Impact of Urgent and Emergency Care Vanguard on Delayed Transfers of Care in England

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Abstract

Objectives: To assess the relationship between Urgent and Emergency Care (UEC) Vanguard, which include as an aim the integration of healthcare and social care sectors, and Delayed Transfers of Care (DTOC) at Local Authority level in England.

Methods: Difference-in-difference and fixed effects panel estimations were used to compare DTOC between UEC partner site Local Authorities with non-UEC Local Authorities employing quarterly data on days of DTOC from Local Authorities in England for the period 2010 to 2017. Robustness checks included employing Ordinary Least Squared (OLS) and synthetic control estimations; differences between the UEC and non-UEC sites were checked prior to the start of the Vanguard.

Results: A statistically significant negative relationship was found between UEC Vanguard and DTOC rates that is robust to various specification checks with no indication of UEC participant sites having lower DTOC rates prior to the start of the initiative.

Conclusions:

UEC Vanguard appear to be associated with 40.5% lower DTOC rates at 1% significance level compared with other English Local Authorities. The empirical evidence indicates a statistically significant impact; however, more research is required to explain the reasons for this relationship.

Keywords:

Delayed Transfers of Care, Urgent and Emergency Care Vanguard,
integration policy

Background

Delayed Transfers of Care (DTOC) is a term used to describe situations where patients are medically fit to be discharged from a hospital to home or further care settings but the process is delayed. DTOC has attracted increased attention from policy makers and health and social care professionals (1), due to recent increases (2), an estimated £820 million annual cost (3), and delayed hospital discharge has been associated with decreased subsequent participation in activities of daily living, frailty, increased age, high comorbidity, cognitive impairment, and dependency (4-10).

Attempts to address the costs associated with DTOC have inspired some innovative policy approaches to integrating social and health care over the last few years, including Better Care Fund (11), Integrated Care Pioneers (12) and recently New Models of Care – Vanguard (13). Vanguard set out to help improve integration of services with five different approaches (13):

- *Acute care collaboration* – link local hospitals to improve clinical and financial viability.
- *Urgent and emergency care* – improve coordination of services and reduce pressure on A&E departments.
- *Enhanced health in care homes* – improve and integrate health, care and rehabilitation services for older people in care homes.
- *Multi-speciality community providers* – move specialist care into the community from hospitals.
- *Integrated primary and acute care systems* – join up GP, hospitals, community and mental health services.

This paper examines the relationship between Urgent and Emergency Care (UEC) Vanguard and DTOC rates specifically, since discharge planning from acute care was identified as one of the challenges by the UEC Vanguard (14). Since DTOC may be directly affected by the effectiveness of communication between health and social care providers, DTOC rates may be a useful proxy for some aspects of integration. DTOC has previously been used as a criterion for evaluating the success of health and social care integration policy initiatives (15).

To date, research related to DTOC is somewhat scarce. Most research considers challenges related to the discharge of older people: appropriate future support, suitable discharge destinations, and how policies are put into practice (16-19), and how lack of social care supply may increase DTOC (20). Concerns over the integration of services in general are also considered (21, 22). As part of a wider study examining the role of social care in DTOC (23) we examined the link between UEC Vanguard and DTOC rates.

Methods

Data were collected for 150 English Local Authorities (here onwards – LAs, excluding City of London and Isles of Scilly) for the time period between 2010 quarter 4 and 2017 quarter 4 (150 LAs, 29 quarters, 4,350 observations). The model specification built on that developed in Roland et al. (24) with minor adjustments:

$$DTOC_{it} = \alpha + V_{it}\beta_1 + C_{it}\beta_2 + u_{it} \quad (1)$$

Where the dependent variable $DTOC_{it}$ is expressed either as number of DTOC days or as its natural logarithm. Subscript i indicates a Local Authority, t time, in quarters and α is a constant. The UEC Vanguard took effect in August 2015 (quarter 3) and included 29 Local Authorities as partners (13). Vanguard partners were identified using the dummy variable V_{it} (1 = after implementation, 2015 quarter 3, 0 = before or not this Vanguard partner), and β_1 is the coefficient of interest for the analysis, showing the effect of the UEC Vanguard on DTOC. Finally, C_{it} is a vector of control variables.

The analysis controlled for the following factors associated with LA-level DTOC: demographics and needs (carer's allowance, disability living allowance, total population in LA, and percentage of population above 65 years old), LA structure (type, size in square metres, percentage of people living in rural areas, the number of Clinical Commissioning Groups (CCGs) each LA interacted with, and care home bed supply), economic variables (jobseeker's allowance, pension credit, house prices, percentage of older people who own houses with mortgages, and percentage of older people who own houses outright). Further details of the data are available in Appendix Table A1.

Both OLS and fixed effects specifications of the model were estimated (25, p. 285). All regressions used cluster-robust standard errors centred at LAs and year dummies for each year since 2010. Total number of days of DTOC and its natural logarithm were both used as the dependent variable, the latter was preferred because of the skewed distribution of DTOC. A Hausman test found that fixed effects specifications was preferred to random effects, although results with the latter specification were comparable.

Synthetic control estimations (26-27) were run as robustness checks, to create a control unit that matched the main characteristics of the treated unit (i.e. derived average of all UEC Vanguard partner sites). This allowed for a more credible prediction of the counterfactual, and was created using characteristics of local authorities that were not UEC Vikings.

Results

[Table 1]

Descriptive statistics

Table 1 gives descriptive statistics. From the last quarter of 2010 to the last quarter of 2017, the average number of DTOC days was 2,755 per English LA per quarter. 6.7% of the sample observations were UEC Vanguard partner sites.

[Figure 1]

Figure 1 compares average number of DTOC days (ratio to LA population) per quarter for LAs in UEC Vikings compared to those not in UEC Vikings. The increase in DTOC days for LAs in UEC Vikings was lower.

Fixed effects panel regression

Table 2 reports the main results from OLS and fixed effects panel regression estimations in column 1. The relationship between the UEC Vikings and DTOC is consistently negative and statistically significant. In the preferred specification, UEC Vikings are associated with 40.5% lower DTOC rates at 1% significance level (95% confidence interval: 22.4 – 58.5%). Reduction in DTOC is larger when estimated with fixed effects (FE) than with OLS (1063

days vs. 863 and 40.5% vs. 25.3%). This is likely due to FE accounting for differences between panel units over time, separating and capturing the relationship with UEC better.

[Table 2]

Robustness checks

Table 2 also presents some of the robustness checks we employed. One of the possible interpretations for the observed results may be that sites participating in UEC Vanguard could have been selected based on better DTOC rates. There is no publically available information of specific selection criteria so we tested for this running the model (1) using two modifications:

a) without identifying the start of the UEC Vanguard, checking for an overall difference between UEC participating sites and others over the entire period of time of data (column 2);

b) using only data prior to 2015, the start of the initiative (column 3).

The findings show there was no statistically significant relationship between UEC Vanguard and DTOC in these alternative specifications that suggests that UEC Vanguard sites did not have lower DTOC rates prior to the start.

[Figure 2]

Figure 2 depicts the predictions of synthetic control estimations. The figure show that since the beginning of UEC Vanguard partner sites had consistently lower average DTOC rates than would be predicted without the Vanguard, and the difference is sizeable (in line with FE). The significant dip in DTOC days just prior to the start of UEC Vanguard suggests that some

form of preparation with regard to integration and DTOC could have taken place in the participating sites.

Discussion

Main findings

Our findings suggest that LAs that were part of UEC Vanguard sites had significantly lower DTOC than non-UEC sites on average. Overall DTOC rates rose substantially in the second quarter of 2015 until the end of 2016, potentially explained by severe cuts to social care (28), however, they rose significantly less in UEC Vanguard sites. We found no evidence suggesting that UEC Vanguard sites had lower DTOC rates prior to becoming Vanguard sites but are unable to rule out the possibility that they might have been in a better position to reduce DTOC, possibly due to other as yet unidentified factors. It is difficult to pinpoint the reasons why UEC Vanguard sites influence DTOC rates and it is likely any explanation lies within other policies and initiatives associated with being in a Vanguard. One potential explanation is the channel shift modelling tool which supports integration of services, communication and cooperation between hospital and community based services (29). Channel shift interventions include planning discharge from time of admission, discharging for further assessment ('discharge to assess') and rapid response services. Consequently, detailed analyses regarding specifics of UEC Vanguard sites should be carried out in future research. Additionally, this analysis does not account for different levels of exposure to UEC Vanguard influence in each LA, and this could be another route of enquiry.

Limitations

We cannot claim the relationship between UEC and DTOC to be causal. There is no publically available information on the criteria of selection into different Vanguard sites, which might inform explanations and analysis. Further work on specific policies used within UEC Vanguard sites, including qualitative analysis and exposure levels to UEC Vanguards by LA, could help untangle potential reasons for the association between UEC Vanguards and DTOC.

Conclusions

The introduction of the UEC Vanguards seems to be related to significantly lower DTOC for UEC partner sites, highlighting important implications for the National Health Service and social care, alongside individuals discharged from hospital. However, it is difficult to isolate the impact of the UEC Vanguards from other Government integration policies, together with the austerity climate facing the care sector.

Abbreviations

UEC: Urgent and emergency care vanguard;

DTOC: delayed transfers of care;

OLS: Ordinary least squares;

LA: Local Authority;

CCG: Clinical Commissioning Group;

FE: Fixed effects panel regression model.

Declarations

Ethics Approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

GM conceived the statistical methodology, performed the statistical analysis and drafted the manuscript; KJ contributed to the conception, study design and the final writing of this paper; SA contributed to the study design,

statistical methodology and the final writing of this paper; DR contributed to the statistical methodology and the final writing of this paper; YB critically revised the draft and contributed to the final writing of this paper; KB critically revised the draft and contributed to the final writing of this paper; KG critically revised the draft and contributed to the final writing of this paper.

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[Appendix]

Tables and Figures

Table 1: Descriptive statistics

Variable	Mean	Min/Max
Dependent variables:		
DTOC days	2755.394	0/26733
DTOC(log)	7.438	0/10.194
Explanatory variables:		
UEC Vanguard	0.067	0/1
JSA ratio	0.026	0.001/0.09
PC ratio (65+)	0.235	0.062/0.691
CA ratio	0.011	0.004/0.027
DLA ratio (65+)	0.087	0.025/0.257
Care home beds (log)	7.553	5.451/9.461
Population (log)	12.598	10.519/14.257
Population 65+ ratio	0.166	0.06/0.286
Rural or hub (%)	17.507	0/100
No. CCGs to LA	5.660	1/21
House prices (£, log)	12.343	11.443/14.62
Owning house ratio (65+)	0.075	0.013/0.126
Owning house outright ratio (65+)	0.069	0.011/0.115
Area(m ²)	86839.430	1213/803761
CCG dummy	0.655	0/1
LA type:		
Metropolitan	0.240	0/1
London	0.213	0/1
County	0.180	0/1
Year:		
2010	0.034	0/1
2011	0.138	0/1
2012	0.138	0/1
2013	0.138	0/1
2014	0.138	0/1
2015	0.138	0/1
2016	0.138	0/1
2017	0.138	0/1
No of obs.	4,350	

Figure 1: Average DTOC days over time

Note: UEC Vanguard partner sites include 29 LA's (12).

Table 2: Relationship between UEC Vanduguards and DTOC

Estimation method	Dependent variable	1)	2)	3)
OLS	DTOC (days)	-862.935*** (284.705)	-322.209 (243.911)	180.772 (218.522)
	DTOC (log)	-0.253*** (0.088)	-0.047 (0.079)	0.132 (0.095)
Panel regression, FE	DTOC (days)	-1063.251*** (253.854)	-	-
	DTOC (log)	-0.405*** (0.091)	-	-
Number of observations		4350	4350	2550

Note: Columns: 1) Main specification, exploring effects of different estimators and expressions of the dependent variable, main result in bold; 2) UEC Vanguard sites are identified with a binary variable without distinguishing the starting point of this Vanguard; 3) same as 2) only using sample prior to 2015.

Other variables included in the estimations but not in the table above include LAs' demographics, structure, benefits, other economic variables and year dummies, specified in Methodology section; more details of variable construction available in the Appendix.

Robust standard errors in parentheses.

‘-’ variable omitted due to collinearity.

*** - $p < 1\%$, ** - $p < 5\%$, * - $p < 10\%$

Figure 2: Synthetic control estimations

Appendix

Table A1: Definition of variables

Variable	Explanation	Frequency	Source
Dependent:			
DTOC (days)	Number of days any patient experienced delayed discharge from hospital	Q	NHS/E
DTOC (log)	Natural logarithm of DTOC(days)	Q	NHS/E
Explanatory:			
UEC Vanguard	1 if one of 29 LA's participating in this Vanguard and it is onwards and after 2015 quarter 3, 0 – otherwise	F	NHS/E
Care home beds(log)	Natural logarithm of the number of care home beds available in the LA	A	CQC
CA Ratio	Percentage of all population that receives Carer's Allowance	Q	ONS
DLA Ratio(65)	Percentage of older population (65+ years) that receives Disability Living Allowance	Q	ONS
JSA Ratio	Percentage of all population that receives Jobseeker's Allowance	Q	ONS
PC Ratio(65)	Percentage of older population (65+ years) that receives Pension Credit	Q	ONS
Population(log)	Natural logarithm of the LA's population	A	ONS
65+ ratio	Percentage of older people (65+) in the population	A	ONS
House prices(log)	Natural logarithm of average house prices in LA	Q	LandReg
Owned house	Percentage of older people (65+) that own a house with mortgage	F	ONS
Owned house (outright)	Percentage of older people (65+) that own a house outright	F	ONS
LA type	Type of Local Authority: Metropolitan, Unitary, London and County	F	Gov
Area	Local Authority's size (m ²)	F	Gov
Rural and hub ratio	Percentage of people living in rural areas and hub towns	F	ONS
CCGs per LA	Number of CCGs each LA is interacting with	F	Gov
CCG dummy	1 – April 2013 onwards, identifies creation of CCG's, 0 – before April 2013	F	Gov

Note: Q – quarterly, A – annual, F – fixed; NHS/E – NHS England, CQC – Care Quality Commission, ONS – Office for National Statistics, LandReg – HM Land Registry's Price Paid Data, Gov – UK government's online service.