Is the French palliative care policy effective everywhere? Geographic variation in changes in inpatient death rates among older patients in France, 2010–2013

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Original Article

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Background: Recently, French policymakers have tried to improve care at the end-of-life, by improving access to community-based palliative care, particularly for patients with cancer and neurological diseases. If effective, these efforts should reduce the proportion of such patients who die in the hospital. In light of these policies, we sought to determine the effectiveness of these efforts on reducing inpatient deaths by conducting a retrospective, observational analysis of patients aged 65 and older who were admitted to hospitals in France between 2010 and 2013 for 1 of 3 non-surgical conditions.

Methods: We calculated department-specific age- and sex-adjusted inpatient death rates for 3 types of non-surgical admissions and modeled expected number of inpatient deaths had their rates for patients with cancer or neurological disease tracked those of patients with non-cancer non-neurological diseases.

Results: We found that patients admitted with a cancer diagnosis experienced 20,394 (13.0%) fewer inpatient deaths that expected had non-surgical cancer diagnosis admission rates tracked those of non-surgical non-cancer and non-neurological admission rates; patients admitted with a primary neurological disease diagnosis experienced 513 (4.5%) fewer inpatient deaths than expected. During the study period, observed-to-expected inpatient deaths fell more dramatically and consistently for patients admitted with cancer diagnoses than for those admitted with neurological diseases. Observed-to-expected ratios fell least in departments that were on the periphery of the French mainland.

Conclusions: Our findings suggest that, in France, efforts to reduce inpatient death rates among patients with cancer or neurological disease diagnoses appear to be effective. However, their effectiveness varies geographically, suggesting that targeted efforts to improve lower performing departments may generate substantial performance improvements.

Keywords: Palliative care; cancer; France; health policy

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Introduction

The World Health Organization has identified improving care at the end-of-life as a global health priority, with improved access to palliative care as a mechanism for doing so (1). High inpatient death rates may reflect overuse of healthcare resources among patients for whom end-of-life care might be improved; and, in the mid-2000s, France has a relatively high inpatient death rate (2). Over the past decade, French policymakers have taken steps to improve care at the end-of-life. Actions have included passing a "Patient's Rights and End-of-life Care" Act in 2005 that clarified end-of-life medical practice in France by authorizing withholding or withdrawal of treatments when appropriate (3), implementing a national 4-year plan to develop home care for end-of life patients in 2008 (4), establishing the "Observatoire National de la Fin de Vie" in 2010 (5), and taking steps to encourage patients with cancer and neurological diseases to die at home, instead of in the hospital, including changing reimbursement to discourage the use of inpatient palliative care beds, transitioning palliative care efforts to the outpatient setting, and establishing palliative care networks that coordinate home care for these patients (6).

We wondered whether these efforts to improve access to palliative care were effective at reducing the proportion of patients who die in the hospital. We reasoned that, if they were, inpatient death rates for older patients admitted with cancer or neurological diseases would decline, over time, relative to those for patients admitted for other reasons. Therefore, we examined a retrospective observation study of the rates of inpatient deaths for patients admitted with cancer diagnoses, neurological disease diagnoses, and non-cancer non-neurological disease diagnoses between 2010 and 2013.

Methods

From the Agence Technique de l'Information sur l'Hospitalisation, we obtained individual case-level data on all medical, surgical, and obstetrical discharges from all hospitals in mainland France for 2009 through 2013. Those data include the patient's age, the primary ICD-10 admission diagnosis, the groupes homogènes de malades (GHM) code (a diagnosis related group-like code), and the mode of discharge (including death).

We sought to examine the impact of these policy changes on patients aged 65 and older, because they had a disproportionately high number of inpatient deaths (1,034,820 of 1,363,820, or 75.9%) relative to the incidence of their admissions for cancer (11,043,400 of 23,263,126, or 47.5%), neurological diseases (1,249,852 of 3,814,873, or 32.8%), or non-cancer non-neurological diseases (30,761,044 of 85,239,965, or 36.1%) during the study period. Reasoning that patients who were admitted for surgical interventions were not near the end-of-life, we further limited our analysis to patients who were not admitted for a surgical reason [those patients whose GHM code did not include the letter "C" in the third position (7), representing 34,308,609 (79.7%) of the 43,054,296 admissions among patients aged 65 and older between 2010 and 2013].

Because demographics vary geographically in France (8-10), Dartmouth Atlas Project (11) methods to calculate age- and sex-adjusted admission rates for 96 geographically-defined departments in mainland France. For each year, we obtained age- and sex-specific department-level population estimates from the French census (12). We analyzed three categories of admission: cancer admissions [non-surgical admission with a primary diagnosis of cancer (ICD-10 diagnosis beginning with "C")]; neurological disease admissions [non-surgical admission with a primary diagnosis of a neurological disorder (ICD-10 diagnosis beginning with "G")]; and non-cancer non-neurological disease admissions (non-surgical admissions without a primary diagnosis of cancer or a neurological disease). We identified inpatient deaths within each type of admission from the MODE_SORTEE variable (where "9" indicates inpatient death).

The age- and sex-adjusted rates of admission for the 3 different categories we examined changed over the study time period (*Table 1*). To account for secular changes, we used year- and department-specific age- and sex-adjusted inpatient death rates for non-cancer non-neurological disease admissions to model the expected number of inpatient admissions for patients with cancer or neurological diseases, had they changed at the same rate as non-cancer non-neurological disease admissions did. We then applied inpatient death rates for cancer and neurological disease-related admissions to the expected number of admissions to calculate the expected number of age- and sex-adjusted inpatient deaths for these admission types. Finally, so that we could identify geographic differences, we determined whether and how much the observed number of age- and sex-adjusted inpatient deaths differed from the expected number, at the department level. The process that we used

Table 1 French national age- and sex-adjusted rates (per 1,000 patients) of non-surgical admissions for patients admitted with a primary diagnosis of cancer, neurological disease, or a non-cancer non-neurological disease among patients aged 65 and older in 2010–2013, and comparison of 2013 to 2010 rates

Type of admission	Year specific age- and sex-adjusted national rate per 1,000 population				2013 to 2010 ratio
	2010	2011	2012	2013	
Cancer	196.7	206.6	212.4	214.8	109.20%
Neurological disease	23.3	23.2	23	22.8	98.00%
Non-cancer non-neurological disease	559.1	567.2	575	597.8	106.90%

Table 2 Method for creating an expected rate of cancer admissions and deaths for comparison to non-cancer non-neurological disease admissions and deaths among patients aged 65 and older at the department level with an example given for Ain (department number 01)

Variable	Year			
	2010	2011	2012	2013
Department (number)	Ain (01)			
Observed non-surgical non-cancer non-neurological admission rate per 1,000 population	387.05	388.04	408.28	420.94
That rate divided by the rate in 2010 (A)	1.000	1.003	1.055	1.088
Observed non-surgical cancer admission rate per 1,000 population (B)	202.56	205.42	215.08	212.07
Expected non-surgical cancer admission rate per 1,000 population ($A \times B_{2010\ rate}=C$)	202.56	203.08	213.67	220.30
Population aged 65 and older (D)	87,892	90,166	93,777	97,302
Observed number of non-surgical cancer admissions (B×D/1,000)	17,804	18,522	20,170	20,635
Expected number of non-surgical cancer admissions (C×D/1,000)	17,804	18,311	20,038	21,436
Observed non-surgical non-cancer non-neurological inpatient death rates per 1,000 population (E)	13.43	12.60	12.37	11.75
That rate divided by the rate in 2010 (F)	1.00	0.94	0.92	0.87
Observed non-surgical cancer inpatient death rate per 1,000 population (G)	5.68	4.33	4.49	3.54
Expected non-surgical cancer inpatient death rate per 1,000 population ($F \times G_{2010\ rate}=H$)	5.68	5.33	5.23	4.97
Observed non-surgical cancer inpatient deaths (G×D/1,000=I)	499	391	421	344
Expected non-surgical cancer inpatient deaths (H×D/1,000=J)	499	481	491	484
Expected minus observed non-surgical cancer inpatient deaths (J–I)	0	90	70	140
Ratio of observed non-surgical cancer inpatient deaths to expected non-surgical cancer inpatient deaths (I/J)	1.00	0.81	0.86	0.71

is demonstrated in *Table 2*.

The study and its use of anonymized data was approved by the French National Union of Regional Health Observatories (Fédération Nationale des Observatoires Régionaux de la Santé) and the French IRB (Commission Nationale Informatique et Libertés, National Committee for Data Files and Individual Liberties) (CNIL authorization number 1180745).

Results

Over the study period, our model predicted that, had non-surgical cancer diagnosis admission rates tracked those of non-surgical non-cancer and non-neurological admission rates, patients admitted with a cancer diagnosis would have been expected to experience 207,512 inpatient deaths; however, 187,118 inpatient deaths were observed, which

Table 3 National estimates of observed, expected, and expected minus observed numbers of inpatient deaths for non-surgical admissions with primary diagnoses of cancer or neurological diseases in 2010–2013

Measures	Year				Cumulative
	2010	2011	2012	2013	
Admissions with cancer diagnoses					
Expected inpatient deaths	50,646	50,595	53,073	53,197	207,512
Observed inpatient deaths	50,646	43,801	45,401	47,269	187,118
Expected minus observed inpatient deaths	0	6,794	7,672	5,928	20,394
Expected minus observed inpatient deaths as a percentage of expected inpatient deaths (%)	0	13.4	15.2	11.2	13.0
Admissions with neurological disease diagnoses					
Expected inpatient deaths	3,711	3,697	3,880	3,888	15,176
Observed inpatient deaths	3,711	3,635	3,689	3,628	14,663
Expected minus observed inpatient deaths	0	63	191	260	513
Expected minus observed inpatient deaths as a percentage of expected inpatient deaths (%)	0	1.7	5.2	6.7	4.5

Percentage of inpatient deaths avoided, numbers may not add exactly due to rounding.

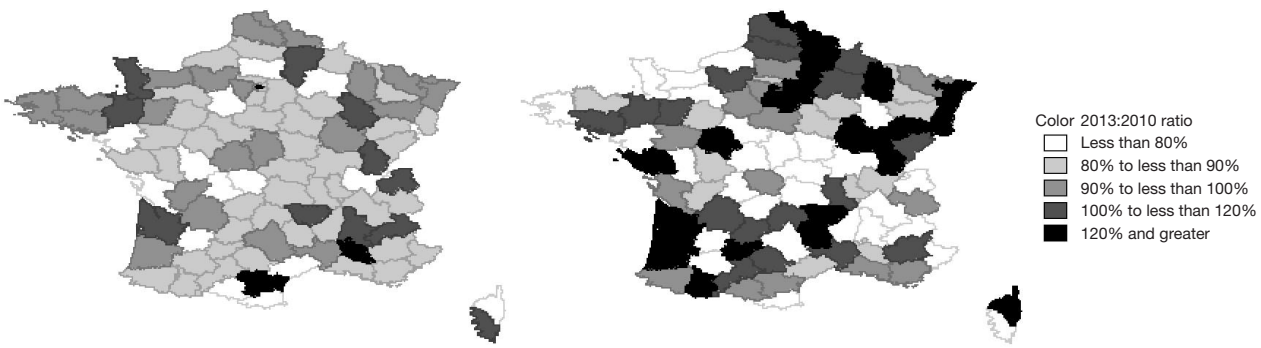

Figure 1 2013:2010 ratio of observed-to-expected rates of non-surgical admissions for cancer (A) or neurological disease (B) in which the patient died in the hospital. From lightest to darkest, the colors represent a 2013:2010 ratio of less than 80%, 80% to less than 90%, 90% to less than 100%, 100% to less than 120%, and 120% or greater. A 2013:2010 ratio of 80% means that the ratio of actual to expected inpatient deaths decreased by 20% between 2010 and 2013; a 2013:2010 ratio of 120% means that the ratio of actual to expected inpatient deaths increased by 20% between 2010 and 2013.

was 20,394 (13.0%) fewer than expected (*Table 3*). The model also predicted that patients admitted with a primary neurological disease diagnosis would have been expected to experience 15,176 inpatient deaths; however, 14,663 inpatient deaths were observed, which was 513 (4.5%) fewer than expected.

Observed-to-expected inpatient deaths fell more dramatically and more consistently for patients admitted with cancer diagnoses than for patients admitted with neurological diseases (*Figure 1*). Seemingly, observed-to-expected ratios fell the least (or even rose) in departments that were on the periphery of the French mainland when compared to departments in the French mainland's center.

Discussion

Principal findings

In light of recent efforts to reduce inpatient deaths among patients with cancer and neurological disease diagnoses in France, we examined changes in the ratio of actual to expected inpatient deaths for such patients who were aged 65 and older and admitted for non-surgical reasons between 2010 and 2013. We found that observed inpatient deaths were below expected inpatient deaths for both types of admissions, considerably so for patients admitted with a cancer diagnosis.

These findings suggest that policies designed to emphasize community-based palliative care and reduce inpatient deaths among such patients have been effective. Indeed, those policies seem to have freed up substantial resources, potentially avoiding nearly 21,000 admissions in which the patient might have been expected to die over a 3-year period.

Nonetheless, we found performance differences at the department level across France; while some departments demonstrated substantial reductions in the observed-to-expected number of inpatient deaths, other departments had substantial increases in that ratio. Reductions were more consistent across France when inpatient deaths among non-surgical admissions with primary cancer diagnoses. The second French National Cancer Plan, enacted between 2009 and 2013, that was intended to improve coordination between palliative care and cancer professionals' health networks and implemented a personal care plan for every cancer patient, could explain our findings that the greatest effects were among cancer patients (13).

Strengths and weaknesses

Our study has several limitations. First, like all studies that use administrative databases, our study assumes that coding is correct. To the extent data are miscoded, our findings are flawed. However, the general consistency of findings across years suggests that coding is consistent. Second, we did not have access to data that might explain the demand for healthcare services, such as underlying rates of year and department-specific cancer or neurological disease incidence or prevalence. Such data might help explain changes in admissions for the conditions we studied. Third, we did not have direct access about palliative care provided in the community. While we infer that community-based palliative care is the driver of changes in inpatient deaths, we cannot prove that.

However, the strengths of our study included our ability to study all relevant admissions in mainland France for 4 years, to correct for underling changes in admission practices during the time period examined, and to conduct small area variation analyses that can identify specific areas for improvement.

Implications

Our findings suggest that efforts to redeploy palliative care into the community have been effective. However, our findings also suggest that some departments may need help in achieving optimal performance levels. Policymakers might consider partnering teams from departments that demonstrated outstanding performance with teams from departments that appeared to have less effective results in order to accelerate change.

Conclusions

In France, efforts to reduce inpatient death rates among patients with cancer or neurological disease diagnoses appear to be effective. However, the effectiveness of those efforts varies geographically, suggesting that targeted efforts to improve lower performing departments may generate substantial performance improvements.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: The study and its use of anonymized data was approved by the French National Union of Regional Health Observatories (Fédération Nationale des Observatoires Régionaux de la Santé) and the French IRB (Commission Nationale Informatique et Libertés, National Committee for Data Files and Individual Liberties) (CNIL authorization number 1180745).

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