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Exploring the system-wide costs of falls in older people in Torbay

Key messages

- One in three people aged over 65, and half of those aged over 80, fall at least once a year (Todd and Skelton 2004). Falls are the commonest cause of death from injury in the over 65s, and many falls result in fractures and/or head injuries. Falls cost the NHS more than £2 billion per year and also have a knock-on effect on productivity costs in terms of carer time and absence from work (Snooks *et al* 2011). With the number of people aged 65 and over predicted to increase by 2 million by 2021, costs are set to rise further.

- Treatment and rehabilitation for falls patients are often poorly integrated, and one way to help design better services is to look more closely at where the costs of treating patients are incurred across health, community and social care services.

- This paper uses Torbay's unique patient-level linked data set to explore the cost of the care pathway for older people admitted to hospital as a result of a fall by tracking their care costs in the 12 months before and after their fall. This is the first time, to our knowledge, that such detailed analysis of the costs in the health and social care system has been carried out in relation to falls patients in England.
  - On average, the cost of hospital, community and social care services for each patient who fell were almost four times as much in the 12 months after admission for a fall as the costs of the admission itself.
  - Over the 12 months that followed admission for falls, costs were 70 per cent higher than in the 12 months before the fall.
  - Comparing the 12 months before and after a fall, the most dramatic increase was in community care costs (160 per cent), compared to a 37 per cent increase in social care costs and a 35 per cent increase in acute hospital care costs.
  - While falls patients in this study accounted for slightly more than 1 per cent of Torbay's over-65 population, in the 12 months that followed a fall, spending on their care accounted for 4 per cent of the whole annual inpatient acute hospital spending, and 4 per cent of the whole local adult social care budget.

■ We discuss how linked health and social care data can be used and improved in the future to inform policy and practice. In particular, we find evidence of significant under-coding of co-morbidities such as dementia. Addressing this will be critically important in improving quality of care as it will allow better targeting of patients for falls prevention programmes and will ensure the most appropriate treatment and rehabilitation after a fall.

■ The findings strengthen the case for an integrated response for frail older people at risk of falls. However, to allow comparison of different models of care, we need other areas to emulate Torbay's recording and analysis of whole-system data at the patient level.

Torbay and its linked health and care data set

Torbay is a coastal region of Devon with a population of approximately 131,000 (Office for National Statistics 2011). It is characterised as a retirement destination, with a high proportion of older people (23 per cent are over 65, compared with the England average of 16 per cent).

In order to deliver improved services to this population, Torbay has developed a model of integrated care and established the Torbay Care Trust in 2005[1] to provide and commission community health and adult social care services in the region. The Care Trust developed an integrated approach to the delivery of care for older people through multidisciplinary health and social care teams organised in zones based on groups of general practices (Thistlethwaite 2011).

As part of its commitment to understanding the use of health and social care services and to support its integrated care vision, Torbay Care Trust invested in linking its health, community and social care data sets, making it possible to analyse how the cost of services varies for individual patients over time.

We used this data to analyse the care costs of patients admitted to inpatient care as emergencies due to a fall. Our analysis of this data aims to shed light on the experience of Torbay's patients and to provide much-needed comparative information as a benchmark for others as they seek to develop more integrated approaches to care.

Why focus on falls patients?

The last census suggested that 8.7 million people in England were aged 65 and over in 2011 (Office for National Statistics 2011). This figure is set to rise by another 2 million by 2021, by which time the over-85 population is expected to have grown by 40 per cent to around 1.7 million.[2]

About one in three people over 65 fall at least once every year in England, accounting for more than 4 million bed days (Royal College of Physicians 2011). Falls are the commonest cause of death from injury in the over 65s and many falls result in fractures and/or head injuries. Even 'minor' falls can be very debilitating: individuals can lose confidence and become nervous about falling again. This means they may become unwilling to move

about, and as a result become more isolated and more dependent on others. This leads to greater concerns for carers, and an increased likelihood that an individual will need residential care.

Falls in hospital accounted for 324,000 (26 per cent) of all patient safety incidents in hospitals in 2011 (NHS Commissioning Board Special Health Authority 2013). NHS costs associated with fragility fractures, a common outcome of falls in older people, are estimated at more than £2 billion a year (Royal College of Physicians 2011).

The *Commissioning Toolkit for Falls and Fractures*[3] has gathered good practice on falls prevention, and the National Institute for Health and Care Excellence (NICE) guidelines for the prevention of falls have recently been updated.[4]

The experience and costs of falls taking place in the acute hospital setting is monitored and comparatively well researched. But there is very little information, if any, on the many people who fall outside hospital settings or on the system-wide costs of falls. We hope that our analysis will help commissioners across health and social care to better understand the whole-system impact and costs associated with falls.

Data, methods and sample characteristics

Our analysis is based on all those patients in Torbay aged 65 and over who were admitted to hospital as the result of a fall[5] between the beginning of July and end of December 2010. Each of these hospital admissions is defined as the 'core event'.

Table 1 below summarises the characteristics of these 421 patients. The majority were female and aged over 85.[6] Around a third were admitted for major falls,[7] and just under 30 per cent died within 12 months of the core event. The large majority presented with 'injuries' as their primary diagnosis, and many patients had co-morbidities, the most common of which were dementia, hypertensive diseases and diabetes.

Table 1 Characteristics of core event patients

Characteristic	Number	%
Total number of hospital admissions	421	100
Major fall	132	31
Died within 12 months of fall	118	28
Female	288	68
Age: 65–74	56	13
Age: 75–84	147	35
Age: 85+	218	52
Primary diagnosis: injury	296	70
Co-morbidity: dementia	61	14
Co-morbidity: hypertensive diseases	59	14
Co-morbidity: diabetes	54	13

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[3] See: www.bgs.org.uk/index.php?option=com_content&view=article&id=330:fallscommissioningtoolkit&catid=47:fallsandbones&Itemid=307

[4] See: http://publications.nice.org.uk/falls-assessment-and-prevention-of-falls-in-older-people-cg161

[5] International Classification of Diseases (ICD)-10 codes: W00.0–W19.9 in primary or secondary diagnosis. See: www.who.int/classifications/icd/en/

[6] Similar findings have been found for the United Kingdom population as a whole, see Scuffham *et al* (2003).

[7] Based on combination of cost of inpatient stay and Healthcare Resources Group code, ie, directly related to fall/trauma and cost > £3,000.

Our analysis covers the inpatient cost of the core event itself and of the health, community and social care services for the 421 patients in each of the 12 months before and after it. Data was extracted from Torbay's seven linked health and social care data sets, with anonymised personal-level records, for the following types of services:

■ acute hospital care: inpatient, outpatient and accident and emergency (A&E)

■ community care:[8] community hospital inpatient and community health visits

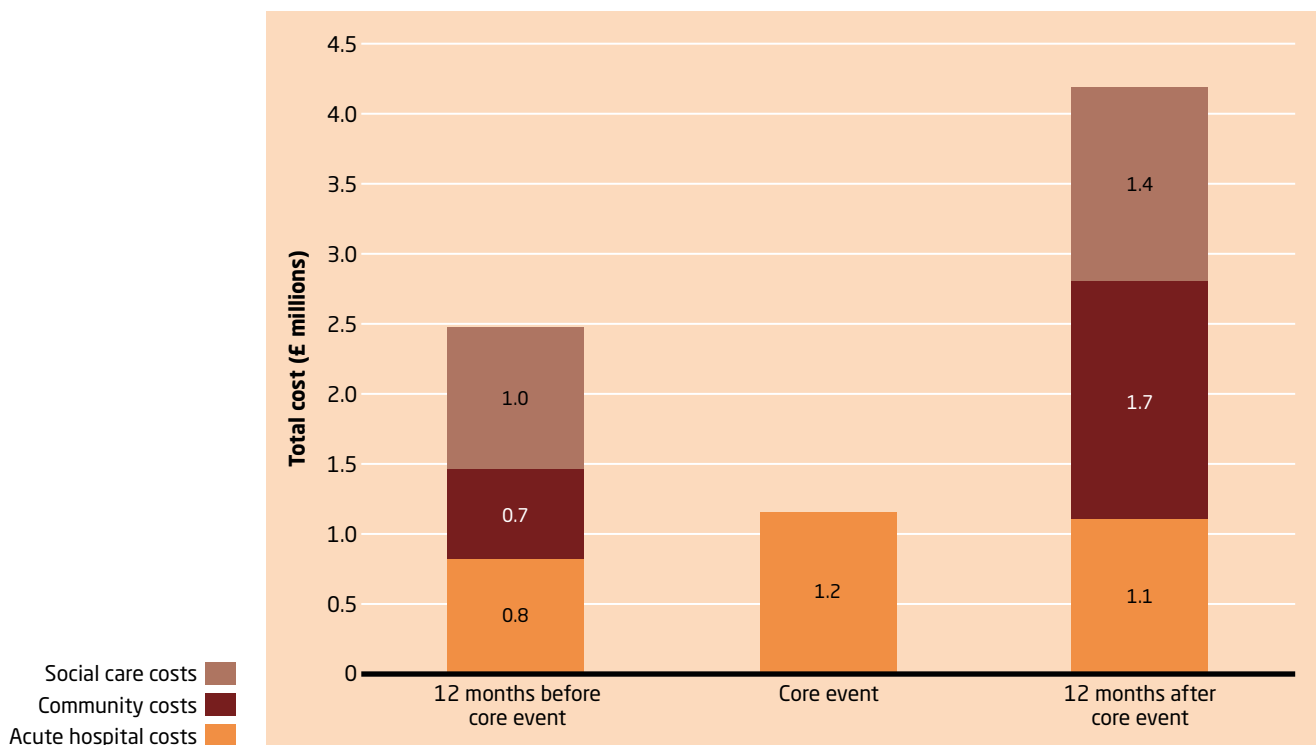■ local authority-funded social care: domiciliary[9] care, day care and care homes.

This analysis does not include the costs of GP services and prescriptions as this data was unavailable. Details of the data we used can be found in the appendix.

Total costs related to falls

Figure 1 below shows the cost of the core event and the wider costs associated with care of those patients in the 12 months before and after the core event.

In the 12 months preceding the fall, the cost of acute hospital, community care and social care for those patients totalled £2.5 million, some of which may have been care related to previous falls. The total costs associated with the fall itself were £1.2 million. In the 12 months following the fall, costs for those patients were £4.2 million across the system, with £1.1 million spent on acute hospital services (an increase of 35 per cent), £1.7 million on community care (an increase of 160 per cent) and £1.4 million on social care (an increase of 37 per cent).

Figure 1 Costs of the core event, and other health and social care costs in the 12 months before and after

Source: All figures are the authors' own, based on data provided by Torbay

[8] In Torbay, community care services were at this time funded by the NHS through the Torbay Care Trust.

[9] Domiciliary care is the service provided to clients in their own home and includes washing, dressing, assistance with meal preparation, and help with other aspects of daily living.

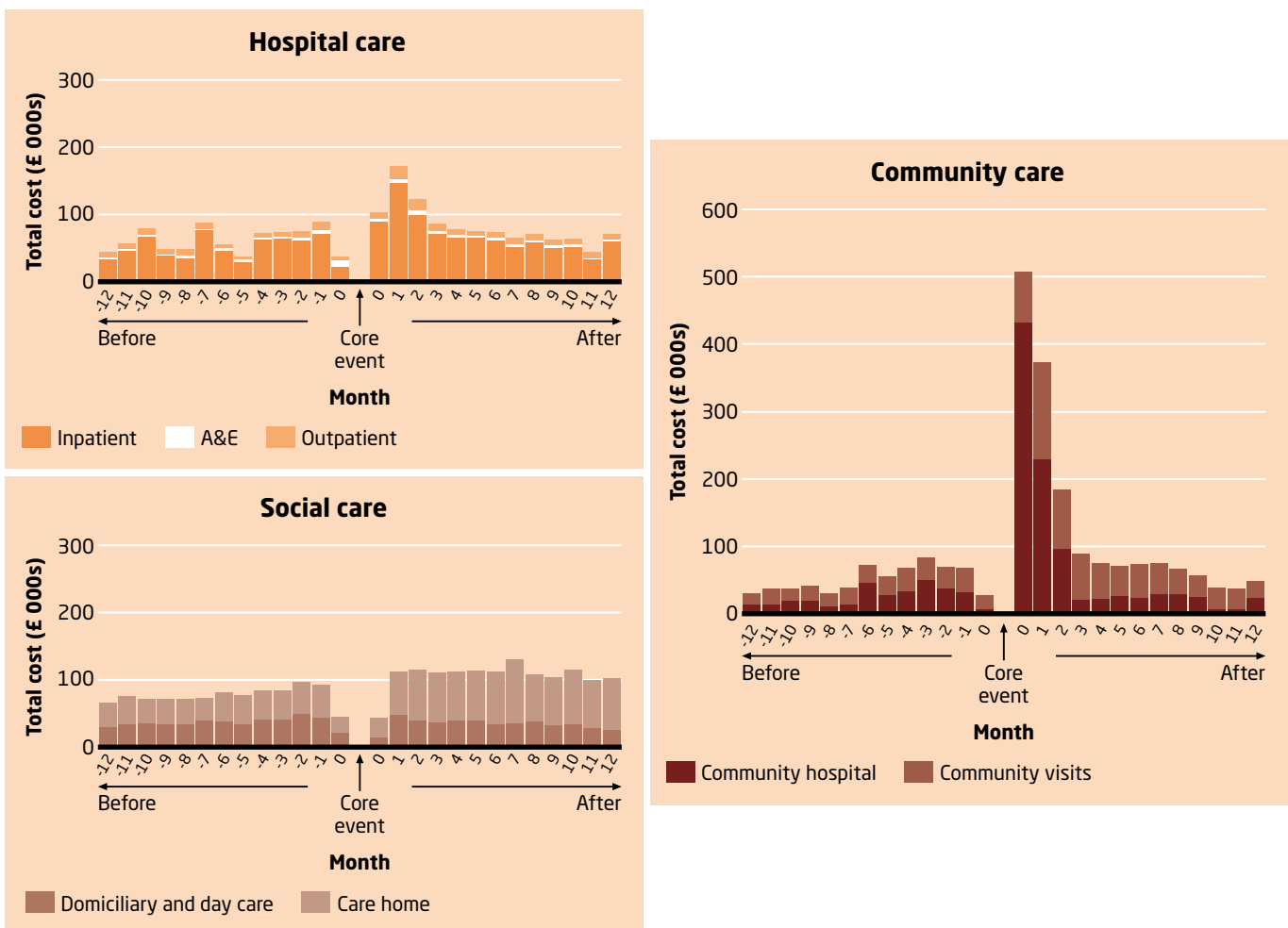## The costs of hospital, community and social care around the core event

Figures 2 (below) to 3 (*see* p 7) unpack these figures further, showing total and average costs per service user each month in the 12 months either side of the core event (ie, excluding the costs of the inpatient admission for the fall itself). We also look at the differential costs for those that survived and those that died in the 12 months following their fall.

Total costs per month

Figure 2 shows[10] that there was an intensive use of acute hospital services and community care services in the short period of time (about three months) following the fall. These costs then decline to a similar level to those before the fall.

For social care services, the pattern is different, with few signs of a peak but with a higher mean cost each month throughout the 12 months after the fall.

Figure 2 Total cost of hospital, community and social care by month in relation to the core events

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[10] Within the month immediately preceding and following the core event, costs are lower than trend across our findings. There are two explanations for this. For hospitals (including community hospitals) activity in the month adjacent to the core event will not add up to a complete month's activity and costs will be represented as lower. We represent this in our figure by two columns labelled month 0, one representing costs within the calendar month before the core event, and one within the month following. For social care and community health visitors, the way that care is paid for, costed and recorded when patients swap settings 'within month' – as they do when admitted for a fall – will lead to costs being split over several settings as opposed to one. Where there are lags in payment, or payments in advance, this will cause dips in the costs claimed in the months adjacent to the core event.

Costs per service user per month

Table 2, below, shows how costs vary per service user in each of the services. It is the most accurate representation of service use since it takes into account the fact that almost one in three people who fell didn't survive to the end of the period and that patients had varied use of services.

Costs for both hospital and social care were relatively stable in the months before and after the fall at around £2,000 per user per month. However, the costs of community hospital inpatient services show much larger variation.

Table 2 Monthly cost of the services per service user

	Inpatient	Outpatient	A&E	Community hospital	Community health visits	Care home	Domiciliary and day care
12 months before the fall							
Mean	**£2,117**	**£113**	**£104**	**£6,529**	**£243**	**£1,386**	**£523**
Min	£1,341	£77	£83	£1,653	£188	£839	£323
Max	£2,934	£173	£116	£10,990	£308	£1,527	£603
12 months after the fall							
Mean	**£2,370**	**£137**	**£119**	**£6,696**	**£375**	**£1,499**	**£535**
Min	£1,764	£104	£91	£3,209	£310	£709	£232
Max	£3,380	£164	£141	£11,525	£552	£1,992	£643

Taken together, Figure 2 and Table 2 show important differences in the patterns of costs across the system that commissioners need to be aware of.

Costs per service user after the fall were highest for community hospital services (£6,696 per month) but very low for community visits (£375 per month) (Table 2). However, although community visits are low cost per user, they are very high volume, forming the backbone of 'aftercare', and so total costs are considerable (Figure 2).
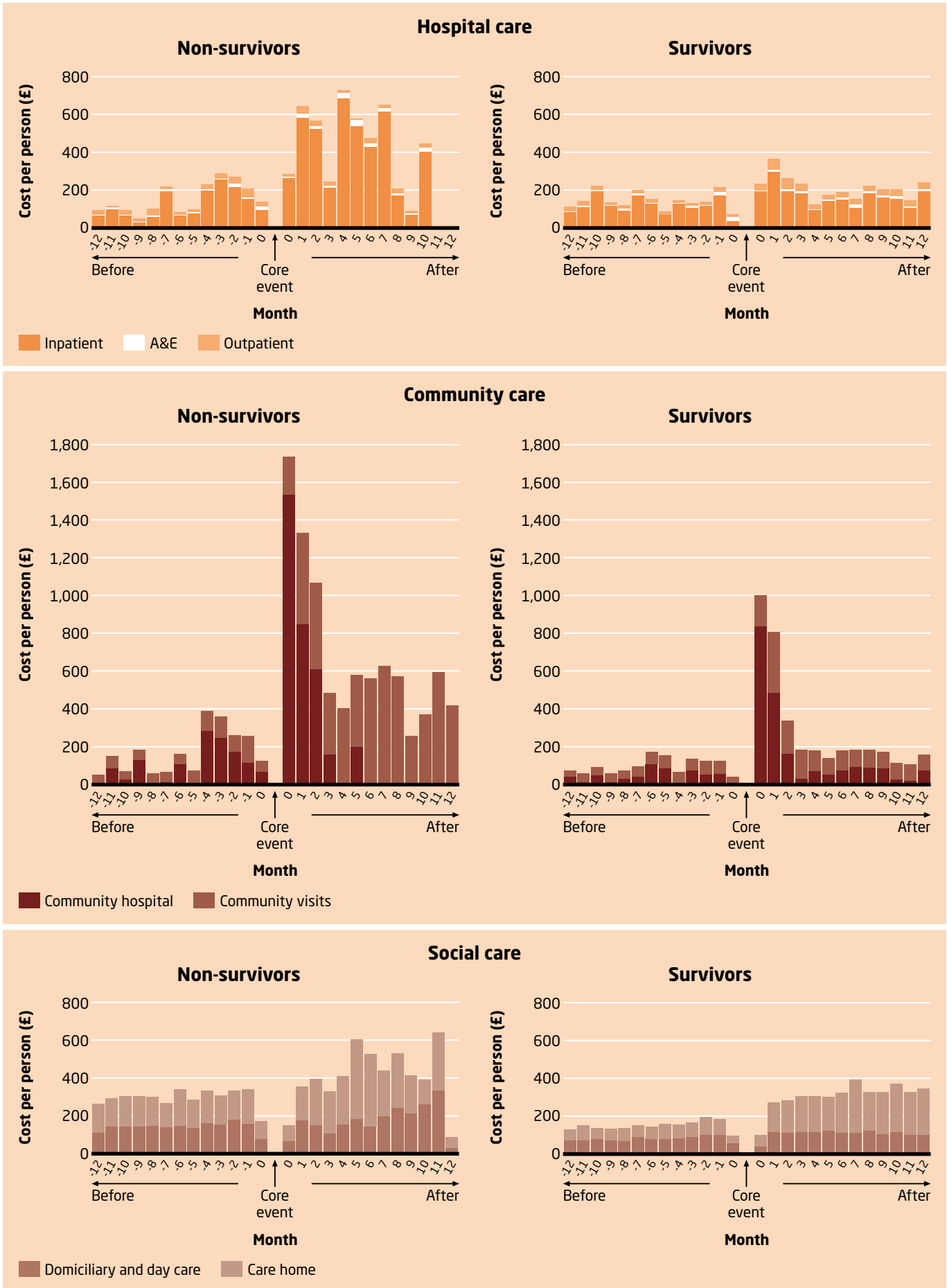
Total costs for acute inpatient and community hospital care tail off in the months after the fall. In contrast, social care costs are sustained (Figure 2), suggesting that patients who survive for more than 12 months after the fall continue to receive increased social care, with associated costs.

Cost differences between survivors and non-survivors

Studies have consistently shown that health and social care costs increase at the end of life (Seshamani and Gray 2004; Bardsley *et al* 2010). We therefore looked at the costs of services separately for those who died within 12 months of a fall and those who survived.

Figure 3, opposite, shows that the costs of acute care, community care and social care are higher for those who died in the 12 months after their fall, compared to those who survived; these are most marked for acute inpatient care, community health visits and domiciliary and day care. In addition, those who died seem to have had, on average, a higher social care cost per person before their fall compared to those who survived.

Figure 3 Cost per person who survived and died within 12 months of the falls

Discussion

This analysis was not designed to test specific hypotheses about the success or otherwise of Torbay's health and care policies. To do that would require an appropriate comparator, either Torbay itself before its focus on integration, or routine or case study data from less integrated health economies elsewhere. Neither of these types of comparator is currently available; we hope that this analysis will encourage developments on this front. It is encouraging to see that NHS England is intending to investigate linking primary care, secondary care and social care data as part of its care.data initiative (Illman 2013).

Nonetheless, these findings do seem consistent with Torbay's decision to focus on integrated care and provide more support in the community. The doubling of community care costs after a fall (Figure 1) seems consistent with a focus on reducing lengths of stay in acute hospital and spending more on community care post-discharge for frail older patients. Torbay also focused on intermediate care and re-ablement services in community care to contribute to reducing reliance on permanent care home placements and minimising ongoing social care costs. Our findings suggest that social care costs do not decline as much as acute and community hospital costs, but without a comparator we cannot judge whether the findings we have are good (in that social care costs would have been even higher) or bad (in that they did not decline).

The majority of the costs of caring for patients after a fall are outside the acute hospital setting; this is perhaps not always recognised by commissioners, because data on costs is never brought together. These findings should help commissioners to assess the ongoing costs of the services provided in community and social care when making more integrated commissioning decisions for this group of patients.

Overall, our analysis shows just how extensive costs associated with falls patients are. For our cohort of 421 patients, more than £5 million was spent on both the care associated with the fall itself and in the year following the fall. While these patients account for slightly more than 1 per cent of Torbay's over-65 population, the sums spent on their care due to the fall and over the next 12 months accounted for about 4 per cent of the whole annual inpatient spending[11] and 4 per cent of the whole local adult social care budget.[12] If falls for this small group of people account for such a noticeable cost across various settings at a time when budgets, at best, are at a standstill it makes the identification and implementation of preventive interventions for falls, and more effective support once individuals do fall, a priority.

Our further investigation of the differential costs for those patients who died and those who survived in the 12 months post fall raise some important questions, particularly whether the information on the difference between survivors and non-survivors in costs before their fall could be used to help identify those in the population who are more likely to die following a fall.

If cost data is to be helpful we need to tackle the major barrier of under-coding of co-morbidities in falls. The majority of patients who fell were females over 85; figures suggest that the prevalence of dementia in that group in the population is one in four (MRC CFAS 1998) and that having dementia doubles the risk of falling (Shaw 2003). It is likely that there were many more patients with dementia in this group than the 14 per cent who were coded as being so in our data. Improving coding of co-morbidities should therefore be a priority for Torbay and for others interested in designing better services for frail older patients at risk of falling.

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[11] Based on The King's Fund analysis of inpatient spending from NHS Comparators, see: www.nhscomparators. nhs.uk/NHSComparators/Login.aspx

[12] Calculation based on figures provided by Torbay.

Conclusions

We have shown how patient-level linked data can be used to understand how costs are distributed across Torbay's hospital, community and social care system for falls patients.

The analysis provides a baseline, against which the impact of further policy and practice changes in Torbay could be assessed.

In February 2012 the Torbay health economy instituted a falls, fractures and bone health clinical pathway group; each month it reviews hospital admissions relating to falls: in the community, in hospital, from care homes and from the ambulance service. This group set up a fracture liaison service that spans primary and secondary care (the first in the country at the time). Staff attend fracture clinics, visit wards, and scrutinise trauma lists and x-ray systems within secondary care. Within primary care, they visit care homes to identify those at risk of fragility fractures and carry out GP audits to identify those patients at risk. The fracture liaison nurses will refer patients for a scan if fit enough, and offer treatment based on NICE guidance.

Our analysis could usefully be repeated to test the impact of the changes and urge others to learn from Torbay's approach to capturing and integrating patient-level health and care data, to enable proper comparison of Torbay's and others' approaches to providing integrated care for our growing population of older people.

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Appendix

The data source is Torbay's locally linked health and social care data set, the Mede system. We analysed cost and activity of health and social care (primary care data is not available) for patients aged 65 and over who were admitted as an emergency admission with falls (ICD 10: W00.0–W19.9) between July and December 2010.

Table 1 Definitions and descriptions of data

Definition	Description
Core event	All inpatient episodes in period 1/7/2010 to 31/12/2010, with ICD10 code of 'Fall' (W00.0–W19.9)
	Where episode = 'unplanned' admission and patient age >64yrs
	Where patient's PCT = TAL (ie, Torbay Care Trust)
	With associated costs of each admission based on HRG (healthcare resource group)
Other inpatient costs	All inpatient episodes for patients included in core event cohort for period 1/4/2007 to 31/1/2012
	Includes both fall and non-fall related diagnoses with associated costs of each admission based on HRG
Outpatient and A&E	All episodes of contact for patients in core event cohort for 1/4/2007 to 31/1/2012
	Categorised by pre/post core event, with associated costs
	With associated costs of each admission based on national tariffs
Community hospital, community health visits, day care and domicillary care, and care homes	All episodes of activity/contact for patient in core event cohort for period 1/4/2009 to 31/1/2012
	Categorised by pre/post core event, with associated costs
	With associated costs based on local tariffs

The 'start date of spell' was used to differentiate pre- and post-core event activities, ie, any activities before the 'start date of spell' were counted as pre-core event and any activities after the 'start date of spell' were counted as post-core event activities.

Following Vu *et al* (2011) we analysed the most common co-morbidities of older people hospitalised for falls-related injuries. All the prevalence of co-morbidities reported was calculated using the 'secondary diagnosis' (up to 12 secondary diagnoses) of the core events. ICD-10 codes used for the conditions are: diabetes E10–14, dementia F00–F03, hypertensive diseases I10–15.

About the authors

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