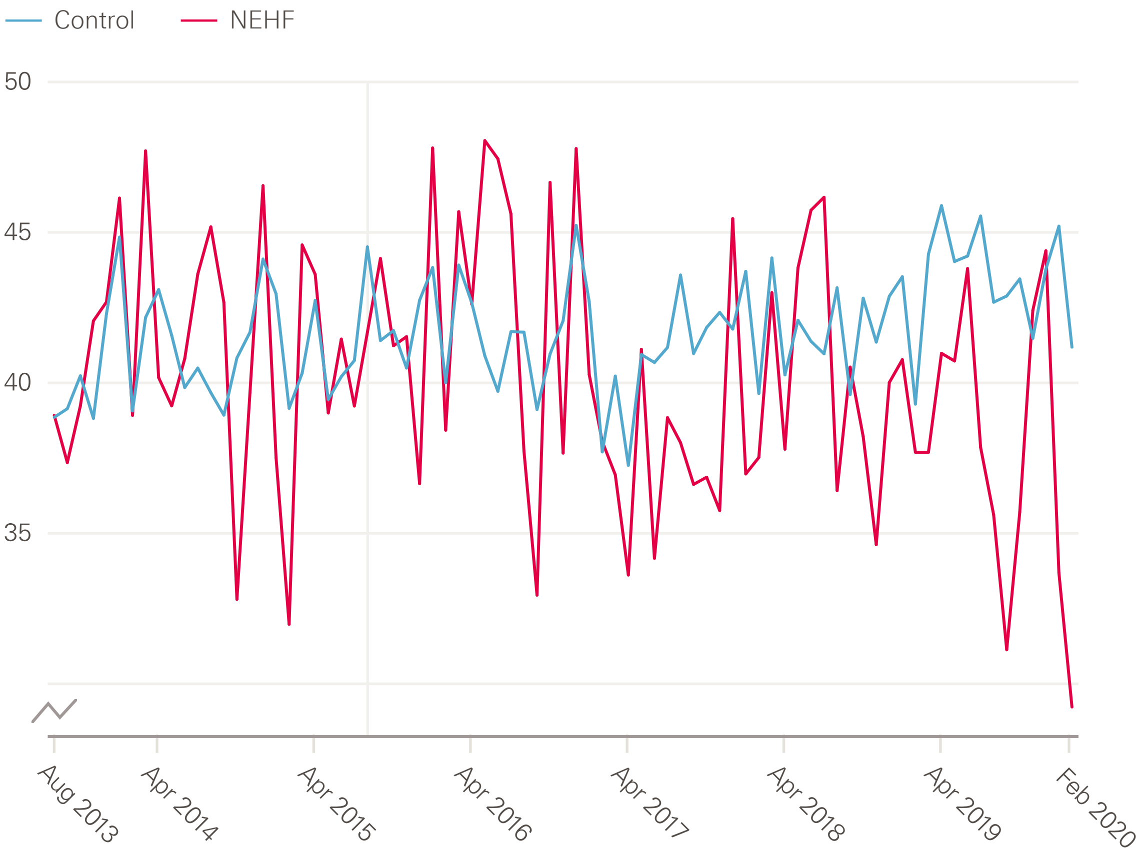
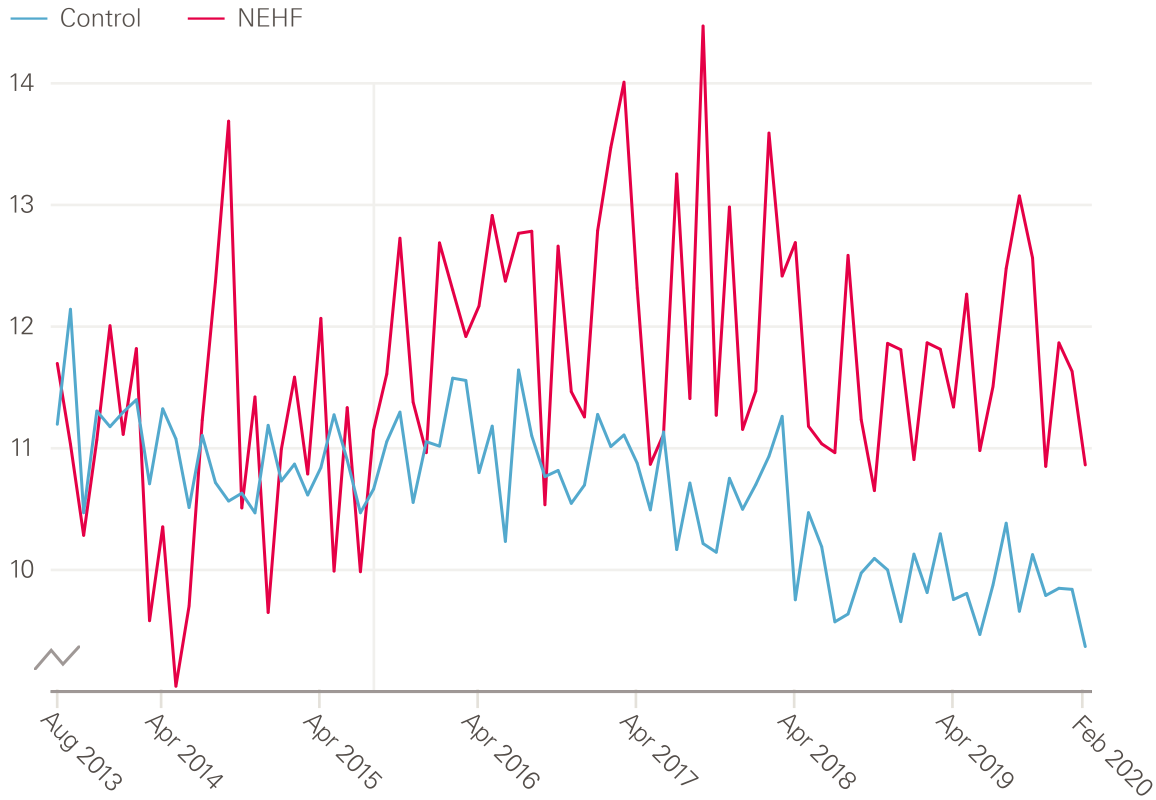


Figure 7 shows that in the 4.5 years following the launch of the vanguard programme, the average length of stay for overnight emergency admissions was consistently higher in NEHF than in the control area. This finding was statistically significant in all but the first year of the follow-up period (see Table 1).

Figure 7: Average length of stay for overnight emergency admissions in the NEHF population aged 65 years and older (rates per 10,000 persons per month)



As a secondary analysis, we examined hospital use in the 18 years and older population. In general, the signs and trends seen in effect estimates for this population were consistent with those for the 65 years and older cohort. For both age groups, we started to see reductions from year 3 of the follow-up and by year 5 all four admission-related impact metrics were significantly lower in NEHF than in the control area. A table showing the results for the 18 years and older cohort is included in the Annex.

Interpretation of findings

We found that the set of initiatives enabled by the vanguard was associated with lower emergency admissions (compared with the control area) from year 3 of the follow-up onwards, and by year 5 all four admission-related impact metrics were significantly lower in NEHF than in the control area. However, we found no lasting association between the introduction of the vanguard and a change in A&E attendances, and average length of stay for overnight emergency admissions was consistently higher in NEHF than in the control area.

A previous IAU study evaluating the effect on the hospital use of patients cared for by the ICTs in the first 2 years of implementation found that they experienced more A&E attendances and emergency admissions than their comparison group, possibly as a result of previously unmet need being identified by the ICTs.[13]

Our findings broadly align with the findings from a similar recent study that looked at the effect of new models of integrated care on hospital use across 23 vanguard sites, including NEHF.[9] The study reported a significant reduction in emergency admission rates in the third year after implementation, but found no change in total hospital bed-days over a 3-year follow-up period. A long-term study of the effect of an integrated care transformation programme in Mid-Nottinghamshire showed a delayed effect on hospital use, with reductions seen in A&E attendances and emergency admissions, but not until 5–6 years after the start of the programme.[10]

We found no lasting association between the introduction of the Vanguard and a change in A&E attendances. This is at odds with our finding of statistically significant reductions in overall emergency admissions, overnight emergency admissions, and admissions for chronic ACSCs and UCSCs. Typically, patients presenting at A&E account for around 75% of all emergency admissions, with most of the remainder admitted directly following an urgent request from a GP.[16] One possible explanation is that admission thresholds may have changed differentially in NEHF, compared with the control area. Estimated odds of admission into a hospital in England via A&E, adjusted for patient case-mix, decreased between 2010 and 2015 with the development of ambulatory emergency care noted as a possible contributory factor.[17] Frimley Park Hospital, the main hospital serving the NEHF population, opened an ambulatory emergency care unit in November 2016. The unit aims to provide emergency care and discharge patients on the same day, thereby avoiding unnecessary admissions to hospital wards. However, according to the local team, admissions to the ambulatory emergency care unit in Frimley Park Hospital were recorded in the SUS data as emergency admissions, and so this would not directly explain the lower emergency admissions seen in our study. The unit may, however, have contributed to lower overnight emergency admissions.

The average length of stay in hospital for overnight emergency admissions was consistently higher in NEHF than in the control area. One possible explanation is that the lower rates (relative to the control area) of overnight emergency admissions seen in NEHF were achieved by primarily avoiding admissions for less serious conditions that would have resulted in short lengths of stay. This would have the effect of increasing the average length of stay among the remaining cohort of patients.

In general, the signs and trends seen in effect estimates from the secondary analysis of the 18 years and older cohort were consistent with those for the 65 years and older cohort. While the absolute effect sizes were lower in the 18 years and older group, the relative effect sizes for the two different age cohorts were of a similar scale, reflecting the difference in background rates between the age groups. This suggests that the range of initiatives rolled out in NEHF successfully targeted both younger and older people.

Strengths and limitations

This is an observational study and, as such, cannot provide proof of causation. Nonetheless, robust statistical methods were used to estimate a causal effect. We used the GSC method to create the counterfactual that has been shown to perform favourably on routine health data.[18] The GSC method allows the researcher to adjust for observed factors, while also offering some protection against bias from time-varying unobserved factors. We performed standard model checks and conducted a range of sensitivity analyses. Further technical details can be found in the statistical analysis protocol for this evaluation.[14]

We used administrative data to carefully construct an artificial comparison area (our counterfactual) to contrast what happened in NEHF with 'what would have happened' in the absence of the vanguard programme. Only GP practices with similar characteristics to those belonging to NEHF CCG contributed to the comparison area.

Control practices were selected from all over England, which limited the impact that a major event or 'shock' specific to any one area could have on our findings. However, the possibility that an event (or series of events) impacted treated and control practices differently in the follow-up period cannot be ruled out. Furthermore, as this is an observational study, we cannot completely rule out the possibility that our findings were affected by unobserved differences between the NEHF population and the control areas.

We performed multiple statistical tests using the same dataset on combinations of outcomes and time. As the number of comparisons increases, the likelihood of observing at least one significant result increases, even in the absence of an underlying difference.

The study follow-up period was artificially curtailed due to the COVID-19 pandemic and its distorting effect on hospital activity. It is not clear what, if anything, we might have learnt from a longer follow-up period.

We used data sourced from a national, individual-level database and constructed our impact metrics to fit, as far as possible, with activity groups where we were confident in the consistency of recording. However, we know that some types of activity, such as same day emergency care, are not always recorded consistently.

The scope of this evaluation is limited to the impact of the vanguard programme on hospital use. Therefore, we are unable to report on the possible effects of the vanguard programme on other important aspects of patient care (eg quality of clinical care, patient satisfaction or quality of life), as these metrics are not routinely recorded, or health service performance (eg cost-effectiveness).

This study was based in a single health economy that introduced a specific set of initiatives over several years. As such, the findings are not readily generalisable to other areas in England.

Conclusion

This evaluation looked at the impact of a set of integrated care initiatives on the emergency hospital use of patients living in NEHF between August 2015 and February 2020. This extended follow-up period allowed us to track impacts that may have taken several years to materialise.

We found that the set of integrated care initiatives implemented in NEHF were associated with lower emergency admissions (compared with the control area) from year 3 of the follow-up and by year 5 overall emergency admissions, overnight emergency admissions, as well as admissions for both chronic ACSCs and UCSCs were all significantly lower in NEHF, compared with the control area. This was true for both age groups, with relative effect sizes similar for both the 65 years and older population and the 18 years and older population. However, we found no lasting association between the vanguard initiatives and a change in A&E attendances, and average length of stay for overnight emergency admissions was consistently higher in NEHF than in the control area.

The evidence from this and other recent studies looking at the long-term impact of integrated care programmes in different areas of England[9,10,19] suggests that integrated care programmes are unlikely to reduce emergency hospital use in the short term.[1] Over a longer period, they may have the potential to reduce some aspects of emergency hospital care, but as seen in NEHF this is likely to require several years at least. Therefore, while acknowledging there may be other possible benefits to patients and staff from these programmes, they should not be considered as a means to reduce hospital resources, especially in the short term.

Annex

Specification of impact metrics

The statistical analysis protocol for this evaluation was completed before the analyses were conducted.[14] During the analysis phase, we deviated from the protocol by altering the specification for some of the impact metrics. All decisions were made before viewing the results for the revised metrics.

1. The A&E attendances outcome was limited to include only visits to type-1 emergency departments.
2. Overnight emergency admissions were added as a new impact metric alongside overall emergency admissions.
3. The average length of hospital stay metric was limited to only overnight emergency admissions.

Our decision to alter the A&E attendances metric arose from a concern relating to the consistency of recording of urgent treatment centre (UTC) activity. UTCs, also known as type-3 emergency departments, treat minor injuries and illness requiring urgent treatment and are an alternative to major (type-1) emergency departments. However, activity in UTCs has not always been recorded consistently and is sometimes missing from national datasets. During the time of the study there were no UTCs receiving patients in NEHF.

The decision to look at overnight emergency admissions, as well as overall emergency admissions, arose from concerns relating to the recording of same day emergency care (SDEC) activity. In recent years, SDEC admissions have increased substantially across England. However, in some instances, this very short-stay activity is not always coded as an admission, and therefore may not appear in the admitted patient care dataset used for this study. These same concerns also led us to limit the average length of hospital stay indicator to only overnight emergency admissions.

Results for 18 years and older population

Table A1. Risk-adjusted estimated impact of the vanguard on emergency hospital use in the NEHF 18 years and older population, August 2015 to February 2020 (rates are per 10,000 persons per month)*

Impact metric	Year 1 Aug-15 to Mar-16	Year 2 2016/17	Year 3 2017/18	Year 4 2018/19	Year 5 Apr-19 to Feb-20
A&E attendances (rate)					
Difference	-8.2 (-15.4 to 2.5)	-3.6 (-14.6 to 9.1)	-4.4 (-17.2 to 6.9)	-6.7 (-26.5 to 14.1)	-6.1 (-23.3 to 12.1)
Relative difference (%)	-4.0 (-7.2 to 1.3)	-1.7 (-6.6 to 4.6)	-2.1 (-7.8 to 3.5)	-3.1 (-11.2 to 7.2)	-2.9 (-10.2 to 6.3)
All emergency admissions (rate)					
Difference	-1.4 (-4.7 to 2.9)	-0.1 (-4.6 to 4.6)	**-6.8 (-12.2 to -1.4)**	-1.4 (-8.7 to 5.4)	**-11.7 (-20.0 to -2.2)**
Relative difference (%)	-1.6 (-5.2 to 3.4)	-0.1 (-4.9 to 5.5)	**-7.2 (-12.1 to -1.6)**	-1.4 (-8.4 to 5.9)	**-11.7 (-18.4 to -2.4)**
Overnight emergency admissions (rate)					
Difference	-1.6 (-4.7 to 1.4)	**-4.3 (-7.9 to -0.7)**	**-9.2 (-12.8 to -5.5)**	**-7.0 (-11.6 to -3.0)**	**-9.8 (-15.0 to -5.0)**
Relative difference (%)	-2.6 (-6.9 to 2.3)	**-6.6 (-11.6 to -1.1)**	**-13.8 (-18.2 to -8.8)**	**-10.5 (-16.2 to -4.8)**	**-14.5 (-20.6 to -7.9)**
Chronic ACSCs admissions (rate)					
Difference	**-0.8 (-1.5 to -0.1)**	-0.3 (-1.1 to 0.5)	**-1.1 (-1.9 to -0.1)**	**-1.2 (-2.2 to 0.0)**	**-1.9 (-3.1 to -0.6)**
Relative difference (%)	**-10.6 (-18.9 to -1.3)**	-4.5 (-13.7 to 8.1)	**-14.4 (-22.0 to -1.5)**	**-14.3 (-24.1 to -0.4)**	**-21.6 (-30.8 to -7.5)**
UCSCs admissions (rate)					
Difference	0.2 (-1.0 to 1.8)	-0.9 (-2.5 to 0.8)	**-2.1 (-4.2 to -0.2)**	-1.0 (-3.5 to 1.4)	**-3.8 (-6.4 to -0.7)**
Relative difference (%)	1.0 (-5.1 to 10.0)	-4.5 (-11.9 to 4.7)	**-10.5 (-19.0 to -1.0)**	-4.7 (-15.0 to 7.7)	**-17.4 (-26.1 to -3.9)**
Average length of stay overnight of emergency admissions (days)					
Difference	0.5 (-0.2 to 1.2)	**0.8 (0.2 to 1.7)**	**1.0 (0.3 to 1.9)**	**1.4 (0.7 to 2.2)**	**1.8 (1.2 to 2.6)**
Relative difference (%)	5.7 (-2.2 to 15.1)	**9.6 (2.6 to 21.3)**	**12.2 (3.4 to 25.7)**	**18.0 (7.8 to 31.4)**	**23.9 (14.5 to 36.8)**

* Statistically significant results (p-value<0.05) are shown in bold.

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Dr Stephen O'Neill is Associate Professor of Health economics and econometrics at the Department of Health Services Research and Policy in The London School of Hygiene & Tropical Medicine.

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The Health Foundation
8 Salisbury Square, London EC4Y 8AP
T +44 (0)20 7257 8000
E info@health.org.uk
@HealthFdn
www.health.org.uk

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