

# The impact of the Marie Curie Nursing Service on place of death and hospital use at the end of life

*Research summary*

Xavier Chitnis, Theo Georgiou, Adam Steventon and Martin Bardsley

November 2012

## Acknowledgements

We are grateful to Michael Cooke and David Bench of Marie Curie Cancer Care for their assistance with this evaluation, and Xanthe Hannah of the Information Centre for carrying out the data linkage. We would also like to thank Ian Blunt for providing the costed data used in this study, and the peer reviewers for all of their comments, which significantly contributed to the final report.

This report was undertaken by the Nuffield Trust and commissioned by Marie Curie Cancer Care, with rights to independent publication retained by the Nuffield Trust. The views expressed here, and any errors, are the authors' own.

More than half of all deaths in England and Wales occur in hospital, even though most people would prefer to die at home. End-of-life care can improve quality of life, reduce emergency hospital admissions and help more people to die in a place of their choosing. We evaluated the impact of the Marie Curie Nursing Service, comparing a large cohort of people who received the service to a group of matched controls. The evaluation examined whether this home-based nursing care helped more people to die at home, and its impact on use and costs of hospital care at the end of life.

---

### Key Points

- We found that people who received Marie Curie Nursing Service (MCNS) care were significantly more likely to die at home than those who received 'standard' care (matched controls). More than three quarters (76.7%) of those who received MCNS care died at home, while only 7.7% died in hospital. In contrast, 34.9% of the control group died at home while 41.6% died in hospital.
- People who received MCNS care were much less likely to use all forms of hospital care than those in the control group: 11.7% of MCNS patients had an emergency admission at the end of life, compared to 35.0% of controls; while 7.9% of MCNS patients had an A&E attendance, compared to 28.7% of the control group.
- We found significant differences between MCNS patients and controls in the costs of both planned and unplanned hospital care. Total costs of hospital care for those who received MCNS care were £1,140 per person less than for the matched controls from the first contact with MCNS until death. However, this figure should be considered alongside other costs, including the cost of the MCNS and possible impacts on other services.
- The impact of MCNS care in terms of more home deaths and lower hospital use was greater for people without a recent history of cancer. There was also a greater reduction in overall hospital costs among MCNS patients with no history of cancer (£1,475), compared to those with cancer (£1,044).
- These results offer evidence that home-based nursing care can reduce hospital use at the end of life, and help more people to die at home. With an increasingly tight financial climate and a rising number of deaths among the very elderly, our findings provide evidence of the potential benefits of home-based nursing care, and support the case for increasing investment in such services so as to improve care for people at the end of life.

## Introduction

More than half of deaths in England and Wales occur in hospital (Office for National Statistics, 2011), although studies have repeatedly shown that the majority of people would prefer to die at home if possible (Gomes and others, 2010; 2012; Higginson, 2003). With the annual number of deaths predicted to increase by 17% from 2012 to 2030 (Gomes and Higginson, 2008), there will either need to be significant growth in inpatient facilities or a sharp rise in the proportion of deaths outside hospital to cope with this trend.

Towards the end of life, the use of hospital care (and other forms of care) rises very significantly, particularly unplanned admissions (Bardsley and others, 2010; Maddams and others, 2011; Pot and others, 2009; Rosenwax and others, 2011; Van den Block and others, 2007). This hospital activity is expensive and often undesirable to patients and their families.

Palliative care at the end of life aims to prevent and alleviate symptoms, and address people's wider practical and social needs (National Institute for Health and Clinical Excellence, 2011). Palliative and end-of-life care can be provided in a range of settings, including hospitals, hospices, outpatient or community services, and at home. Studies

---

Around **75%**  
of the 470,000 people  
who die each year in  
England would benefit  
from palliative care

---

have suggested that palliative and end-of-life care can allow more people to die at home, improve quality of life, reduce pain and other symptoms, and lower the demand for unplanned hospital care (Alonso-Babarro and others, 2011; 2012; Barbera and others, 2010; Brumley and others, 2007; Gomes and Higginson, 2006; Gómez-Batiste and others, 2012; Lorenz and others, 2008; Serra-Prat and others, 2001; Shepperd and others, 2011; Tamir and others, 2007; Temel and others, 2010). A recent review of funding for palliative care estimated that around 75% of the 470,000 people who die each year in England would benefit from palliative care, while around 90,000 people die each year without access to palliative care (Hughes-Hallett and others, 2011).

Marie Curie Cancer Care (see box on page 5) employs more than 2,700 nurses, doctors and other health and social care professionals in its nine hospices and the Marie Curie Nursing Service (MCNS). The MCNS is staffed by registered nurses and healthcare assistants who provide home-based end-of-life care to around 28,000 people at the end of life annually in the UK. Previous studies have suggested that a high proportion of people who receive care from the service die at home and that it is cost-effective (Higginson and Wilkinson, 2002; Taylor and Carter, 2004). However, no research has directly compared the patterns of service use of people who received MCNS care to others who did not.



The Nuffield Trust was commissioned by Marie Curie Cancer Care to carry out an evaluation of the impact of the MCNS on patient outcomes and hospital usage.<sup>1</sup>

Key questions were:

1. Are people who receive MCNS care more likely to die at home?
2. Does the MCNS reduce unplanned hospital use at the end of life?

### Marie Curie Cancer Care

Marie Curie Cancer Care gives people with all terminal illnesses the choice to be looked after in their preferred place of care at the end of life. The charity's nursing service provides high-quality end-of-life care to make it possible for people to spend their last days at home rather than in hospital.

The Marie Curie Nursing Service provides hands-on care and emotional support for people in their own homes, day and night. The nursing service also provides discharge support to get people home from hospital, integrated health and social care so that patients can be cared for at home, and urgent care to help manage patients' symptoms at home and prevent unnecessary hospital admissions.

The charity has nine Marie Curie Hospices providing specialist care and support for people with terminal illnesses and their families. Each hospice offers inpatient and outpatient care, as well as day services to promote people's quality of life. Additionally, most Marie Curie Hospices offer a variety of community based services.

---

<sup>1</sup> This evaluation focused only on care provided by the MCNS. Therefore, subsequent references in the report to Marie Curie care relate only to the MCNS, rather than to care provided by Marie Curie hospices.

## Methods

We studied 29,538 people who received MCNS care and died between January 2009 and November 2011, and 29,538 controls selected from the population of England who died in the same period. Controls were individually matched to MCNS patients on a range of demographic, clinical and hospital use variables obtained from Hospital Episode Statistics (HES) datasets. We excluded MCNS patients and controls who died in care homes from our analyses. We have previously shown that older people in care homes tend to have lower levels of hospital use than others (Bardsley and others, 2012). Given that the MCNS is not generally available to people in care homes, it would be unfair to compare use of services between MCNS patients that lived at home and controls that were in care homes.

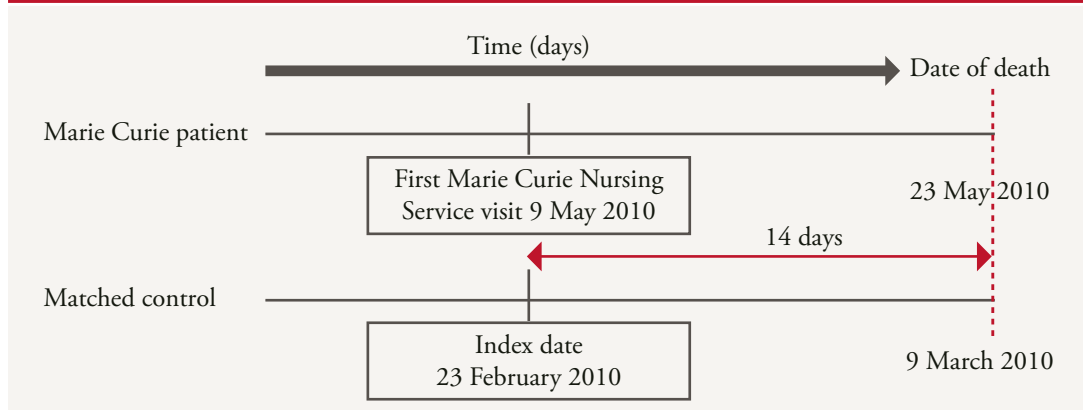
Our key outcome measures were the proportion of MCNS patients and controls that died at home, their level of hospital use, and hospital costs from the index date (Figure 1) until death. We used multivariate regression models to test for differences in the rate of home deaths, hospital use and hospital costs.

We studied  
**29,538**  
 people who received  
 MCNS care, and  
 a similar number of  
 matched controls

Hospital costs were calculated using the 2010/11 Payment by Results (PbR) national tariff (Department of Health, 2010) where applicable. Where no national tariff existed we used 2007/08 Reference Costs<sup>1</sup> adjusted for inflation.

For each MCNS patient the date of their first MCNS visit was taken as the study index date. For the controls it was necessary to calculate an equivalent index date. For each control the index date was based on the time in days between the first MCNS visit and death of their matched case (for example, if the case had their first MCNS visit 14 days before death then the index date for the matched control was 14 days before their death). This process is illustrated in Figure 1.

Figure 1. Process for calculating the index date



<sup>1</sup> Reference Costs are the average unit costs to the NHS of providing specified types of care. They are submitted by NHS providers and form the basis of the PbR national tariff.

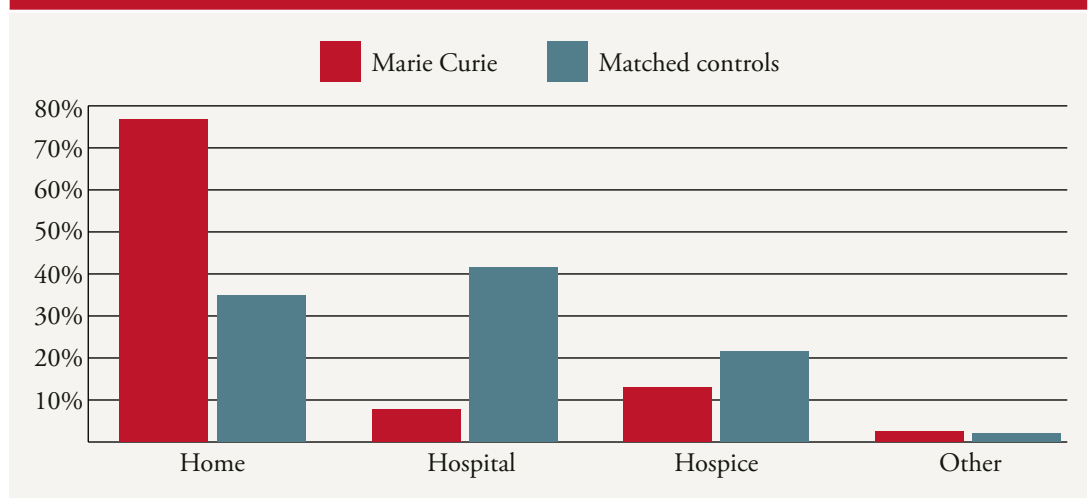
## Results

### Place of death

#### a) Overall

There was a significant difference in place of death between those who received MCNS care and the matched controls: 76.7% of those who received MCNS care died at home, with only 7.7% dying in hospital. In contrast, only 34.9% of the controls died at home, with 41.6% dying in hospital (Figure 2).

Figure 2. Place of death for MCNS patients and matched controls



#### b) History of cancer

In order to investigate if MCNS care had an impact on particular groups of people, we divided the MCNS patients and the controls according to whether or not they had a recent history of cancer: 23.1% of the MCNS patients did not have a malignant cancer diagnosis recorded on a hospital admission in the preceding three years. We found a significant difference between the groups in the effect of MCNS care on place of death. Compared to controls, MCNS patients with no recent history of cancer were significantly more likely to die at home than MCNS patients with cancer (Table 1).

Table 1. Proportion of deaths at home for MCNS patients and matched controls, by history of cancer

Group	Marie Curie	Matched controls	Difference
History of cancer	75.6%	36.7%	38.9%
No recent history of cancer	80.6%	28.6%	52.0%

## Hospital use and costs

### a) Overall

Across all types of hospital activity, people who received MCNS care used significantly less hospital care than matched controls (Tables 2 and 3): 11.7% of those who received MCNS care had an emergency hospital admission after the index date until death, compared to 35.0% of the controls. A similar pattern was seen for elective admissions, and outpatient and A&E attendances.

**Table 2. Proportion of MCNS patients and controls who used hospital care after the index date**

Activity type	Marie Curie	Matched controls
Emergency admissions	11.7%	35.0%
Elective admissions	3.0%	6.7%
Outpatient attendances	8.4%	18.7%
A&E attendances	7.9%	28.7%

Table 3 shows the average number of admissions, attendances and bed-days per person for MCNS patients and the controls between the index date and death. The Incidence Rate Ratio (IRR) is a measure of the relative impact on hospital admissions: an IRR of 0.5 would mean that MCNS patients had half the number of admissions of controls. Across most forms of activity, people who received MCNS care had between a third and half of the level of hospital use seen in controls.

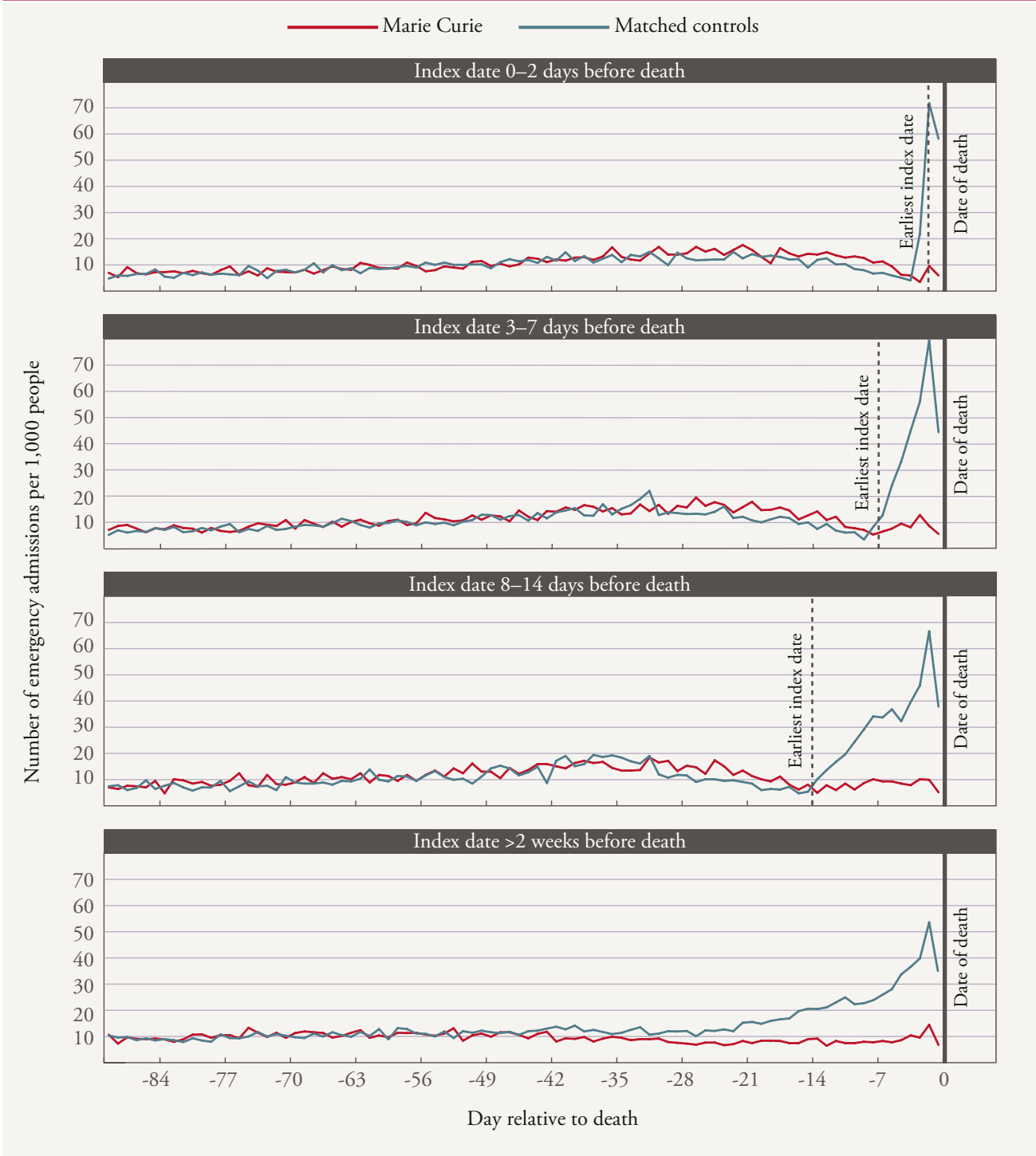
**Table 3. Post-index date hospital activity for MCNS patients and matched controls**

Activity type	Mean (standard deviation) activity per person		Unadjusted difference	Incidence Rate Ratio
	Marie Curie	Matched controls		
Emergency admissions	0.15 (0.48)	0.44 (0.73)	-0.29	0.34
Elective admissions	0.06 (0.78)	0.14 (1.16)	-0.08	0.47
Outpatient attendances	0.25 (1.65)	0.52 (2.01)	-0.27	0.46
A&E attendances	0.10 (0.38)	0.34 (0.63)	-0.24	0.28
Emergency bed-days	1.32 (5.59)	3.60 (8.97)	-2.28	0.37
Elective bed-days	0.25 (2.38)	0.45 (3.35)	-0.20	0.58

Figure 3 shows the number of emergency admissions per 1,000 people by day over the last three months of life. Each row in the figure is for a different subset of MCNS patients and controls, split by their index date relative to death. It shows that the MCNS patients and controls were well matched in terms of emergency admissions before the index date, but that emergency admissions stayed static or fell in those who received MCNS care, but rose sharply among controls in all subsets after the index date.



Figure 3. Number of emergency admissions per 1,000 people by day over the last three months of life



Unsurprisingly, given the differences in hospital use, we also found very significant differences in the costs of hospital care between MCNS patients and controls. Overall, the unadjusted costs of hospital care after the index date until death was £1,140 less per person for those who received MCNS care than for controls (Table 4). Around three quarters of this difference was due to lower costs of unplanned care (emergency admissions and A&E attendances).

**Table 4. Post-index date average hospital costs for MCNS patients and matched controls**

Activity type	Unadjusted mean (standard deviation) hospital costs per person		Unadjusted difference
	Marie Curie	Matched controls	
Emergency admissions	£463 (£1,758)	£1,293 (£2,531)	-£830
Elective admissions	£106 (£961)	£350 (£1,736)	-£244
Outpatient attendances	£33 (£212)	£76 (£340)	-£43
A&E attendances	£9 (£34)	£31 (£60)	-£22
All hospital activity	£610 (£2,172)	£1,750 (£3,377)	-£1,140

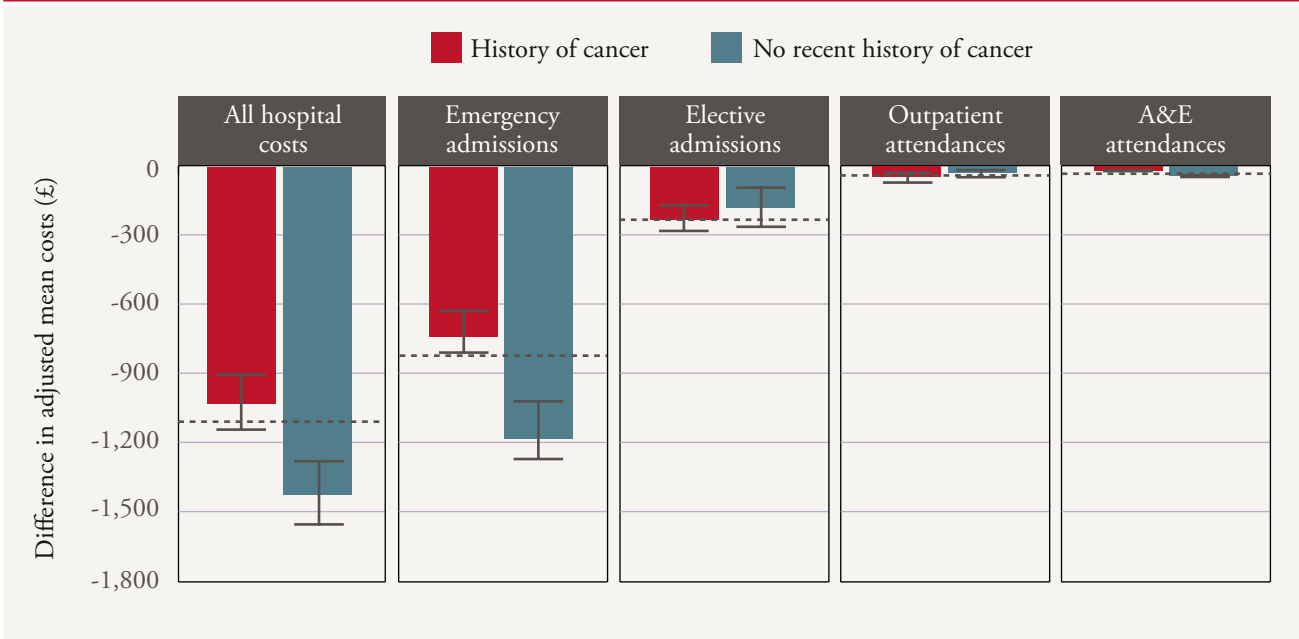
#### **b) History of cancer**

The impact of MCNS care on hospital activity varied significantly according to whether or not patients had a history of cancer. Compared to controls there was a greater reduction in use of unplanned hospital care (emergency admissions and A&E attendances) in MCNS patients with no recent history of cancer, but a smaller reduction among those with cancer.

These activity changes were also reflected in differences in hospital costs. Compared to controls, there was a much larger reduction in overall crude hospital costs for MCNS patients with no recent history of cancer than for those with cancer (-£1,475 versus -£1,044). This effect was largely due to differences in the costs of emergency admissions.

After adjustment for other factors, such as the number of long-term conditions and prior hospital use, these differences in costs remained statistically significant. Figure 4 plots the average difference (with 95% confidence limits) in adjusted hospital costs between MCNS patients and controls, by history of cancer. The dotted line represents the adjusted overall cost difference between MCNS patients and controls for each type of activity.

Figure 4. Difference in adjusted hospital costs per person between MCNS patients and controls, by history of cancer



## Discussion

The results of this evaluation provide evidence that home-based nursing care can significantly influence place of death and hospital activity at the end of life. People who received MCNS care were much more likely to die at home, less likely to require hospital care and incurred significantly lower hospital costs, compared to matched controls. The reduction in people admitted to hospital as an emergency, and the greater number able to die at home, suggests that the service led to better quality of care.

---

**“ People who received MCNS care were much more likely to die at home, less likely to require hospital care and incurred significantly lower hospital costs. ”**

---

This study looked at a large number of people from a well-defined service widely available across the UK, and we used relatively sophisticated methods to generate a matched control group. The overall findings of a higher rate of home deaths, and lower hospital utilisation and costs among those who received home-based care are consistent with the existing literature (Alonso-Babarro and others, 2011; 2012; Barbera and others, 2010; Brumley and others, 2007; Costantini and others, 2003; Gomes and Higginson, 2006; Gómez-Batiste and others, 2012; Lorenz and others, 2008; National Audit Office, 2008; Serra-Prat and others, 2001; Shepperd and others, 2011; Tamir and others, 2007).

The use of a large sample allowed us to look at sub-groups of patients. One of the more surprising findings was that the differences between MCNS patients and controls were generally larger for people with no recent history of cancer. Compared to controls, MCNS patients with no recent history of cancer were more likely to die at home than those with cancer. The average difference in hospital costs between cases and controls was also significantly larger for those without a recent history of cancer. This was unexpected as the existing end-of-life literature has largely focused on people with cancer, and the evidence for the benefits of palliative and end-of-life care has been found to be stronger for people with cancer (Lorenz and others, 2008). The MCNS patients in this evaluation who did not have a recent history of cancer had a wide range of conditions, including respiratory, cardiac and neurological illnesses. Future studies should therefore investigate whether there are non-cancer conditions that particularly benefit from home-based end-of-life care.

There are limitations of the current evaluation that should be considered. Although we found significant reductions in the cost of hospital care, these figures would need to be offset against other costs such as the cost of providing the home-care service itself. It is possible that keeping people at home at the end of life would also increase demand for other services, including district nursing, primary care and social care. Future work should explore the impact of end-of-life home nursing services on the broader set of health and care services (National End of Life Care Programme, 2012). The Palliative Care Funding Pilot sites set up as a result of the recent palliative care funding review may provide relevant information on the costs of these services (Hughes-Hallett and others, 2011). As well as the direct costs of health and care services, future studies should also take account of the indirect costs to family members and other carers of a person remaining at home at the end of life.

Another important point to consider is that this was not a randomised trial and so there may have been unobserved systematic differences between cases and controls. Although our groups were similar in their demographic and clinical characteristics, and prior hospital use, there are likely to be characteristics that influence individuals' suitability for home-based end-of-life care that are not recorded in routine administrative data. For example, the groups could have differed in terms of family or other carer support, as well as where they wanted to die. This would have affected the results if, for example, MCNS patients were more amenable to home care or had greater informal support than controls.

In an increasingly tight financial climate for public services, there is a drive to identify models of service delivery that can reduce demand for expensive hospital care, while maintaining or improving the quality and experience of patient care. End-of-life care is one of the 12 workstreams of the government's QIPP (Quality, Innovation, Productivity and Prevention) programme: key objectives are to increase the number of people dying in their usual place of residence, and to reduce the number of emergency admissions in the last year of life. Our findings are clearly very relevant to this programme, in that they provide evidence of the potential benefits of home-based end-of-life schemes, such as that operated by Marie Curie, and support increasing investment in such services so as to improve care for people at the end of life.



**Our findings provide evidence of the potential benefits of home-based end-of-life schemes, such as that operated by Marie Curie, and support increasing investment in such services so as to improve care for people at the end of life.**

---

## References

- Alonso-Babarro A, Astray-Mochales J, Domínguez-Berjón F, Génova-Maleras R, Bruera E, Díaz-Mayordomo A and Centeno C (2012) 'The association between in-patient death, utilization of hospital resources and availability of palliative home care for cancer patients', *Palliative Medicine* [Epub ahead of print: <http://pmj.sagepub.com/content/early/2012/04/03/0269216312442973.full.pdf+html>].
- Alonso-Babarro A, Bruera E, Varela-Cerdeira M, Boya-Cristia MJ, Madero R, Torres-Vigil I, De Castro J and González-Barón M (2011) 'Can this patient be discharged home? Factors associated with at-home death among patients with cancer', *Journal of Clinical Oncology* 29(9), 1159–67.
- Barbera L, Sussman J, Viola R, Husain D, Lirach SL, Walker H, Sutradhar R, Chartier C and Paszat L (2010) 'Factors associated with end-of-life health service use in patients dying of cancer', *Healthcare Policy* 5(3), e125–43.
- Bardsley M, Georghiou T, Chassin L, Lewis G, Steventon A and Dixon J (2012) 'Overlap of hospital use and social care in older people in England', *Journal of Health Service Research and Policy* 17(3), 133–9.
- Bardsley MJ, Georghiou T and Dixon J (2010) *Social Care and Hospital Use at the End of Life*. Nuffield Trust.
- Brumley R, Enguidanos S, Jamison P, Seitz R, Morgenstern N, Saito S, McIlwane J, Hillary K and Gonzalez J (2007) 'Increased satisfaction with care and lower costs: results of a randomized trial of in-home palliative care', *Journal of the American Geriatric Society* 55(7), 993–1000.
- Costantini M, Higginson IJ, Boni L, Orengo MA, Garrone E, Henriquet F and Bruzzi P (2003) 'Effects of a palliative home care team on hospital admissions among patients with advanced cancer', *Palliative Medicine* 17(4), 315–21.
- Department of Health (2010) *Confirmation of Payment by Results Arrangements for 2010-11*.
- Gomes B and Higginson IJ (2006) 'Factors influencing death at home in terminally ill patients with cancer: systematic review', *British Medical Journal* 332(7540), 515–21.
- Gomes B and Higginson IJ (2008) 'Where people die (1974–2030): past trends, future projections and implications for care', *Palliative Medicine* 22(1), 33–41.
- Gomes B, Higginson IJ, Calanzani N, Cohen J, Deliens L, Daveson BA, Bechinger-English D, Bausewein C, Ferreira PL, Toscani F, Meñaca A, Gysels M, Ceulemans L, Simon ST, Pasman HR, Albers G, Hall S, Murtagh FE, Haugen DE, Downing J, Koffman J, Pettenati F, Finetti S, Antunes B and Harding R; PRISMA. (2012) 'Preferences for place of death if faced with advanced cancer: a population survey in England, Flanders, Germany, Italy, the Netherlands, Portugal and Spain', *Annals of Oncology* 23(8), 2006–15.
- Gomes B, McCrone P, Hall S, Koffman J and Higginson IJ (2010) 'Variations in the quality and costs of end-of-life care, preferences and palliative outcomes for cancer patients by place of death: the QUALYCARE study', *BMC Cancer* 10, 400.
- Gómez-Batiste X, Caja C, Espinosa J, Bullich I, Martínez-Muñoz M, Porta-Sales J, Trelis J, Esperalba J and Stjernsward J (2012) 'The Catalonia World Health Organization demonstration project for palliative care implementation: quantitative and qualitative results at 20 years', *Journal of Pain and Symptom Management* 43(4), 783–94.
- Higginson IJ (2003) *Priorities and Preferences for End of Life Care in England, Wales and Scotland*. The Cicely Saunders Foundation.
- Higginson IJ and Wilkinson S (2002) 'Marie Curie nurses: enabling patients with cancer to die at home', *British Journal of Community Nursing* 7(5), 240–4.
- Hughes-Hallett T, Craft A and Davies C (2011) *Funding the Right Care and Support for Everyone – An independent review for the Secretary of State for Health*. Palliative Care Funding Review.
- Lorenz KA, Lynn J, Dy SM, Shugarman LR, Wilkinson A, Mularski RA, Morton SC, Hughes RG, Hilton LK, Maglione M, Rhodes SL, Rolon C, Sun VC and Shekelle PG (2008) 'Evidence for improving palliative care at the end of life: a systematic review', *Annals of Internal Medicine* 148(2), 147–59.
- Maddams J, Utley M and Moller H (2011) 'Levels of acute health service use among cancer survivors in the United Kingdom', *European Journal of Cancer* 47(14), 2211–20.
- National Audit Office (2008) *End of Life Care*.
- National End of Life Care Programme (2012) *Reviewing End of Life Care Costing Information to Inform the QIPP End of Life Care Workstream*.

National Institute for Health and Clinical Excellence (2011) *End of Life Care for Adults Quality Standard*.

Office for National Statistics (2011) *Mortality Statistics: Deaths Registered in England and Wales (Series DR), 2010*.

Pot AM, Portrait F, Visser G, Puts M, van Groenou MI and Deeg DJ (2009) 'Utilization of acute and long-term care in the last year of life: comparison with survivors in a population-based study', *BMC Health Services Research* 9, 139.

Rosenwax LK, McNamara BA, Murray K, McCabe RJ, Aoun SM and Currow DC (2011) 'Hospital and emergency department use in the last year of life: a baseline for future modifications to end-of-life care', *Medical Journal of Australia* 194(11), 570–3.

Serra-Prat M, Gallo P and Picaza JM (2001) 'Home palliative care as a cost-saving alternative: evidence from Catalonia', *Palliative Medicine* 15(4), 271–8.

Shepperd S, Wee B and Straus SE (2011) 'Hospital at home: home-based end of life care', *Cochrane Database of Systematic Reviews* (7) CD009231.

Tamir O, Singer Y and Shvartzman P (2007) 'Taking care of terminally-ill patients at home – the economic perspective revisited', *Palliative Medicine* 21(6), 537–41.

Taylor DG and Carter S (2004) *Valuing Choice – Dying at Home. A case for core equitable provision of high-quality support for people who wish to die at home*. Marie Curie Cancer Care.

Temel JS, Greer JA, Muzikansky A, Gallagher ER, Admane S, Jackson VA, Dahlin CM, Blinderman CD, Jacobsen J, Pirl WF, Billings JA and Lynch TJ (2010) 'Early palliative care for patients with metastatic non-small-cell lung cancer', *New England Journal of Medicine* 363(8), 733–42.

Van den Block L, Deschepper R, Driessens K, Bauwens S, Bilsen J, Bossuyt N and Deliens L (2007) 'Hospitalisations at the end of life: using a sentinel surveillance network to study hospital use and associated patient, disease and healthcare factors', *BMC Health Services Research* 7, 69.

---

For more information about the Nuffield Trust,  
including details of our latest research and analysis,  
please visit [www.nuffieldtrust.org.uk](http://www.nuffieldtrust.org.uk)

---

 Download further copies of this research summary  
from [www.nuffieldtrust.org.uk/publications](http://www.nuffieldtrust.org.uk/publications)

---

 Subscribe to our newsletter:  
[www.nuffieldtrust.org.uk/newsletter](http://www.nuffieldtrust.org.uk/newsletter)

---

 Follow us on Twitter: [Twitter.com/NuffieldTrust](https://twitter.com/NuffieldTrust)

---

---

Nuffield Trust is an authoritative  
and independent source of  
evidence-based research and  
policy analysis for improving  
health care in the UK

---

59 New Cavendish Street  
London W1G 7LP  
Telephone: 020 7631 8450  
Facsimile: 020 7631 8451  
Email: [info@nuffieldtrust.org.uk](mailto:info@nuffieldtrust.org.uk)

 [www.nuffieldtrust.org.uk](http://www.nuffieldtrust.org.uk)

Published by the Nuffield Trust.  
© Nuffield Trust 2012. Not to be reproduced  
without permission.