



# Quality of End-of-Life Cancer Care for Medicare Beneficiaries Regional and Hospital-Specific Analyses

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## Introduction

More than 1.5 million cancers are diagnosed each year in the United States.<sup>1</sup> This Dartmouth Atlas report examines how elderly patients with poor prognosis cancer are cared for across regions and hospitals and finds remarkable variation depending on where the patients live and receive care. Even among the nation's leading medical centers, there is no consistent pattern of care or evidence that treatment patterns follow patient preferences. Rather, the report demonstrates that many hospitals and physicians aggressively treat patients with curative attempts they may not want, at the expense of improving the quality of their last weeks and months.

For many cancer patients, medical and surgical care leads to long-term remission or cure. Other patients have aggressive or disseminated (metastatic) cancer at the time of diagnosis or experience a recurrence later in their illness. Despite achievements in cancer detection and treatment, half a million patients die of cancer annually in the United States. The majority of these deaths are in those over age 65.<sup>2</sup>

For patients with a poor prognosis because the cancer is advanced or disseminated, death is the likely short-term outcome. When a cure is unlikely, patients and families often have strong preferences about where and how they are cared for in their last months of life. Some desire aggressive treatment up to the time of death. These patients seek to gain weeks or months of additional life irrespective of treatment side effects and the isolation from home and family that aggressive treatment often entails. Other patients with limited life expectancy prefer care directed toward the quality rather than the quantity of life. They want to be able to bring closure to their lives with a focus on their comfort in familiar surroundings, close to family and friends. They also want control of pain and the many other difficult symptoms associated with advanced cancer and its aggressive treatment.<sup>3</sup>

Patients with cancer also want honest conversations with their providers. This includes balanced information about the chances of disease remission or progression, and the possible benefits and discomforts of different treatment options. Most importantly, they want to be active partners with clinicians in making the decisions about the type and place of care.

Too often, care for patients near the end of life falls short of the desires of patients and families. This has been well documented for patients with advanced illness and specifically for cancer. The Institute of Medicine's 1997 report, "Approaching Death: Improving Care at the End of Life," documented the pervasive undertreatment of pain and other burdensome symptoms, as well as overtreatment with curative measures that many patients do not want.<sup>4</sup> In 2001, the Institute released a related report, "Improving Palliative Care for Cancer," which concluded:

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*Improvements in the development and delivery of symptom control and other aspects of palliative care needed in the late stages of cancer (and other chronic diseases) have not kept pace with the medical advances that have allowed people to live longer. For at least half of those dying from cancer, death entails a spectrum of symptoms, including pain, labored breathing, distress, nausea, confusion, and other physical and psychological conditions that go untreated or undertreated and vastly diminish the quality of their remaining days. Patients, their families, and caregivers all suffer from the inadequate care available to patients in pain and distress, although the magnitude of these burdens is only now being described.<sup>5</sup>*

Data for the care of Medicare patients with poor prognosis cancer are available for all hospitals with sufficiently large study populations, as well as hospital referral regions, on our web site: [www.dartmouthatlas.org](http://www.dartmouthatlas.org). Excel tables are available on our Downloads page; or you can create your own reports using our custom report tools. To get started, click on **Data by Topic**, then select *Care of Chronic Illness in Last Two Years of Life*. In the **Start a Report** menu, select the *Cancer Care* topic, and choose a measure to explore.

In the past decade, the cancer care community has developed a heightened interest in improving palliative and hospice care for patients with advanced cancer.<sup>6-10</sup> Numerous performance measures on the quality of cancer care have been developed; several of these are specifically for care near the end of life.<sup>11-15</sup>

In this report the Dartmouth Atlas Project examines care for Medicare patients over age 65 with cancers that have a poor prognosis and finds that care at the end of life varies markedly across regions and academic medical centers. The major findings are as follows:

1. Across many regions and academic medical centers, over one third of patients with poor prognosis cancer spent their last days in hospitals and intensive care units. A significant proportion of patients received advanced life support interventions such as endotracheal intubation, feeding tubes and cardiopulmonary resuscitation (CPR).
2. The use of chemotherapy in the last two weeks of life overall was about 6% of patients, but in some regions and academic medical centers the rate exceeded 10%.
3. The use of hospice care varied markedly across regions and hospitals. In at least 50 academic medical centers, less than half of patients with poor prognosis cancer received hospice services.
4. In some hospitals, referral to hospice care occurred so close to the day of death that it was unlikely to have provided much assistance and comfort to patients.

Do these patterns of care reflect patient and family preferences? While this report does not measure patient treatment choices directly, published research strongly indicates that care patterns near the end of life are partly driven by the local availability of health resources, such as hospital beds and new treatment technologies.<sup>16,17</sup> In addition, communication with cancer patients and families often fails to include accurate information about prognosis and treatment options.<sup>18</sup> These studies suggest that high hospital day rates and low hospice use are often signs of overly aggressive treatment. While many health systems have addressed some of these shortcomings, further work needs to be done to improve end-of-life care. The findings presented in this report provide a starting point for the longitudinal monitoring of further efforts to improve care for patients with poor prognosis cancer.

## Hospital use in patients with poor prognosis cancer

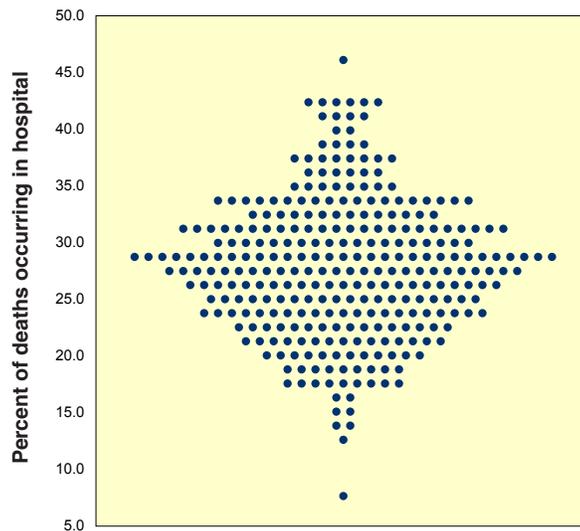
Most patients with serious illness prefer to be at home at the end of life, in familiar settings and close to family. A smaller number of patients want to receive life-sustaining care, even if it means spending more time in the hospital for treatments accompanied by serious adverse effects and debilitating symptoms.<sup>19</sup> These differences in patient preferences are often a challenge for clinicians to incorporate in care decisions when cure or remission is the hope of nearly every patient with cancer. The well-documented failure in counseling patients about their prognosis and the full range of care options, including early palliative care, leads many patients to acquiesce to more aggressive care without fully understanding its impact on the length and quality of life.

### Regional variation in hospital care

We observed a high degree of regional variation in the amount of inpatient care patients with poor prognosis cancer received. The known differences in racial and ethnic preferences for aggressive treatment at the end of life are not large enough to explain the degree of variation we observed<sup>19</sup>; nor can it be explained by differences in patient illness levels. These were all patients known to their health care teams to have advanced or disseminated cancer. The differences in the amount of hospital care received by these patients can help identify regions and hospitals where there are opportunities to improve the quality of the patient decision process.

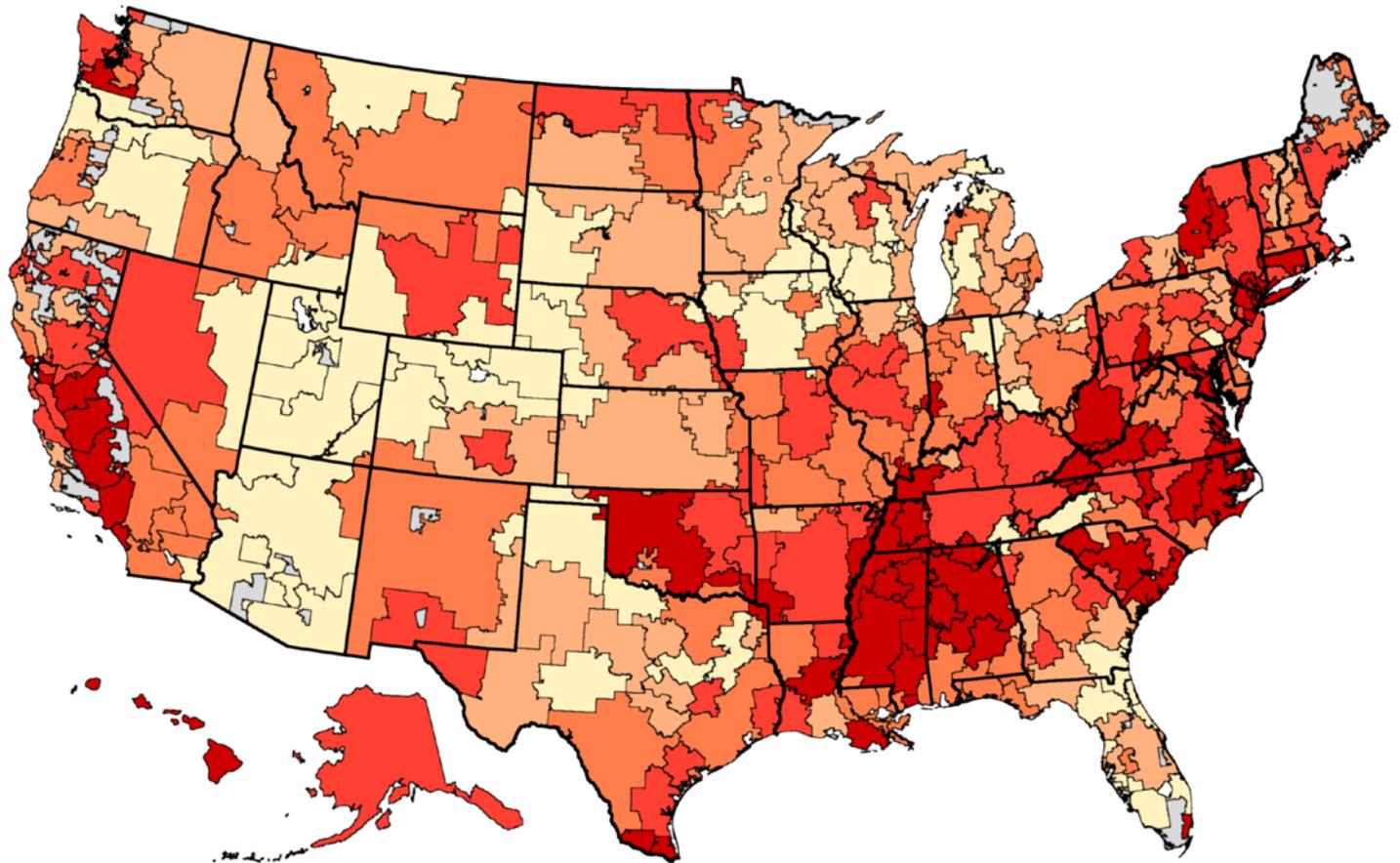
## Death in the hospital among hospital referral regions

Across the United States, about 29% of cancer patients who died during the period from 2003 to 2007 did so in a hospital. Cancer patients were most likely to die in a hospital in the Manhattan hospital referral region, where 46.7% experienced death in a hospital. The rates were also high in surrounding regions, including Ridgewood, New Jersey (42.8%), East Long Island, New York (42.5%) and Newark, New Jersey (41.1%). These rates were about six times higher than the rate in the Mason City, Iowa region, where only 7.0% of cancer patients died in the hospital. Cancer patients were also much less likely to experience a hospitalized death in Cincinnati (17.8%) and Fort Lauderdale, Florida (19.6%).



**Figure 1. Percent of cancer patients dying in hospital among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. The percent of cancer patients dying in a hospital ranged from 7% in Mason City, Iowa to almost 47% in Manhattan.

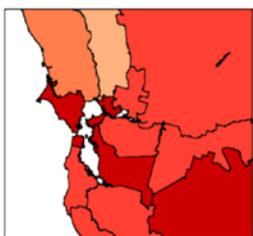


**Percent of Cancer Patients Dying in Hospital**

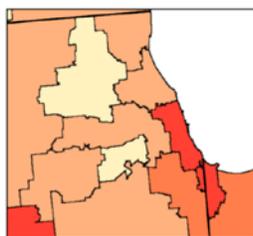
by HRR (deaths occurring 2003-07)

- 33% to 47% (60)
- 29% to < 33% (64)
- 26% to < 29% (67)
- 22% to < 26% (61)
- 7% to < 22% (53)
- Insufficient data (1)
- Not populated

**Map 1. Percent of cancer patients dying in hospital (deaths occurring 2003-07)**



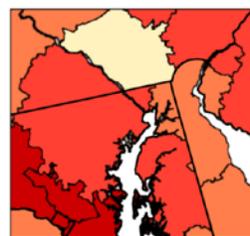
San Francisco



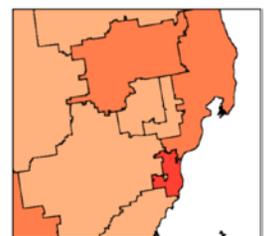
Chicago



New York



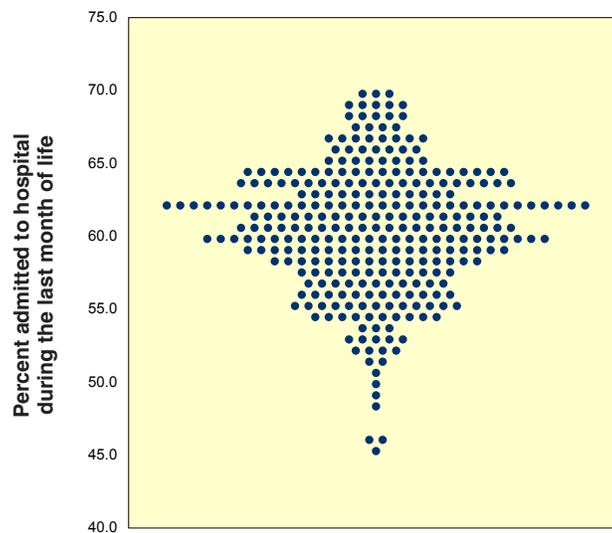
Washington-Baltimore



Detroit

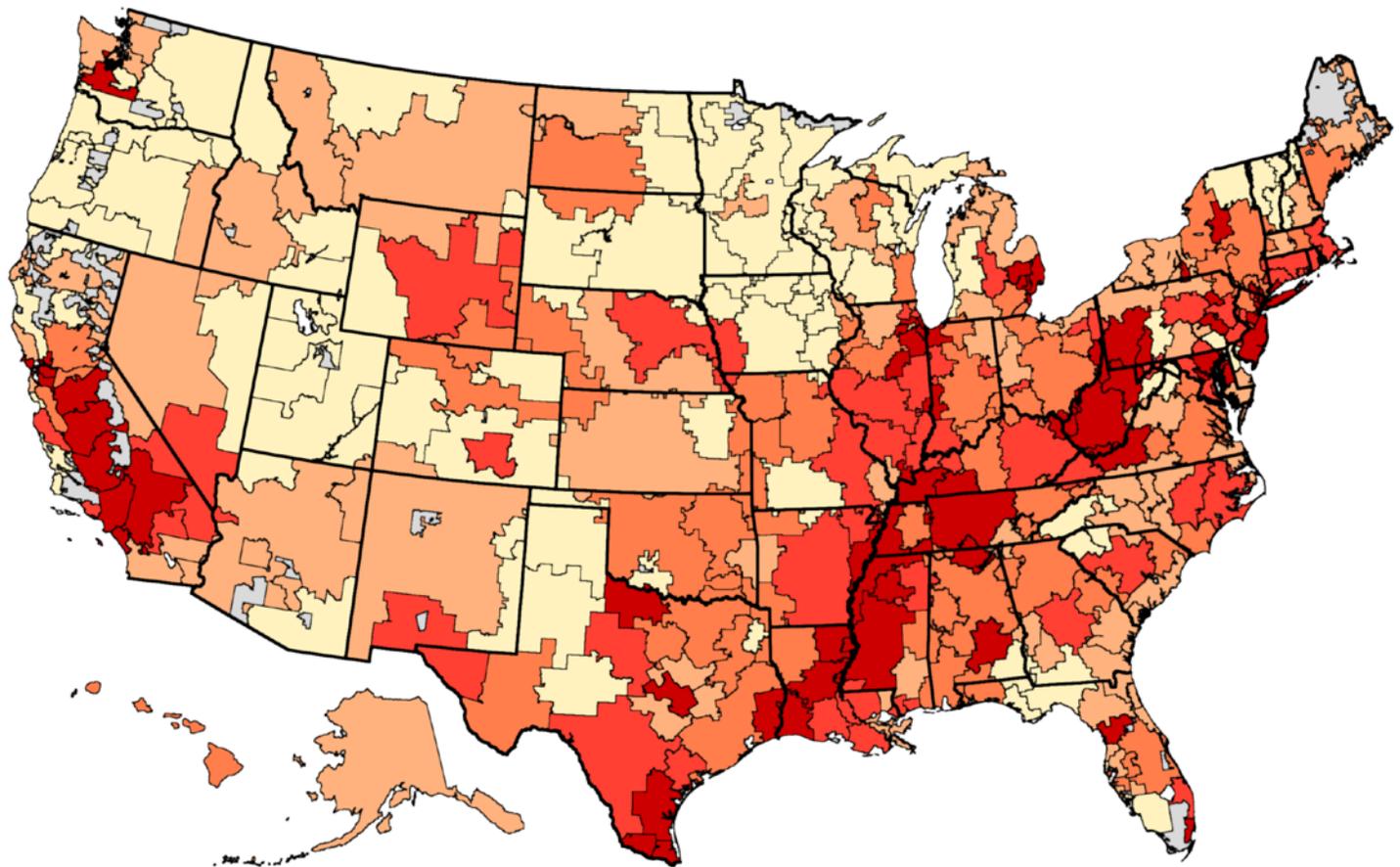
## Hospital admissions during the last month of life among hospital referral regions

The percent of cancer patients hospitalized at least once during their last month of life varied by a factor of about 1.6 during the period from 2003 to 2007. Cancer patients were most likely to be hospitalized during the last month of life in hospital referral regions in Michigan, including Detroit (70.2%), Royal Oak (69.4%), Pontiac (69.4%) and Dearborn (69.1%). Rates were also high in the southernmost Texas regions of McAllen (69.3%) and Harlingen (69.2%). Less than half of cancer patients were hospitalized during the last month of life in Mason City, Iowa (44.9%), San Angelo, Texas (46.3%), Cedar Rapids, Iowa (48.0%) and La Crosse, Wisconsin (49.0%). Nationally, 61.3% of cancer patients were hospitalized at least once during their last month of life.



**Figure 2. Percent of cancer patients hospitalized during the last month of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. Less than half of cancer patients were admitted to a hospital in the last month of life in five regions, while nearly 70% of cancer patients were admitted in other regions.

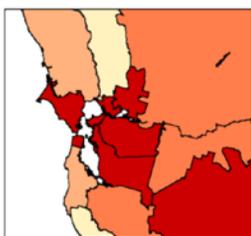


**Percent of Cancer Patients  
Admitted to Hospital during  
the Last Month of Life**

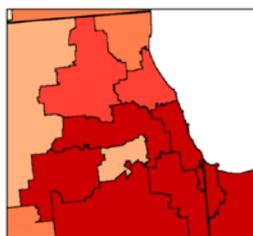
by HRR (deaths occurring 2003-07)

- 64% to 71% (61)
- 62% to < 64% (49)
- 60% to < 62% (63)
- 57% to < 60% (66)
- 44% to < 57% (67)
- Not populated

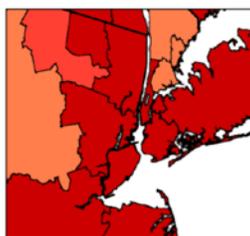
**Map 2. Percent of cancer patients hospitalized during the last month of life (deaths occurring 2003-07)**



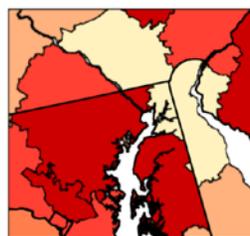
San Francisco



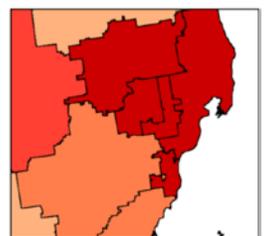
Chicago



New York



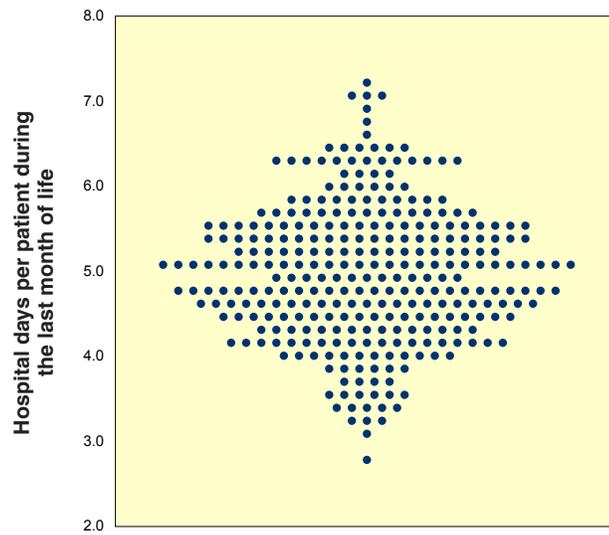
Washington-Baltimore



Detroit

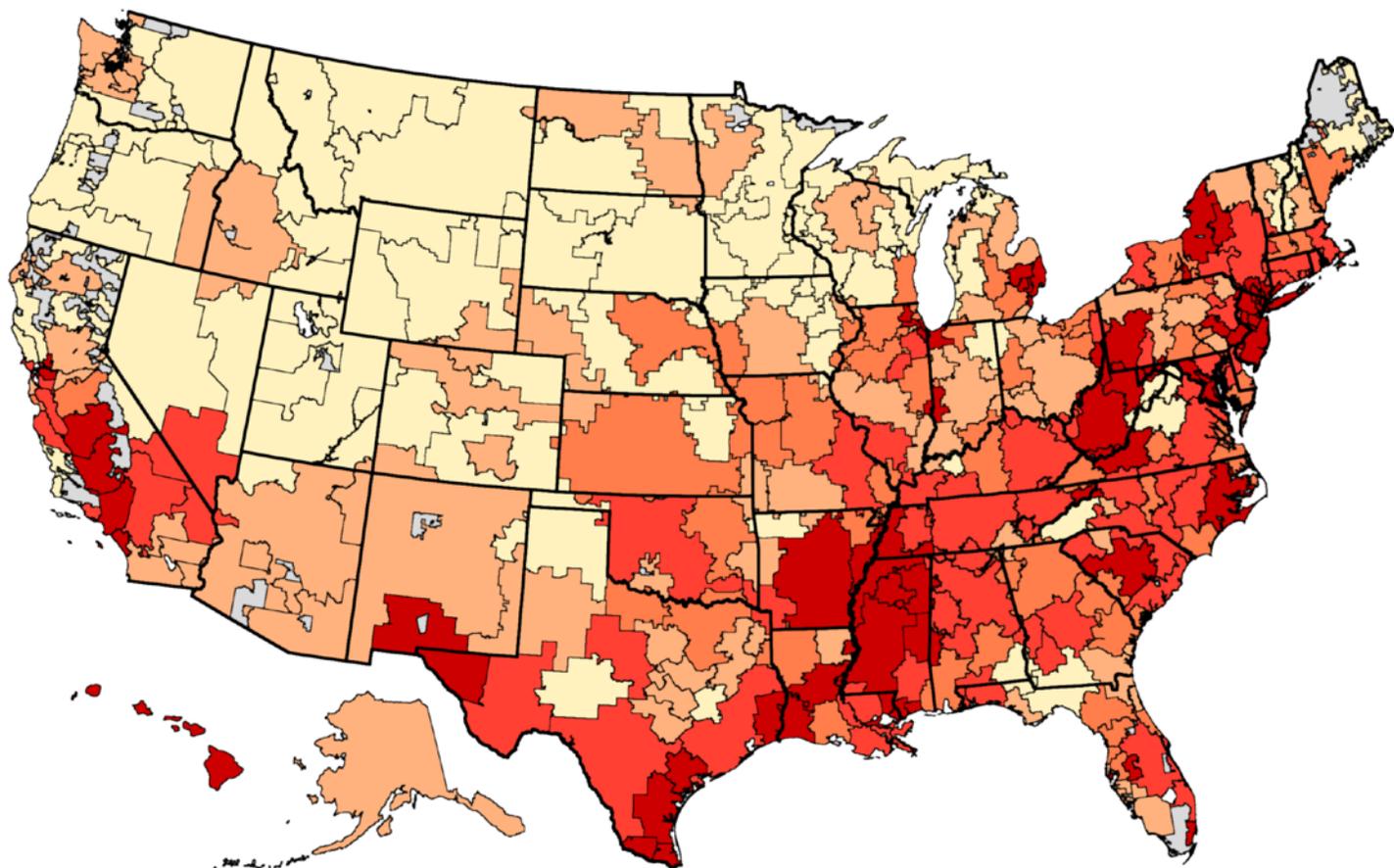
## Hospital days during the last month of life among hospital referral regions

On average, cancer patients spent 5.1 days in the hospital during the last month of life. Cancer patients spent a week or more of their last month of life in the hospital in several regions in New York and New Jersey, including Manhattan (7.3 days), Newark (7.1), Ridgewood, New Jersey (7.1) and New Brunswick, New Jersey (7.0). Patients spent four or fewer days in the hospital during the last month of life in Salt Lake City (3.5), Madison, Wisconsin (3.7) and Portland, Oregon (4.0).



**Figure 3. Average number of days spent in hospital per cancer patient during the last month of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. The amount of time cancer patients spent in the hospital during the last month of life varied more than twofold, from 2.7 days in Mason City, Iowa to more than a week in Manhattan.

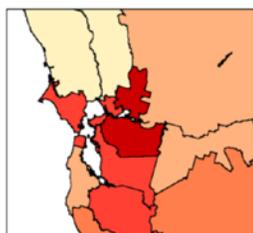


**Hospital Days per Cancer Patient during the Last Month of Life**

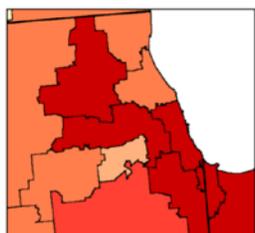
by HRR (deaths occurring 2003-07)

- 5.6 to 7.3 (63)
- 5.2 to < 5.6 (58)
- 4.8 to < 5.2 (54)
- 4.3 to < 4.8 (66)
- 2.7 to < 4.3 (65)
- Not populated

**Map 3. Average number of days spent in hospital per cancer patient during the last month of life (deaths occurring 2003-07)**



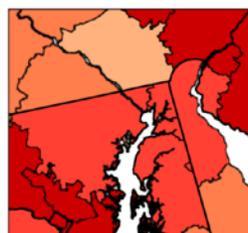
San Francisco



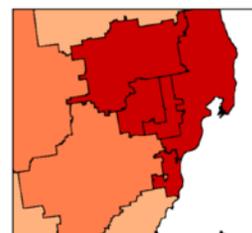
Chicago



New York



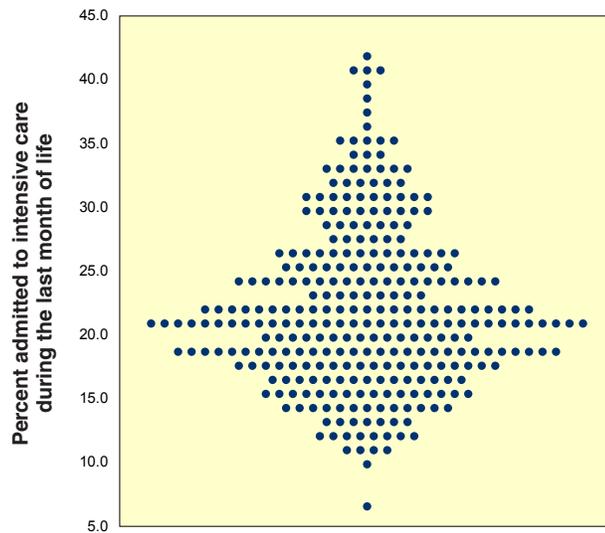
Washington-Baltimore



Detroit

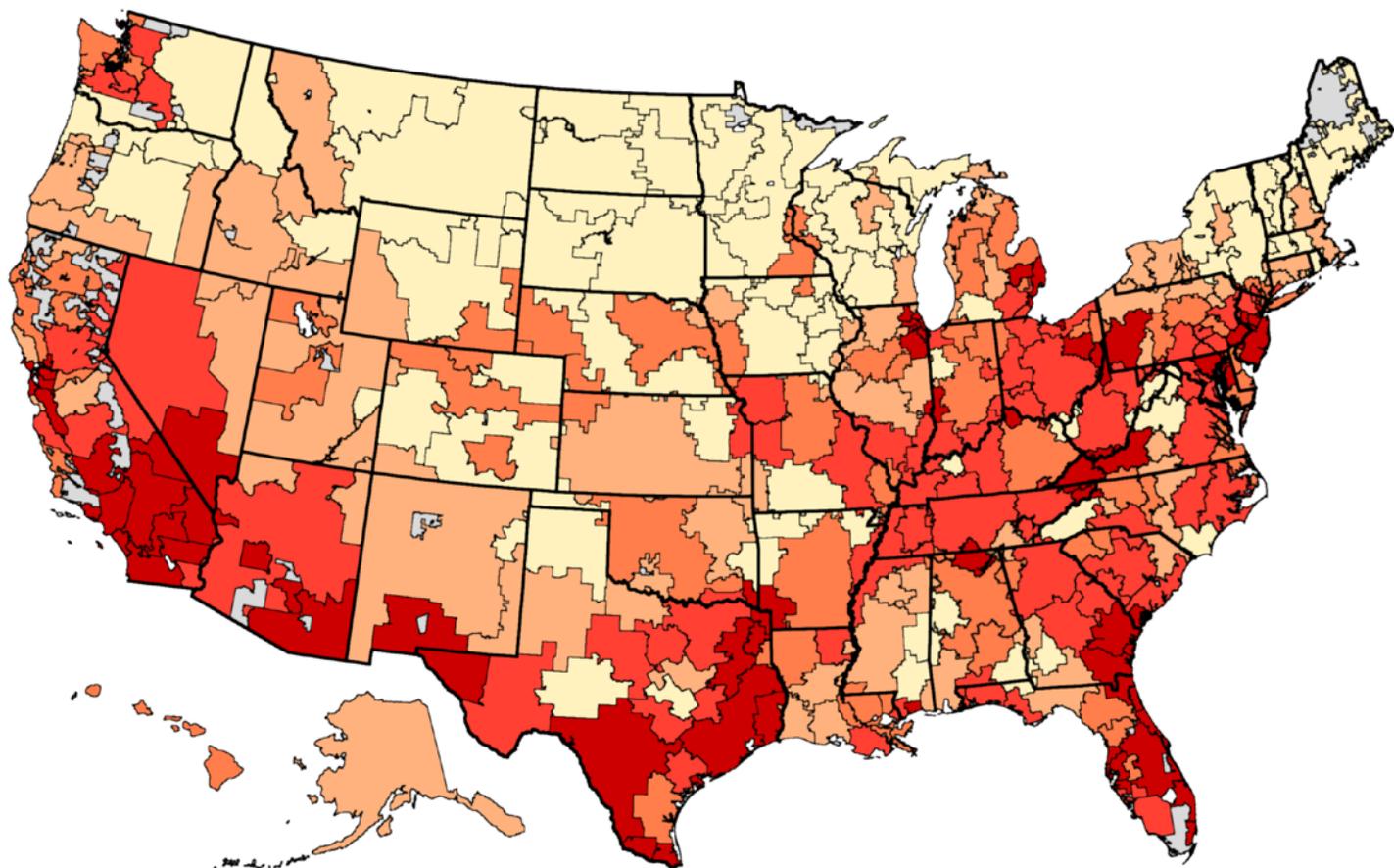
## Intensive care admissions during the last month of life among hospital referral regions

About 24% of cancer patients were admitted to intensive care at least once during their last month of life. However, the percent admitted to intensive care varied more than sevenfold across hospital referral regions. More than 40% of cancer patients who died from 2003 to 2007 were admitted to intensive care during the last month of life in Huntsville, Alabama (42.4%), McAllen, Texas (41.0%), Los Angeles (40.3%) and Miami (40.3%). Only 6% of cancer patients were admitted to intensive care during the last month of life in Mason City, Iowa. Admission rates to intensive care were also low in Madison, Wisconsin (13.0%), Portland, Maine (14.3%) and Minneapolis (14.6%).



**Figure 4. Percent of cancer patients admitted to intensive care during the last month of life among hospital referral regions (deaths occurring 2003-07)**

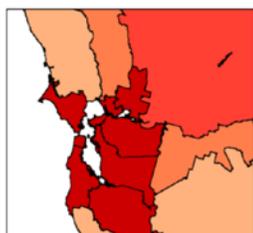
Each dot represents one of 306 hospital referral regions. Seven times more cancer patients were admitted to intensive care during the last month of life in the Huntsville, Alabama region than in Mason City, Iowa.



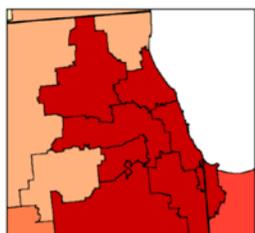
**Percent of Cancer Patients  
Admitted to Intensive Care  
during the Last Month of Life**  
by HRR (deaths occurring 2003-07)

- 27% to 43% (62)
- 22% to <27% (64)
- 20% to <22% (57)
- 17% to <20% (58)
- 5% to <17% (65)
- Not populated

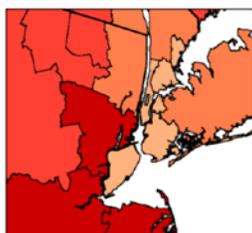
**Map 4. Percent of cancer patients admitted to intensive care during the last month of life (deaths occurring 2003-07)**



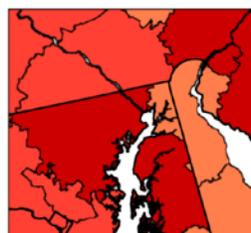
San Francisco



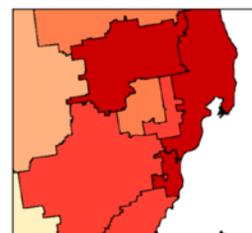
Chicago



New York



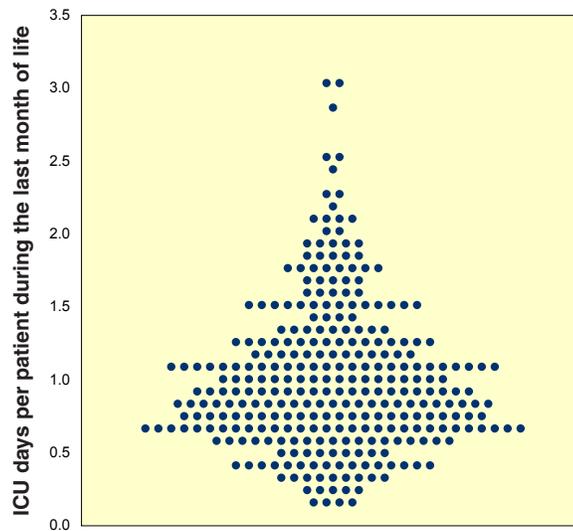
Washington-Baltimore



Detroit

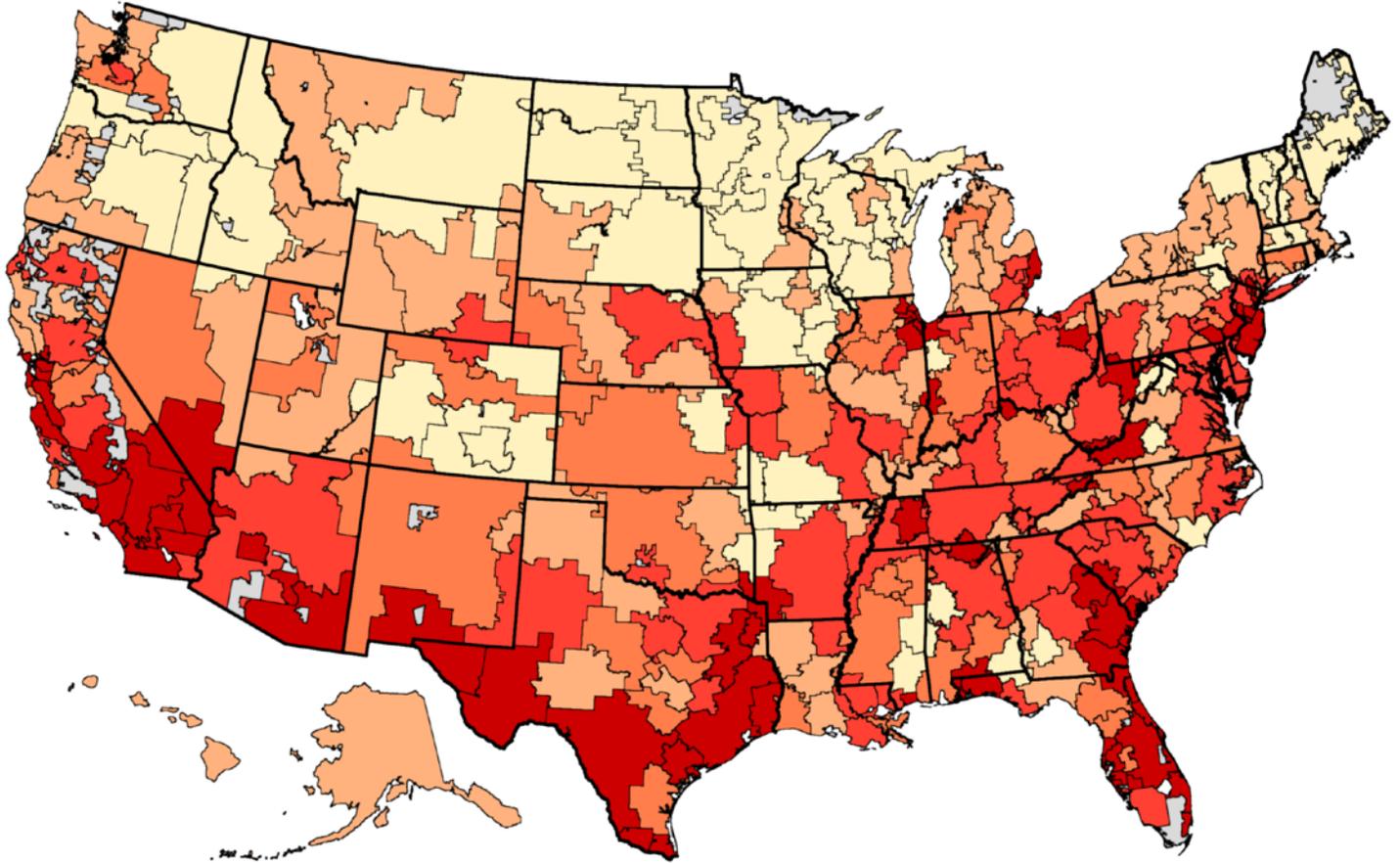
## Intensive care days during the last month of life among hospital referral regions

The average number of days cancer patients spent in intensive care units during the last month of life varied dramatically across hospital referral regions. Intensive care days per patient in the highest regions, including Huntsville, Alabama (3.1 days), Miami (3.0) and McAllen, Texas (2.8) were more than 25 times higher than the number of days in the lowest regions, Mason City, Iowa (0.1) and Appleton, Wisconsin (0.1). Intensive care days were also low in Minneapolis (0.4), Portland, Oregon (0.5) and Albany, New York (0.7). The national average of days spent in intensive care per cancer patient during the last month of life was 1.3.



**Figure 5. Average number of days spent in intensive care per cancer patient during the last month of life among hospital referral regions (deaths occurring 2003-07)**

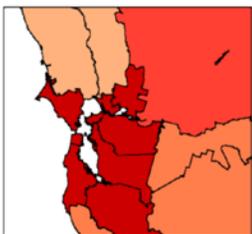
Each dot represents one of 306 hospital referral regions. On average, cancer patients spent 1.3 days in intensive care during the last month of life, but this rate varied by a factor of more than 25 across regions.



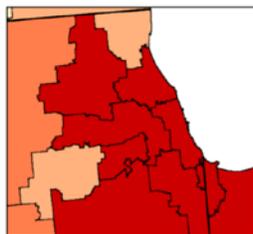
**Intensive Care Days per  
Cancer Patient during  
the Last Month of Life**  
by HRR (deaths occurring 2003-07)

- 1.3 to 3.1 (70)
- 1.0 to < 1.3 (65)
- 0.8 to < 1.0 (51)
- 0.6 to < 0.8 (68)
- 0.1 to < 0.6 (52)
- Not populated

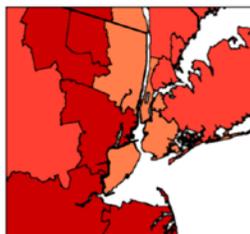
**Map 5. Average number of days spent in intensive care per cancer patient during the last month of life (deaths occurring 2003-07)**



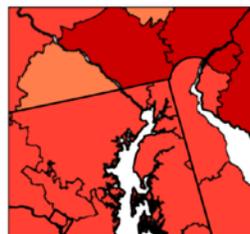
San Francisco



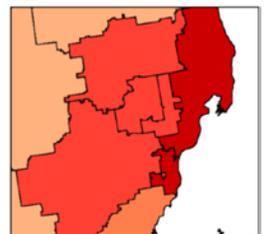
Chicago



New York



Washington-Baltimore



Detroit

## Variation in hospital care across academic medical centers

Academic medical centers in the U.S. are at the forefront of patient care, medical education and research. Most of the new knowledge about cancer care has been developed at academic medical centers, including those designated as National Cancer Institute Cancer Centers. These health systems aspire to practice at the highest level of evidence-based care for cancer treatment. There have been few previous studies of end-of-life care at academic medical centers,<sup>20</sup> particularly of cancer care. This report provides information about the care provided to Medicare beneficiaries at specific centers for several indicators of end-of-life care quality, beginning with the use of hospital care.

There is a remarkable amount of variation in the use of hospitals for elderly patients with poor prognosis cancer who are near the end of life. Even after controlling for cancer type, age, sex and race, there were more than twofold differences in the number of days spent in hospitals and intensive care units in the last month of life. These differences in patient care should stimulate teaching hospitals to further examine clinician practice styles and decision-making processes in relation to the evolving national norms of quality end-of-life care.

### ***What should hospitals do to improve care for patients at the end of life?***

Fundamental to patient-centered cancer care are health care providers educating patients about their prognoses, eliciting their preferred treatment approaches, and formulating care plans that respect their choices regarding the goals of care. The majority of cancer patients want to be involved in their medical care, but a collusion of silence and health care fragmentation results in far too many patients uninformed of their prognoses and the option of hospice. Many are informed far too late, resulting in hospice referral in the last three days of life. This pattern of care often leaves the dying patient in pain and without the opportunity to say “goodbye, I love you, please carry on...”

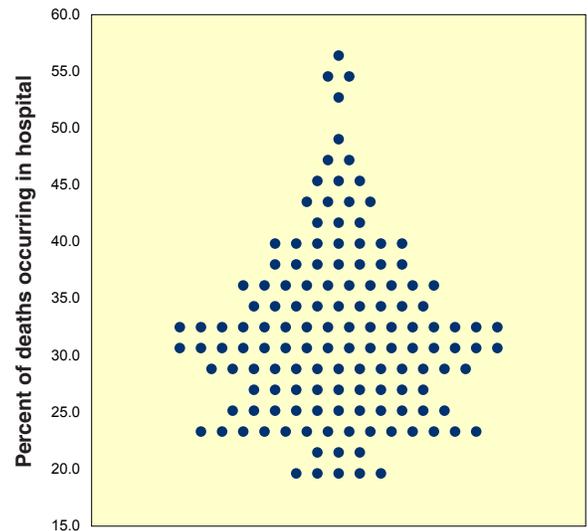
So what should hospitals and academic medical centers do? Be leaders and embrace patient- and family-centered care for all patients, especially those with

cancers with poor prognoses. Hospitals should examine their rates of ICU utilization, hospice referral, and other utilization measures and then ask: do these results reflect a practice of educating patients about their prognoses, eliciting their choices, and forming care plans that respect patients’ goals of care? If opportunities to improve are identified, hospitals should work with the local hospice or existing palliative care consult service, and/or start a palliative care consult service, to ensure that the institution is delivering high-quality care. Health care reform presents an important opportunity to restructure health care and transition from serving the needs of institutions to providing care that focuses on patients, as well as the family members and friends who care for them.

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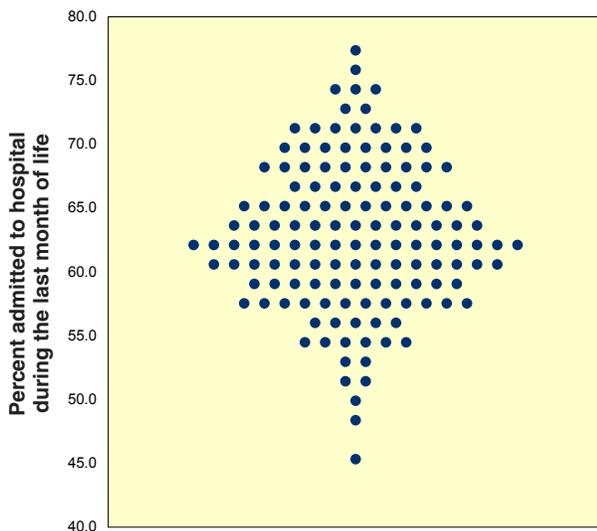
The percent of cancer patients dying in a hospital varied threefold among patients receiving most of their care at academic medical centers (Figure 6). More than half of cancer patients died in the hospital among those receiving care at New York Methodist Hospital (54.9%) and Maimonides Medical Center (54.3%), both in Brooklyn. Other New York City hospitals had much lower rates of death in hospital among cancer patients, including St. Vincent's Hospital (now closed) in Manhattan (30.4%) and Montefiore Medical Center in the Bronx (32.1%); however, even these rates were more than 60% higher than the rate at the lowest academic medical center, Evanston Northwestern Healthcare (18.7%).

The likelihood of being admitted to the hospital during the last month of life among cancer patients varied from less than 50% to more than 75% across academic medical centers (Figure 7). The percent of cancer patients hospitalized during the last month of life was highest among patients frequenting two Detroit hospitals, St. John Hospital and Medical Center (78.1%) and Sinai-Grace Hospital (75.3%). Less than half of cancer patients were admitted to the hospital during the last month of life among those using the University of Washington Medical Center in Seattle (44.6%), the University of Iowa Hospitals and Clinics in Iowa City (48.1%) and the H. Lee Moffitt Cancer Center in Tampa, Florida (49.9%).



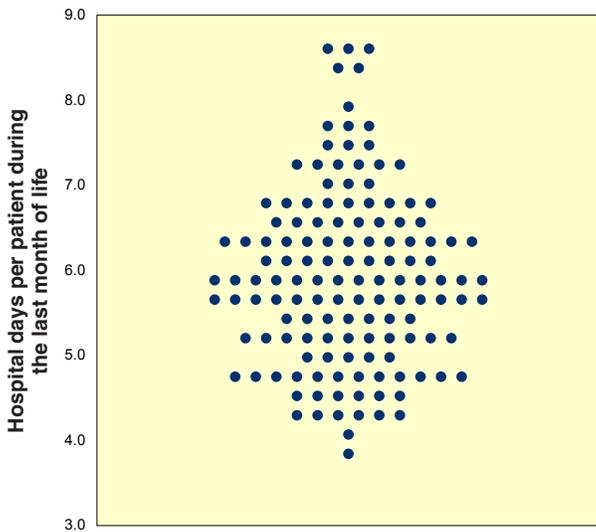
**Figure 6. Percent of cancer patients dying in hospital among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. The percent of cancer patients dying in the hospital ranged from 18.7% of patients using Evanston Northwestern Healthcare in Evanston, Illinois, to 57.3% of patients using Westchester Medical Center in Valhalla, New York.



**Figure 7. Percent of cancer patients hospitalized during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. The percent of cancer patients hospitalized during the last month of life varied by a factor of 1.75 from the lowest to the highest hospital.

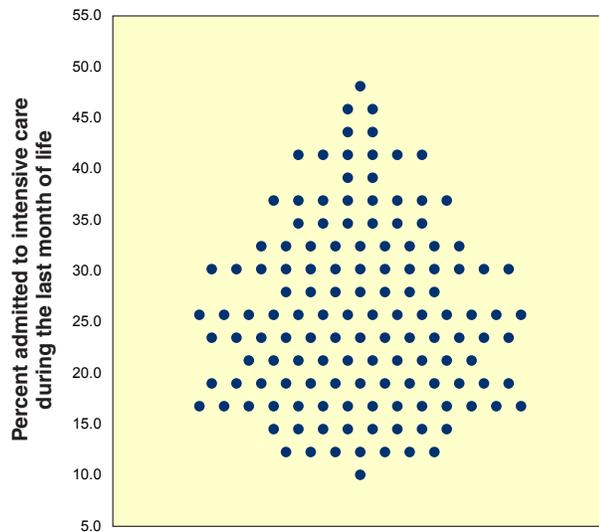


**Figure 8. Average number of days spent in hospital per cancer patient during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. Cancer patients using the University of California Davis Medical Center in Sacramento spent 3.7 days in the hospital during the last month of life; cancer patients using Newark Beth Israel Medical Center spent more than twice this amount of time in the hospital.

On average, cancer patients using several New York and New Jersey hospitals spent a week or more in the hospital during their last month of life. These hospitals included Newark Beth Israel Medical Center (8.7 days), Westchester Medical Center in Valhalla, New York (8.7), New York Methodist Hospital in Brooklyn (8.6) and Winthrop-University Hospital in Mineola, New York (8.5). Patients at Albany Medical Center, by contrast, spent an average of 4.5 days in the hospital during the last month of life. Among New York City hospitals, the day rate per patient during the last month of life was lowest at Memorial Sloan-Kettering Cancer Center (6.3).

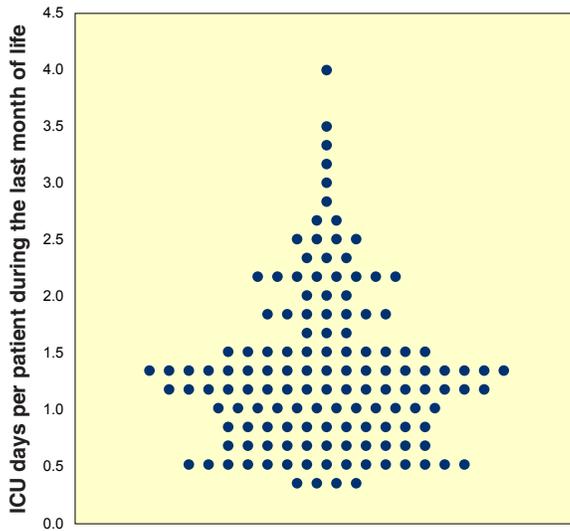
The percent of cancer patients admitted to intensive care during the last month of life varied fivefold among those frequenting academic medical centers. Nearly half of cancer patients were admitted to intensive care during the last month of life at St. John Hospital and Medical Center in Detroit (46.1%) and Allegheny General Hospital in Pittsburgh (46.0%). Use of intensive care units for cancer patients was dramatically lower at Memorial Sloan-Kettering Cancer Center in Manhattan (8.9%) and Montefiore Medical Center in the Bronx (12.1%).



**Figure 9. Percent of cancer patients admitted to intensive care during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. Cancer patients were more than five times more likely to be admitted to intensive care during the last month of life at Cooper Health System in Camden, New Jersey than at Memorial Sloan-Kettering Cancer Center: the rates at these hospitals were 49.2% and 8.9%, respectively.

The average number of days cancer patients spent in intensive care during the last month of life varied by a factor of nearly 15. Intensive care day rates were among the highest for cancer patients using three hospitals in Pennsylvania: Allegheny General Hospital in Pittsburgh (4.1 days), Thomas Jefferson University Hospital in Philadelphia (3.3) and Lankenau Hospital in Wynnewood (3.2). By contrast, intensive care day rates among cancer patients were among the lowest at Geisinger Medical Center in Danville, Pennsylvania (0.5).

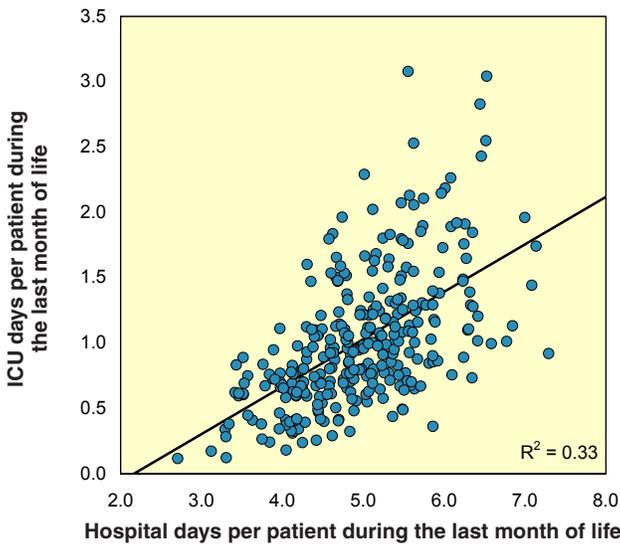


**Figure 10. Average number of days spent in intensive care per cancer patient during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. Cancer patients spent, on average, 0.3 days in intensive care during the last month of life at St. Francis Hospital and Medical Center in Hartford, Connecticut and Fletcher Allen Health Care in Burlington, Vermont. The rate was nearly 15 times higher at Allegheny General Hospital.

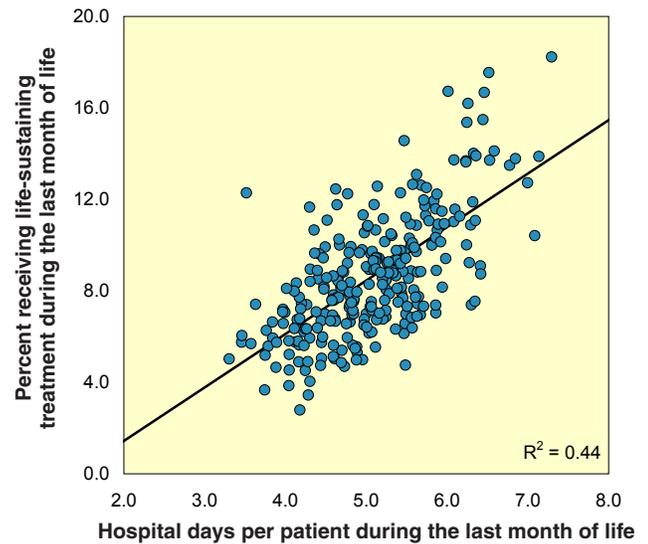
## Hospital days in the last month of life are a good indicator of care intensity across regions

The hospital where a patient with advanced cancer received care determined more than the number of days they spent in the hospital. Patients with more hospital days also spent more days in intensive care units, received more aggressive treatment—such as endotracheal intubation, feeding tube placement, CPR and chemotherapy—and received care from many different physicians. Figures 11 to 14 show that, across hospital referral regions, there was a positive association between the number of hospital inpatient days experienced by patients during the last month of life and other types of cancer care.<sup>i</sup>



**Figure 11. The relationship between the average number of days spent in hospital and in intensive care per cancer patient during the last month of life among hospital referral regions (deaths occurring 2003-07)**

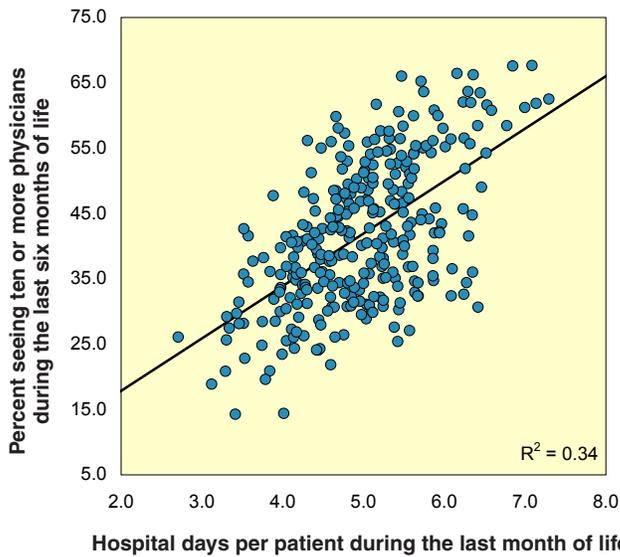
The figure shows the relationship between the average number of days cancer patients spent in the hospital and in intensive care during the last month of life. Each dot represents one of 306 hospital referral regions. One third of the variation in the ICU day rate can be explained by the variation in the hospital day rate ( $R^2 = 0.33$ ).



**Figure 12. The relationship between the average number of days spent in hospital per cancer patient and the percent of cancer patients receiving life-sustaining treatment during the last month of life among hospital referral regions (deaths occurring 2003-07)**

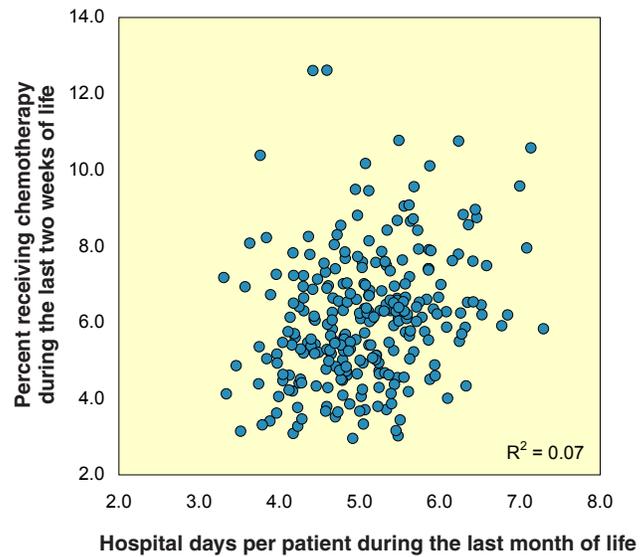
The figure shows the relationship between the average number of days cancer patients spent in hospital and the percent receiving life-sustaining treatment during the last month of life among hospital referral regions. There was a strong relationship between the amount of time cancer patients spent in the hospital and their likelihood of receiving a life-sustaining procedure ( $R^2 = 0.44$ ).

<sup>i</sup> The  $R^2$  value is an indication of the strength of the correlation between two variables. For example, if the  $R^2$  association between the number of days cancer patients spent in the hospital during the last month of life and the percent receiving chemotherapy during the last two weeks if life was 0.07, that means that only 7% of the variation in the percent of patients receiving chemotherapy could be explained by the hospital day rate. That is a weak relationship. An  $R^2$  of 0.50, on the other hand, would suggest that the average number of hospital days per cancer patient accounted for 50% of the variation in the percent receiving chemotherapy. That is a strong relationship.



**Figure 13. The relationship between the average number of days spent in hospital per cancer patient during the last month of life and the percent of cancer patients seeing ten or more physicians during the last six months of life among hospital referral regions (deaths occurring 2003-07)**

Among hospital referral regions, the variation in the number of days cancer patients spent in the hospital during their last month of life explained 34% of the variation in the percent seeing ten or more different physicians during the last six months of life ( $R^2 = 0.34$ ).

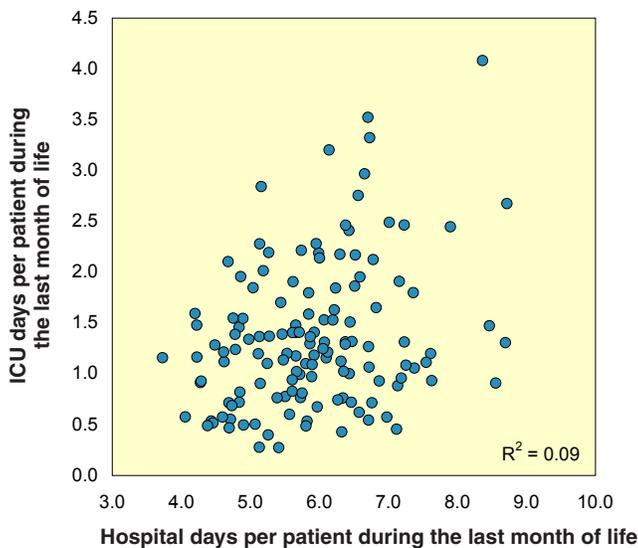


**Figure 14. The relationship between the average number of days spent in hospital per cancer patient during the last month of life and the percent of cancer patients receiving chemotherapy during the last two weeks of life among hospital referral regions (deaths occurring 2003-07)**

The relationship between the amount of time cancer patients spent in the hospital during their last month of life and the likelihood of receiving chemotherapy during their last two weeks of life was negligible among hospital referral regions ( $R^2 = 0.07$ ).

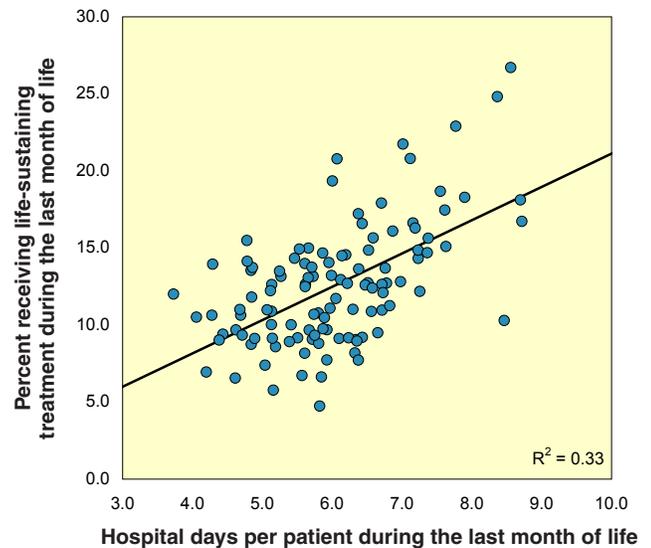
## Hospital days in the last month of life are not always a good indicator of care intensity across academic medical centers

Although more hospital days in the last month of life correlated with more aggressive cancer care at a regional level, this was not always true for individual hospitals. Figures 15 to 18 show a relatively weak relationship between the number of hospital days in the last month of life and other types of cancer care among patients receiving their care at academic medical centers. This reflects the differences in the ways that specific academic medical centers care for patients with poor prognosis cancer. For example in some hospitals where patients generally received more hospital days of care, patients spent no more time in the ICU, but received a greater number of chemotherapy treatments.



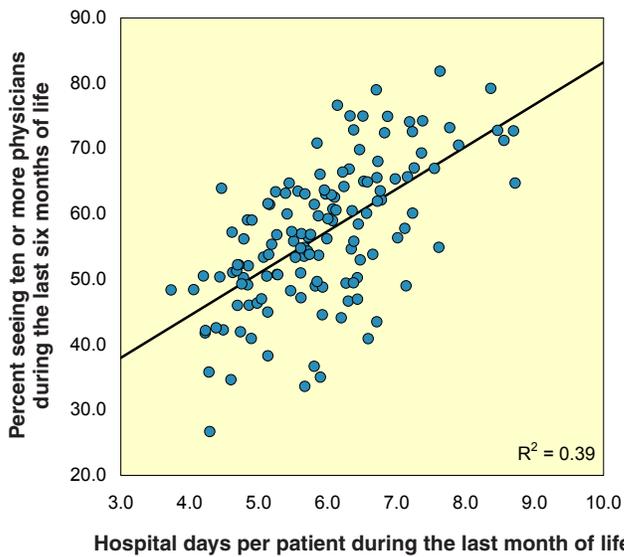
**Figure 15.** The relationship between the average number of days spent in hospital and in intensive care per cancer patient during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)

The figure shows the relationship between the average number of days cancer patients spent in the hospital and in intensive care during the last month of life among patients using 137 academic medical centers most often for their care. There was a weak relationship between the overall amount of time spent in the hospital and time spent in intensive care ( $R^2 = 0.09$ ).



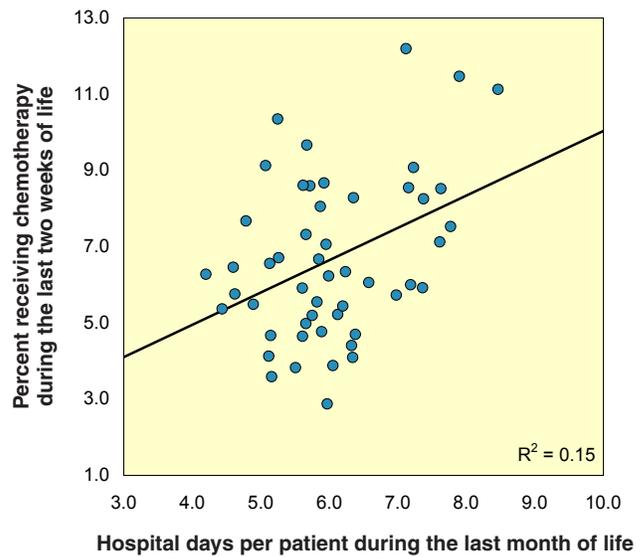
**Figure 16.** The relationship between the average number of days spent in hospital per cancer patient and the percent of cancer patients receiving life-sustaining treatment during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)

There was a relatively strong relationship between the amount of time spent in the hospital and the likelihood of experiencing a life-sustaining procedure among cancer patients frequently using academic medical centers ( $R^2 = 0.33$ ).



**Figure 17. The relationship between the average number of days spent in hospital per cancer patient during the last month of life and the percent of cancer patients seeing ten or more physicians during the last six months of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Almost 40% of the variation in the percent of cancer patients seeing ten or more different physicians during the last six months of life among academic medical centers can be explained by the number of days cancer patients spent in the hospital during their last month of life ( $R^2 = 0.39$ ).



**Figure 18. The relationship between the average number of days spent in hospital per cancer patient during the last month of life and the percent of cancer patients receiving chemotherapy during the last two weeks of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

There was a moderate relationship between the amount of time cancer patients spent in the hospital during their last month of life and their likelihood of receiving chemotherapy during their last two weeks of life among patients frequenting academic medical centers ( $R^2 = 0.15$ ).

## Variation in cancer care directed toward cure at the end of life

Chemotherapy and life-sustaining procedures can prolong life and return some cancer patients to home and work. For frail elderly patients, and any patient with advanced cancer, these treatments have limited or no benefit. Across hospital referral regions and academic medical centers, there is marked variation in the frequency of these types of aggressive treatment.

Atul Gawande, a surgeon at Brigham and Women's Hospital in Boston, has written about the challenges faced by patients and physicians as the end of life nears. His article "Letting go: What should medicine do when it can't save your life?" was published in *The New Yorker* on August 2, 2010 and can be found at [www.newyorker.com/reporting/2010/08/02/100802fa\\_fact\\_gawande](http://www.newyorker.com/reporting/2010/08/02/100802fa_fact_gawande)

## ***Life-sustaining treatments***

This section presents three treatments associated with aggressive end-of-life care: endotracheal intubation, feeding tube placement and cardiopulmonary resuscitation (CPR).

***Endotracheal intubation.*** Endotracheal intubation is the insertion of a special breathing tube through the mouth into the windpipe to provide oxygen and breathing assistance with a mechanical ventilator. Patients usually need to be sedated as long as they have this breathing tube, and even mildly sedated patients are unable to talk to caregivers and family. These patients require careful monitoring and nursing care and usually remain in intensive care units. This can be a life-saving procedure for patients who need temporary assistance with breathing. Patients near the end of life, such as poor prognosis cancer patients, are rarely able to breathe again on their own. While some hours or days of life may be gained, patients are often unaware of their surroundings and unable to communicate with family and caregivers.

***Feeding tube placement.*** One way of providing water and nutrition for very ill patients who cannot eat by mouth is to insert a tube through the skin and muscles of the abdomen and into the stomach. The tube can be left in place for weeks or months. Fluids are then slowly pumped into the stomach. The feeding tube placement procedure is done by a surgeon with the patient under heavy sedation or anesthesia. This can help some

patients get better sooner by improving their nutritional state. For patients near the end of life, a feeding tube has few benefits and means being attached to a feeding pump for many hours of the day.

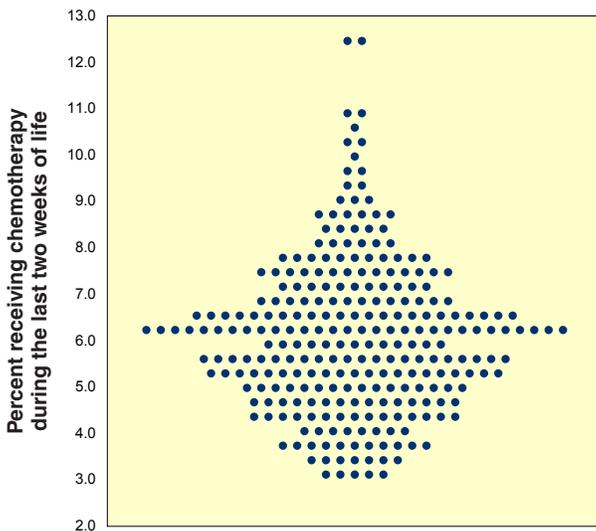
***Cardiopulmonary resuscitation.*** When a patient's lungs or heart stops, CPR attempts to prevent immediate death by compressing the chest and pumping air into the lungs through the mouth. For some causes of cardiopulmonary arrest, CPR is lifesaving, although only a small proportion of patients recover enough to leave the hospital. However, an extremely small number of patients with terminal cancer can be successfully resuscitated. Many elderly patients suffer injury during the resuscitation process, including broken ribs. For patients who want to die peacefully with family close by, CPR is very disruptive. It is extremely rare that CPR succeeds in prolonging life in a way that allows patients to communicate again with spouses and relatives.

These procedures can save lives and provide good long-term outcomes for many patients with serious illness, including pneumonia, early stage cancer, or a heart attack. However, in patients with advanced chronic illness, particularly poor prognosis cancer, the likelihood that life will be prolonged is very low. Each of the procedures has the potential for causing harm or prolonging suffering. Patients who are included in the decision-making process about their end-of-life care, either before or when they are ill, often decline these procedures.

## Chemotherapy during the last two weeks of life

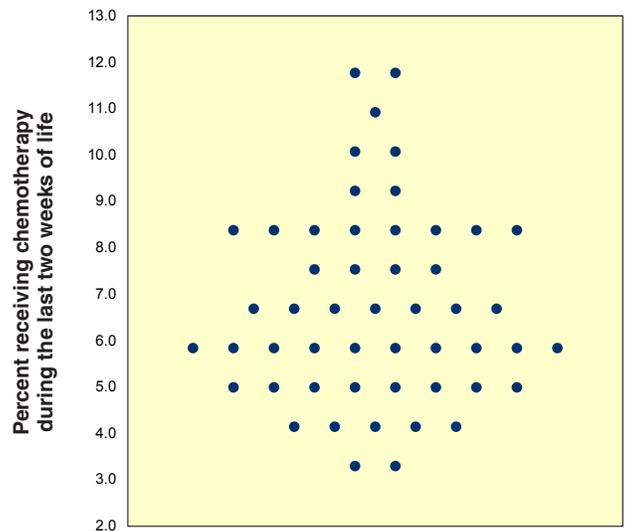
The percent of cancer patients receiving chemotherapy during their last two weeks of life varied fourfold among hospital referral regions. More than 10% of cancer patients received chemotherapy during this period in eight regions, including Olympia, Washington (12.6%) and San Antonio, Texas (10.8%). About 3% of cancer patients received chemotherapy during the last two weeks of life in Worcester, Massachusetts and Baton Rouge, Louisiana. On average, 6% of cancer patients received chemotherapy during the last two weeks of life across the United States.

The variation was similar among patients receiving most of their care at academic medical centers. More than 10% of cancer patients received chemotherapy during the last two weeks of life at four hospitals, including Lenox Hill Hospital in Manhattan (12.2%) and Cedars-Sinai Medical Center in Los Angeles (11.5%). Less than 4% had chemotherapy at the Cleveland Clinic (2.9%), Johns Hopkins Hospital (3.8%) and the University of Pittsburgh's Presbyterian Shadyside Medical Center (3.9%).



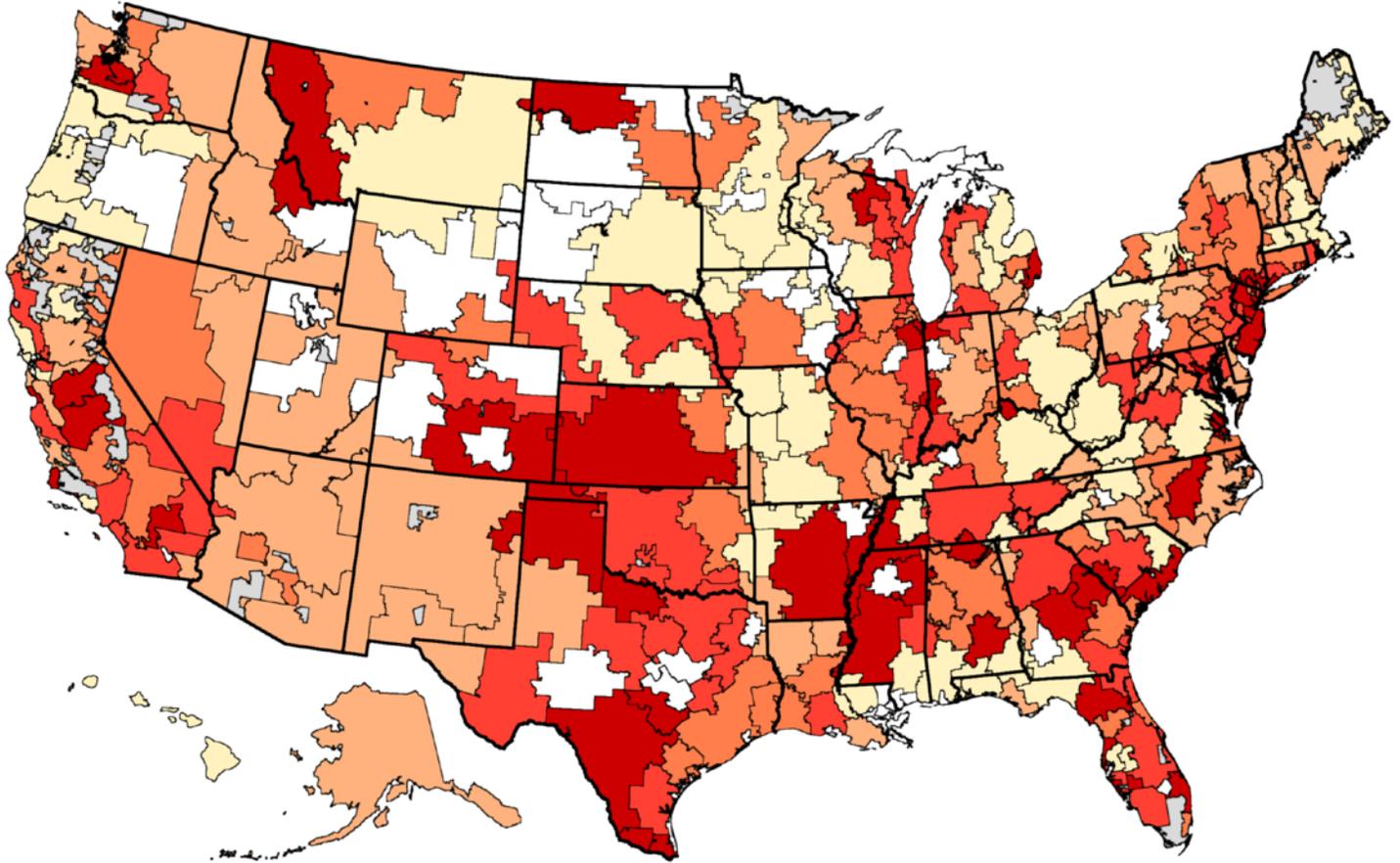
**Figure 19. Percent of cancer patients receiving chemotherapy during the last two weeks of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. Nearly 13% of cancer patients received chemotherapy during the last two weeks of life in Olympia, Washington and Minot, North Dakota. About 3% of cancer patients experienced this treatment in five regions.

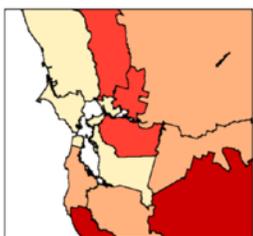
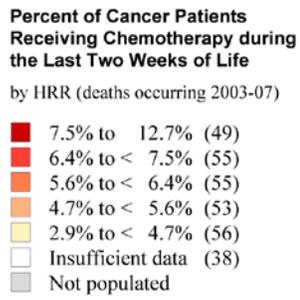


**Figure 20. Percent of cancer patients receiving chemotherapy during the last two weeks of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

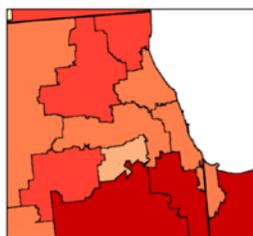
Each dot represents one of 51 academic medical centers with a sufficient number of patients receiving chemotherapy during the last two weeks of life to report the measure. The rates varied fourfold, from about 3% of cancer patients to about 12%.



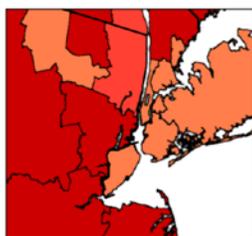
**Map 6. Percent of cancer patients receiving chemotherapy during the last two weeks of life (deaths occurring 2003-07)**



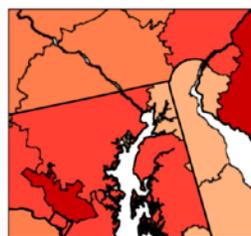
San Francisco



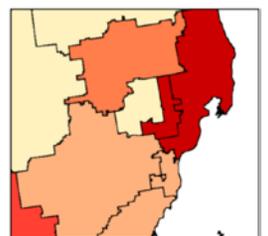
Chicago



New York



Washington-Baltimore

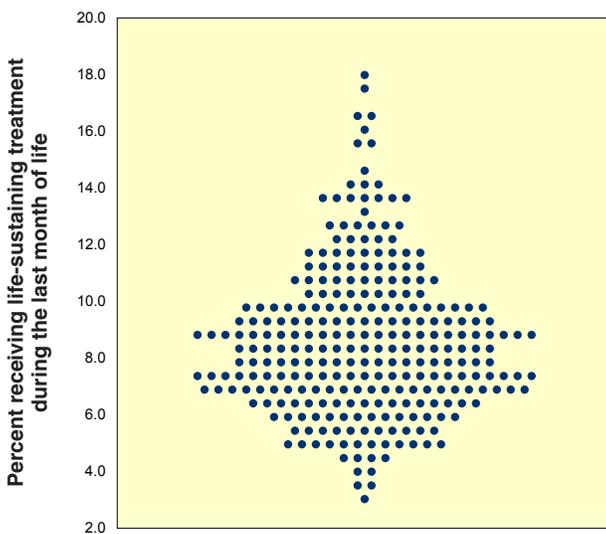


Detroit

## Life-sustaining treatment during the last month of life

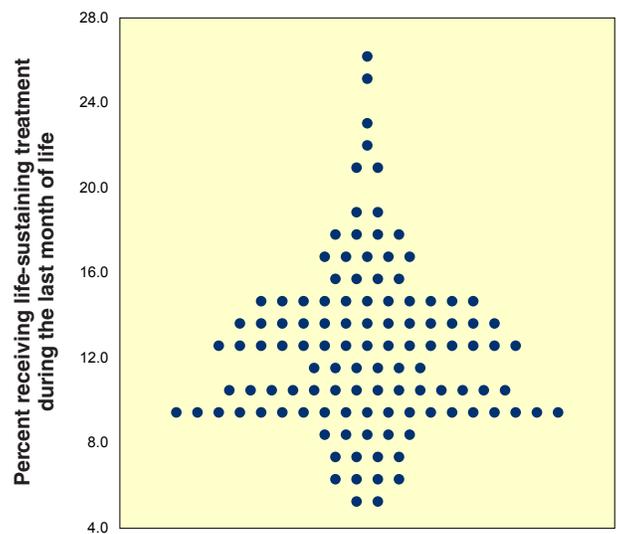
Among cancer patients, the percent receiving life-sustaining treatment during the last month of life was about 9%, but rates varied by a factor of more than six among hospital referral regions. Cancer patients were most likely to receive life-sustaining treatment in the Manhattan hospital referral region, where 18.2% experienced a procedure such as endotracheal intubation, feeding tube placement or CPR. Rates of life-sustaining treatment were also high in Los Angeles (17.5%), Orange County, California (16.7%) and Chicago (16.2%). Cancer patients were much less likely to experience aggressive life-sustaining procedures in Minneapolis (3.9%), Des Moines (5.1%) and Seattle (6.4%).

Rates of aggressive life-sustaining treatment during the last month of life varied more than fivefold among cancer patients using academic medical centers. More than 20% of cancer patients experienced life-sustaining treatment during the last month of life at six hospitals, including three in the New York metropolitan area: New York Methodist Hospital (26.7%), Maimonides Medical Center (22.9%) and Lenox Hill Hospital (20.8%). Rates were below 10% at 34 hospitals, including the University of Texas M.D. Anderson Cancer Center (6.6%), Massachusetts General Hospital (6.7%) and Memorial Sloan-Kettering Cancer Center (8.2%).



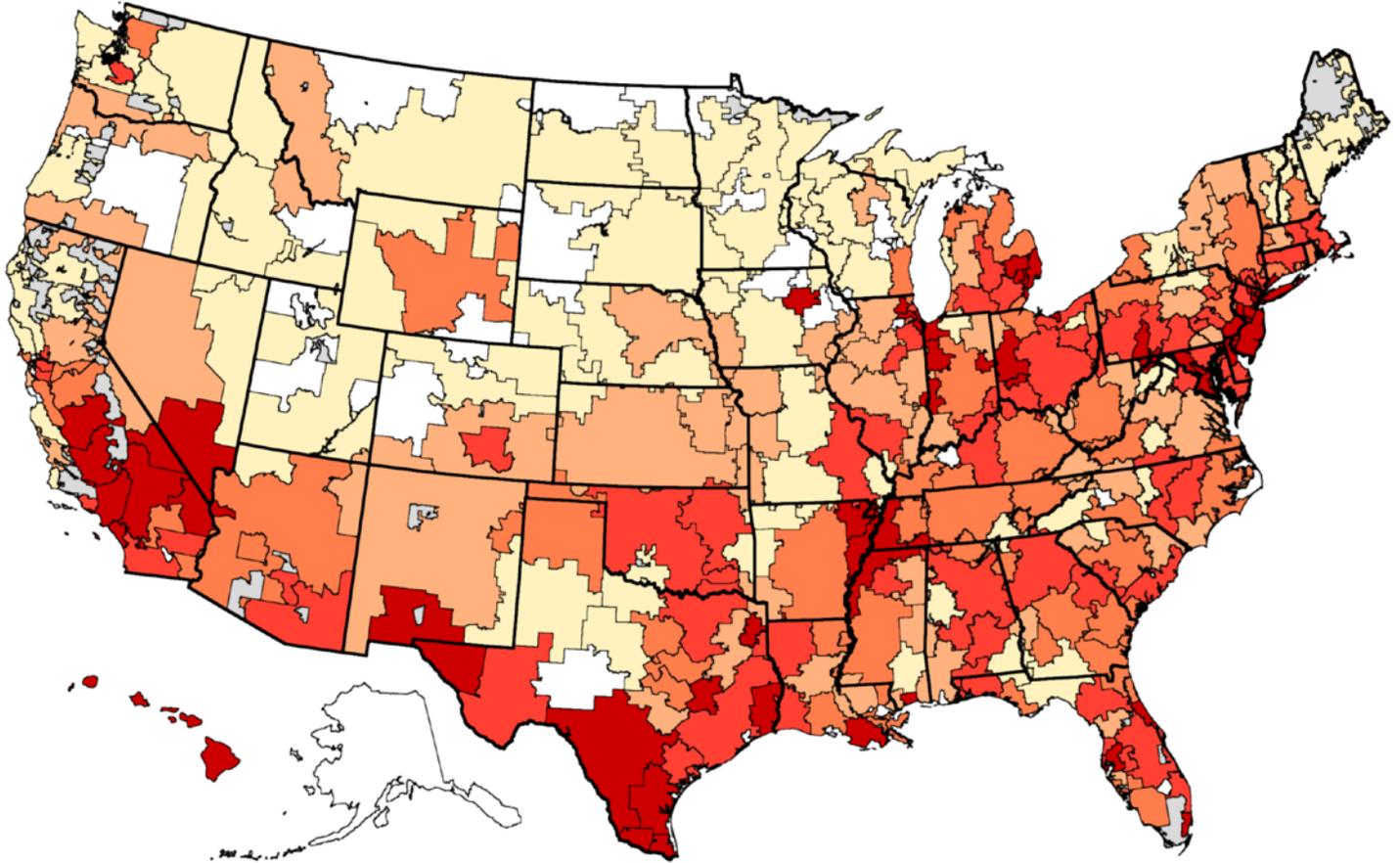
**Figure 21. Percent of cancer patients receiving life-sustaining treatment during the last month of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. The percent of cancer patients receiving a life-sustaining procedure varied more than sixfold among regions, from less than 3% in Green Bay, Wisconsin to more than 18% in Manhattan.



**Figure 22. Percent of cancer patients receiving life-sustaining treatment during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

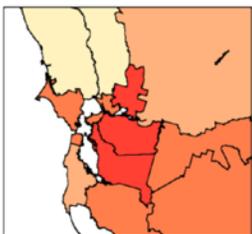
Each dot represents one of 114 academic medical centers with a sufficient number of cancer patients receiving life-sustaining procedures during the last month of life to report the measure. The rates varied more than fivefold, from less than 5% of cancer patients at Maine Medical Center to about 27% at New York Methodist Hospital.



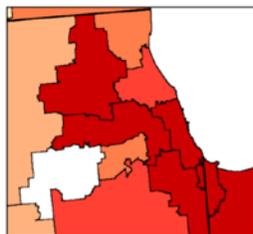
**Percent of Cancer Patients Receiving Life-Sustaining Treatment during the Last Month of Life**  
by HRR (deaths occurring 2003-07)

- 10.8% to 18.3% (55)
- 8.9% to < 10.8% (58)
- 7.6% to < 8.9% (55)
- 6.5% to < 7.6% (55)
- 2.7% to < 6.5% (57)
- Insufficient data (26)
- Not populated

**Map 7. Percent of cancer patients receiving life-sustaining treatment during the last month of life (deaths occurring 2003-07)**



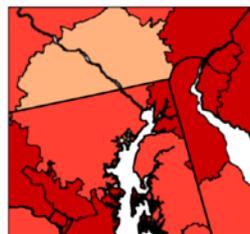
San Francisco



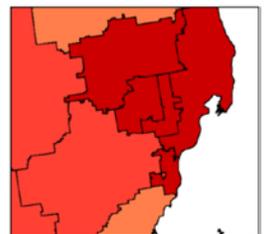
Chicago



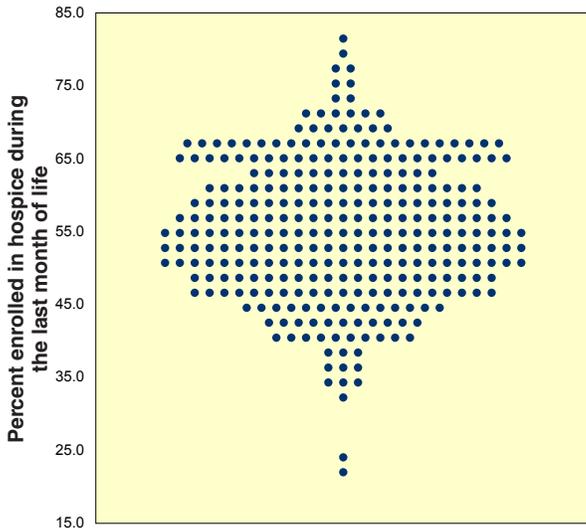
New York



Washington-Baltimore



Detroit



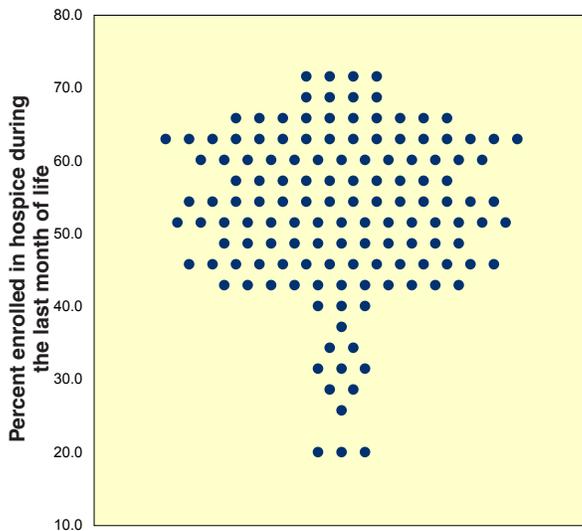
**Figure 23. Percent of cancer patients enrolled in hospice during the last month of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. Use of hospice services by cancer patients during the last month of life varied nearly fourfold, from about 20% to more than 80%.

## Variation in hospice care at the end of life

For elderly patients with serious illness and a life expectancy of six months or less, Medicare benefits include hospice services. Hospice care is directed toward comfort and support services that allow patients to live out their lives to the fullest extent possible.<sup>21</sup> Whenever possible, care is provided in the home, and includes palliative services to control symptoms, home care services, and family support prior to and after the death of the patient. Patients choose to enroll in hospice, and they may withdraw from hospice care at any time.

Hospice care has gained increasing recognition as a valuable way to improve the quality of life for patients with poor prognosis cancer. Still, in many places, the fight for a cancer cure or remission can crowd out discussions with patients about the full range of available treatments, including palliative and hospice care. There was a marked degree of variation in the percent of cancer patients who died and received hospice care in the last month of life. This variation was high across both hospital referral regions and academic medical centers.



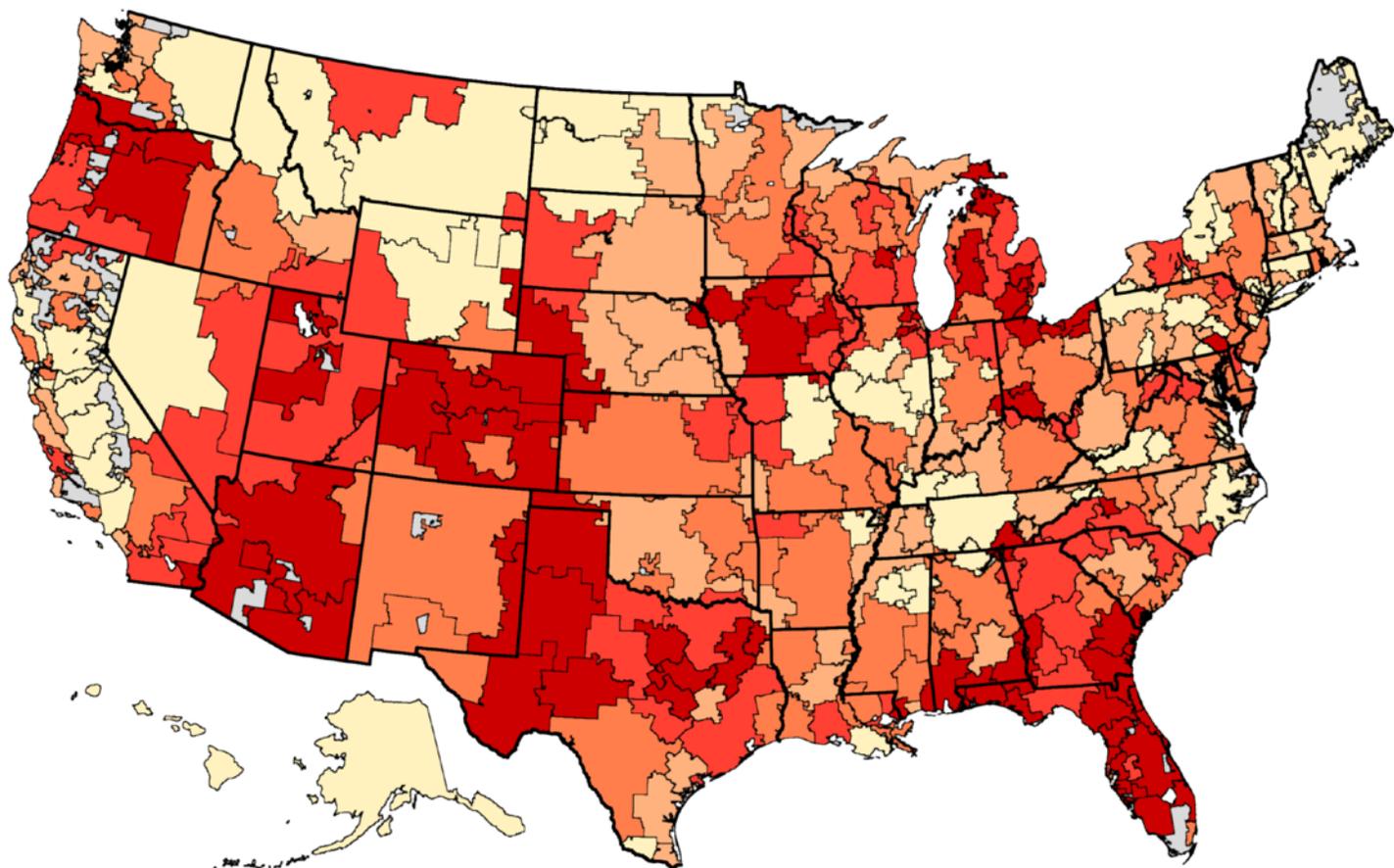
**Figure 24. Percent of cancer patients enrolled in hospice during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. About 20% of cancer patients used hospice services during the last month of life at three hospitals; more than 70% of cancer patients used hospice during this period at four hospitals.

## Percent enrolled in hospice during the last month of life

Nationally, about 55% of cancer patients who died during the period from 2003 to 2007 used hospice services during their last month of life. However, cancer patients in some regions were more than three times more likely to be enrolled in hospice during the last month of life than patients in others. In Mason City, Iowa, 82.5% of cancer patients were enrolled in hospice during the last month of life. More than three quarters of cancer patients also used hospice services in Sun City, Arizona (79.9%) and Fort Myers, Florida (75.6%). By contrast, less than one quarter of cancer patients used hospice in the last month of life in the Bronx (21.0%) and Anchorage, Alaska (24.4%). Rates were also relatively low in Manhattan (31.3%) and Los Angeles (39.9%).

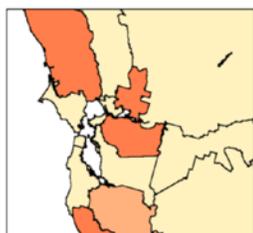
Use of hospice services during the last month of life among cancer patients frequenting academic medical centers also varied nearly fourfold. More than 70% of cancer patients were enrolled in hospice during the last month of life among those receiving care at Monmouth Medical Center in Long Branch, New Jersey (73.0%), Evanston Northwestern Healthcare in Evanston, Illinois (72.1%) and the University Hospitals of Cleveland (70.6%). Less than 20% of cancer patients used hospice services during the last month of life at Westchester Medical Center in Valhalla, New York (18.6%) and Montefiore Medical Center in the Bronx (18.6%).



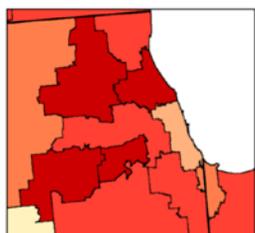
**Percent of Cancer Patients Enrolled in Hospice during the Last Month of Life**  
by HRR (deaths occurring 2003-07)

- 64% to 83% (66)
- 57% to < 64% (57)
- 52% to < 57% (67)
- 47% to < 52% (54)
- 20% to < 47% (62)
- Not populated

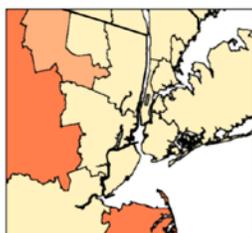
**Map 8. Percent of cancer patients enrolled in hospice during the last month of life (deaths occurring 2003-07)**



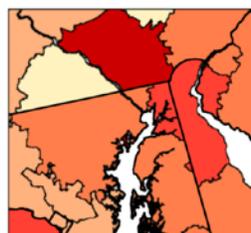
San Francisco



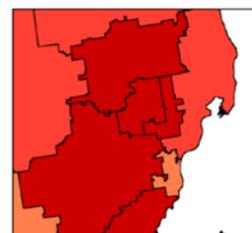
Chicago



New York



Washington-Baltimore

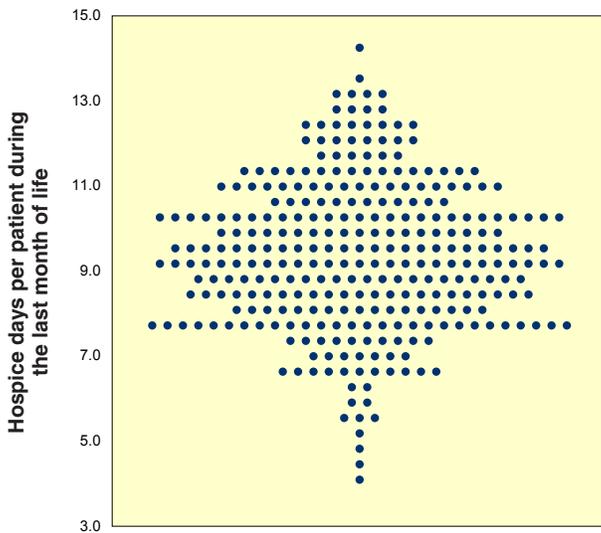


Detroit

## Hospice days during the last month of life

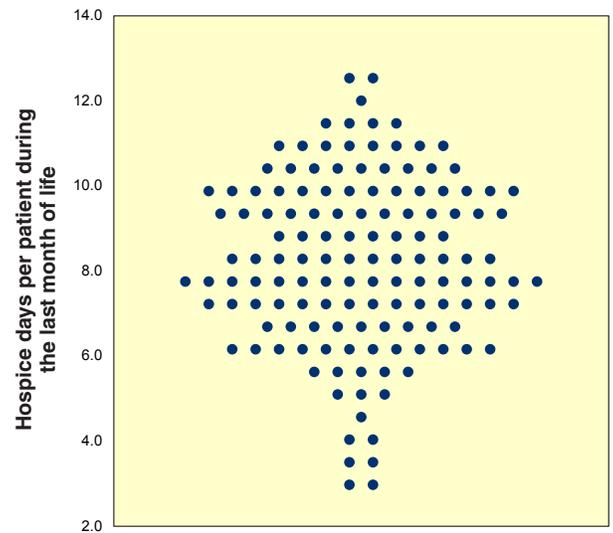
On average, cancer patients dying between 2003 and 2007 spent 8.7 days in hospice during the last month of life. In some hospital referral regions, cancer patients spent almost half of their last month of life in hospice, including Mason City, Iowa (14.4 days), Dothan Alabama (13.6) and San Angelo, Texas (13.3). Cancer patients spent less than one week in hospice in the Bronx (3.9 days), Los Angeles (5.8) and San Francisco (6.6).

Among cancer patients using academic medical centers for most of their care, the amount of time spent in hospice during the last month of life varied more than four-fold. Patients spent more than 12 days in hospice at the University Medical Center in Lubbock, Texas (12.8) and the University of Iowa Hospitals and Clinics (12.5). By contrast, cancer patients spent less than four days in hospice at four New York City-area hospitals, including Montefiore Medical Center (2.7), Westchester Medical Center (2.8), New York Methodist Hospital (3.6) and New York-Presbyterian Hospital (3.8). The number of days spent in hospice was closer to the national average at St. Luke's-Roosevelt Hospital Center in New York City (7.8).



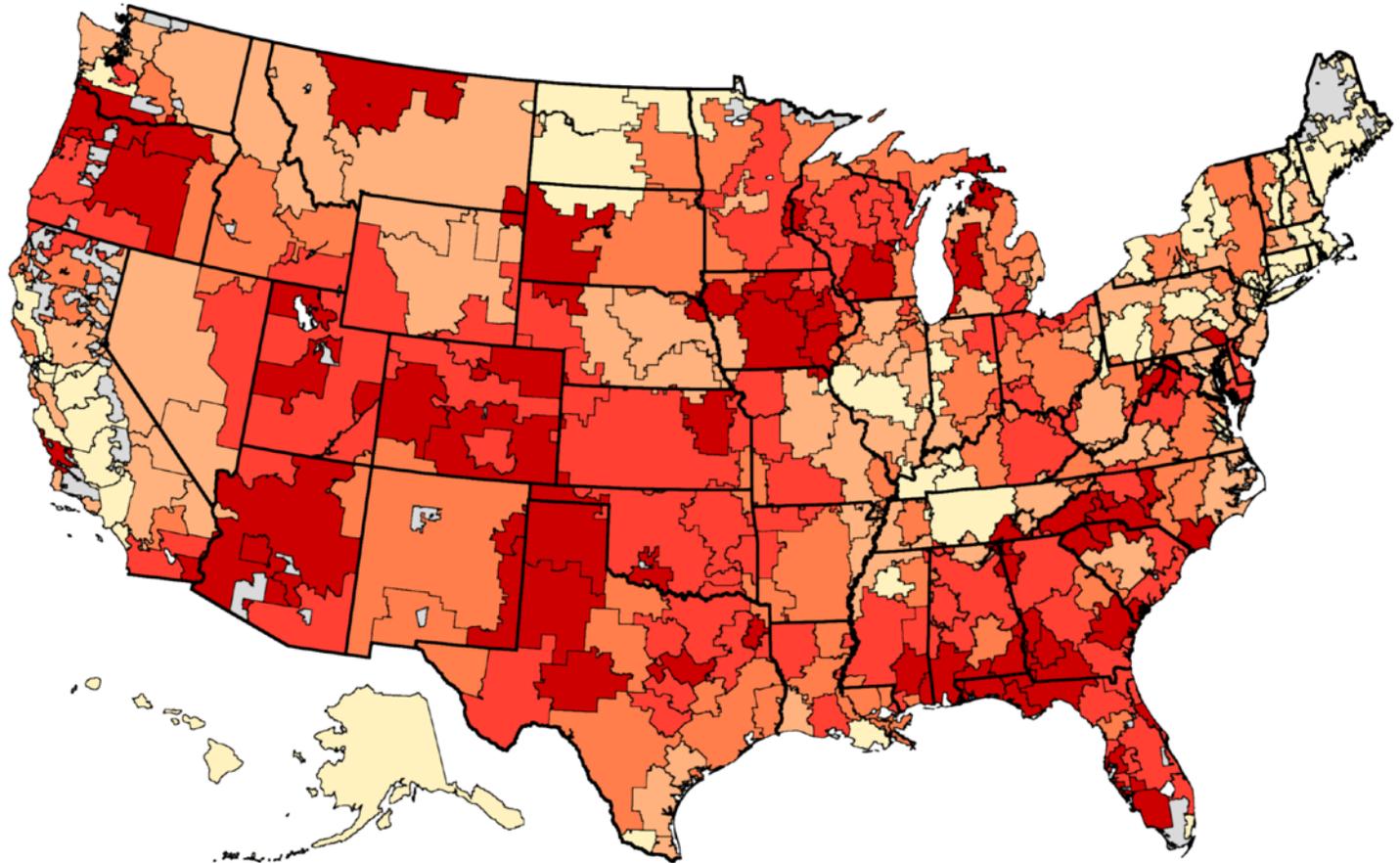
**Figure 25. Average number of days in hospice per cancer patient during the last month of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. The amount of time spent in hospice varied more than threefold, from less than four days per cancer patient during the last month of life to more than two weeks.



**Figure 26. Average number of days in hospice per cancer patient during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. The amount of time cancer patients spent in hospice during the last month of life varied from 2.7 days at the lowest-ranked academic medical center to 12.8 days at the highest.

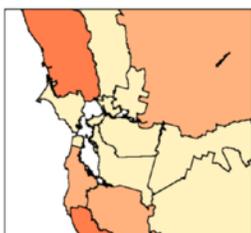


**Hospice Days per Cancer Patient during the Last Month of Life**

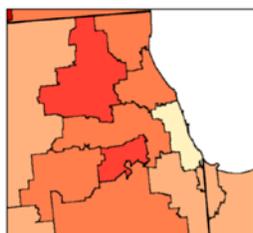
by HRR (deaths occurring 2003-07)

- 10.9 to 14.5 (60)
- 9.7 to < 10.9 (65)
- 8.8 to < 9.7 (61)
- 7.8 to < 8.8 (62)
- 3.9 to < 7.8 (58)
- Not populated

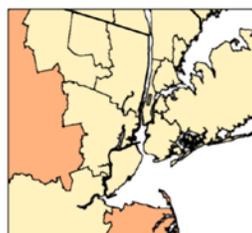
**Map 9. Average number of days in hospice per cancer patient during the last month of life (deaths occurring 2003-07)**



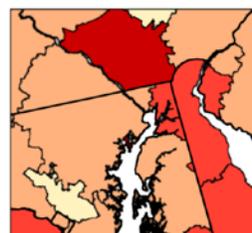
San Francisco



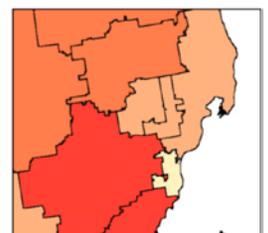
Chicago



New York



Washington-Baltimore



Detroit

## **Variation in less effective hospice care**

The goal of helping cancer patients live out their last weeks and months with as much comfort and function as possible cannot be achieved if patients enter hospice care just before they die. Of course no one can predict with certainty when a patient with serious illness will pass away, but in some health care systems, a relatively high proportion of cancer patients do not enter hospice until they are within three days of death. These regions and academic medical centers may have important opportunities to improve the care of patients with poor prognosis cancer.

## ***Dying well – things for us all to consider***

Remarkable advances in cancer science have cured countless people who would have died prematurely in earlier times. Additionally, millions of Americans now live for years with treatable cancers. Still, today, cancer claims too many lives. No one likes to think about themselves or someone they love dying. Yet in the course of incurable cancer, there often comes a time at which more treatment does not equal better care. Instead, comfort and quality of life become paramount.

At the end of a courageous fight against a relentless disease, the vast majority of people want to die gently. Few people want to be in a hospital in their final days; fewer still want to die in an ICU, tethered to drips and devices. Most of us would like to be at home, or in a homelike setting, surrounded by people we love and that love us. These are reasonable goals, but planning and preparation are required to reliably achieve them.

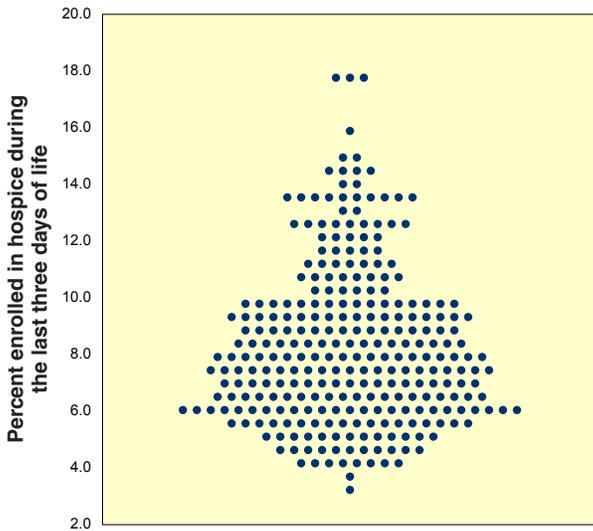
As a doctor caring for people who have serious, life-threatening conditions, I commonly ask patients to consider a few basic questions: What is most important to you as you think about the end of your life? Where would you like to be during your final days? Who would you want to care for you? What types of treatment would you want, or not want?

It is important for each of us to discuss our personal answers to these questions with our families and our doctors. It is also important for each of us to complete an advance directive that formally names those we trust to speak for us in making health care decisions if we become unable to speak for ourselves.

For people who want to be at home through the end of life, and for families who want to care for them, hospice is essential. Hospice programs provide medications needed to control pain and other discomfort, visits by highly skilled nurses, a team of professionals, and quick access to someone to answer questions or manage problems 24 hours a day.

Please talk with your family and the people you love about these difficult but important matters. It is also worthwhile to consider if there would be anything left unsaid if you—or they—were to die suddenly, as any of us might. Because we are all mortal, it is never too soon to say Please forgive me, I forgive you, Thank you, I love you. In so doing, we will be better able to live fully and, when the time comes, better prepared to say Goodbye.

*Ira Byock, MD is Director of Palliative Care at Dartmouth-Hitchcock Medical Center and a professor at Dartmouth Medical School. He is the author of Dying Well and The Four Things That Matter Most.*



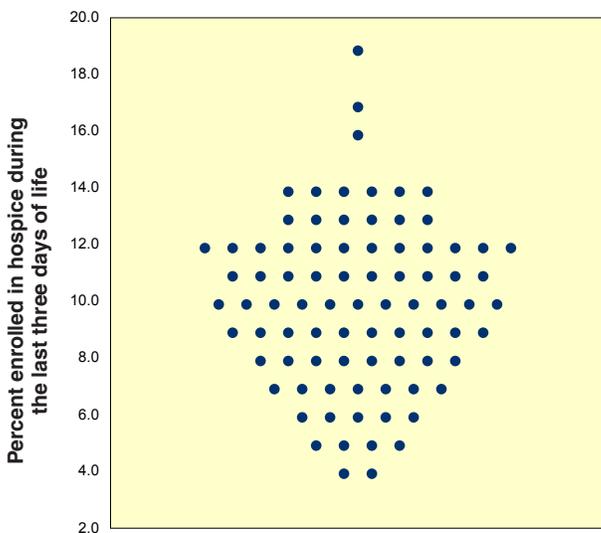
**Figure 27. Percent of cancer patients enrolled in hospice during the last three days of life among hospital referral regions (deaths occurring 2003-07)**

Each dot represents one of 306 hospital referral regions. The percent of cancer patients enrolled in hospice at the very end of life ranged from 3% to 18%.

## Percent enrolled in hospice during the last three days of life

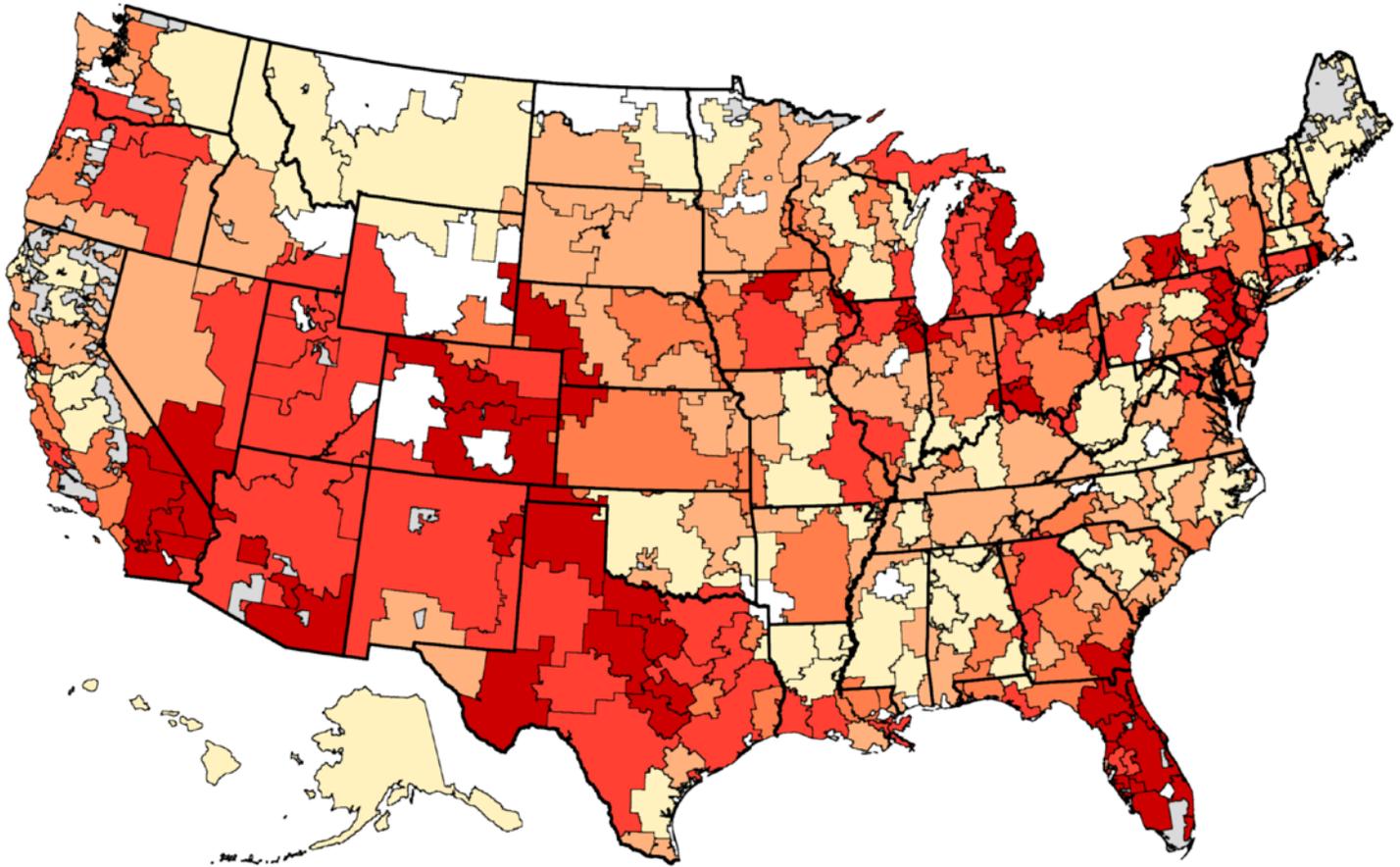
The percent of cancer patients enrolled in hospice during the last three days of life varied sixfold among hospital referral regions. The likelihood of being enrolled in hospice at the very end of life was greater than 15% in five regions, including Royal Oak, Michigan (18.0%), Sun City, Arizona (17.7%) and Fort Lauderdale, Florida (15.8%). Less than 4% of patients were admitted to hospice in the last three days of life in Tupelo, Mississippi (3.0%) and Anchorage (3.7%). The national average was 8.3%. In general, the use of hospice during the last three days of life reflected the overall use of hospice during the last month of life in individual regions. However, this was not always the case; for example, in the Dothan, Alabama region, a relatively high percentage of cancer patients received hospice services during the last month of life (68.7%), but only 5.1% of cancer patients were enrolled in the last three days of life.

The likelihood of being enrolled in hospice in the last three days of life among cancer patients using academic medical centers varied more than fivefold during the period from 2003 to 2007, from less than 4% to almost 20%. The percent of cancer patients enrolled in hospice within three days of death was high among those using St. John Hospital and Medical Center in Detroit (19.3%), St. Mary's Health Center in Richmond Heights, Missouri (17.3%) and Mercy Hospital of Pittsburgh (14.0%). Less than 5% of cancer patients were enrolled in hospice during the last three days of life at Memorial Sloan-Kettering Cancer Center (3.4%) and New York-Presbyterian Hospital (4.1%), reflecting relatively low use of hospice among cancer patients frequenting those hospitals. The rate was also low at Duke University Hospital (4.9%).



**Figure 28. Percent of cancer patients enrolled in hospice during the last three days of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 84 academic medical centers with a sufficient number of cancer patients enrolled in hospice during the last three days of life to report the measure. Rates varied by a factor of more than five, from 3.4% to 19.3%.

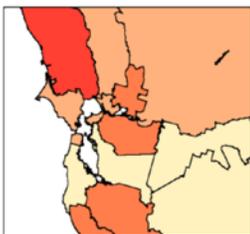


**Percent of Cancer Patients Enrolled in Hospice during the Last Three Days of Life**

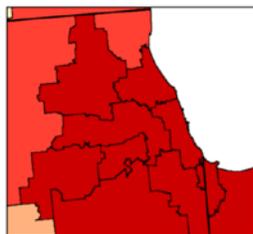
by HRR (deaths occurring 2003-07)

- 10.2% to 18.0% (60)
- 8.5% to < 10.2% (58)
- 7.1% to < 8.5% (57)
- 5.9% to < 7.1% (58)
- 2.9% to < 5.9% (55)
- Insufficient data (18)
- Not populated

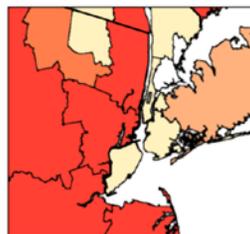
**Map 10. Percent of cancer patients enrolled in hospice during the last three days of life (deaths occurring 2003-07)**



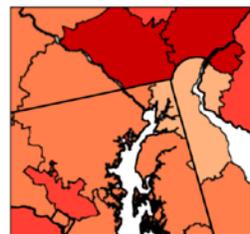
San Francisco



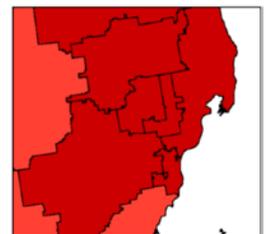
Chicago



New York



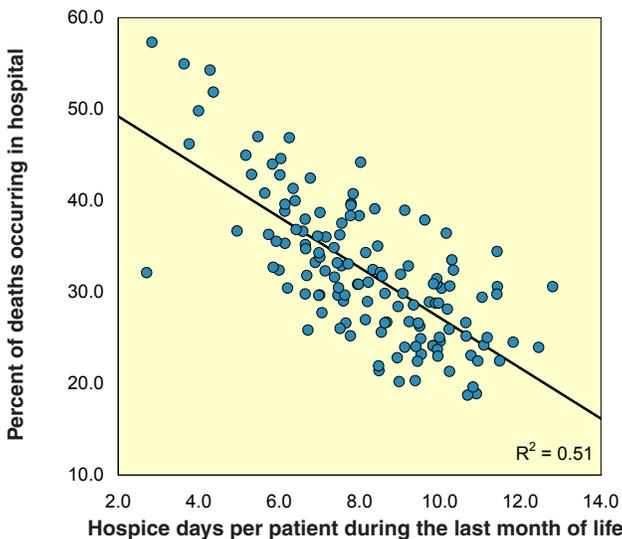
Washington-Baltimore



Detroit

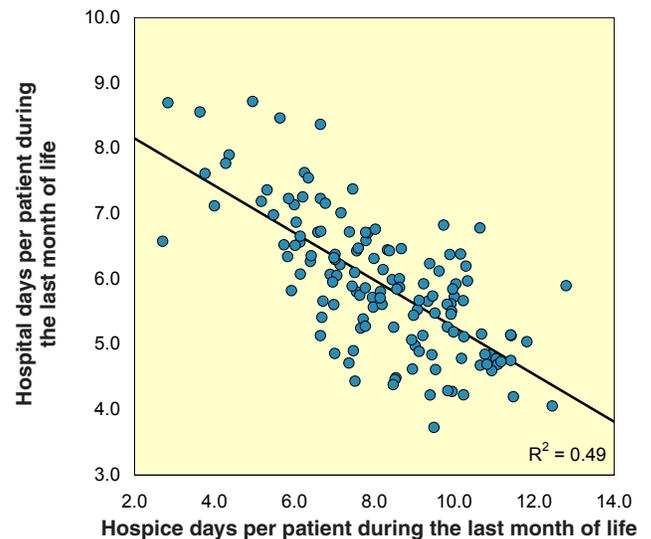
## Hospice care and curative care

Elderly patients with hospice care generally receive much less hospital-based care. This is in keeping with the goals and reimbursement requirements of the Medicare hospice program. Regions and hospitals with patients receiving higher amounts of hospice care, on average, were much less likely to have patients die in the hospital, and the patients spent fewer days in the hospital in the last month of life. There was not a strong relationship between more hospice days and fewer ICU days, life-sustaining procedures or chemotherapy treatments. Overall, these associations show that patients cared for at hospitals providing higher amounts of hospice services did not consistently receive less intensive and curative care.



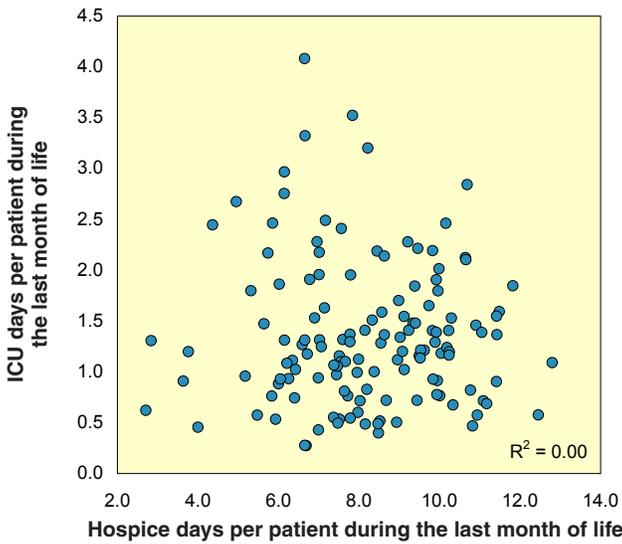
**Figure 29. The relationship between the average number of hospice days per cancer patient during the last month of life and the percent of cancer patients dying in hospital among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. There was a strong negative relationship between the amount of time cancer patients spent in hospice care and the percent dying in a hospital ( $R^2 = 0.51$ ).



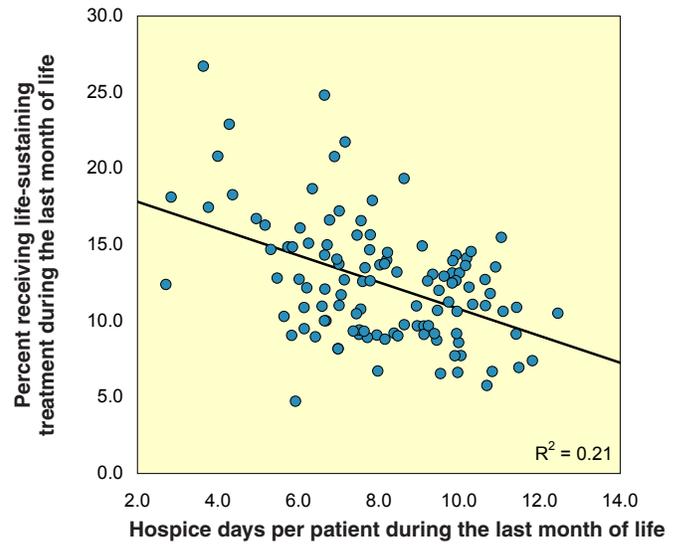
**Figure 30. The relationship between the average number of hospice days and hospital days per cancer patient during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. In general, the more time cancer patients spent in hospice during the last month of life, the less time they spent as inpatients in hospitals, as demonstrated by the strong negative association between the two measures ( $R^2 = 0.49$ ).



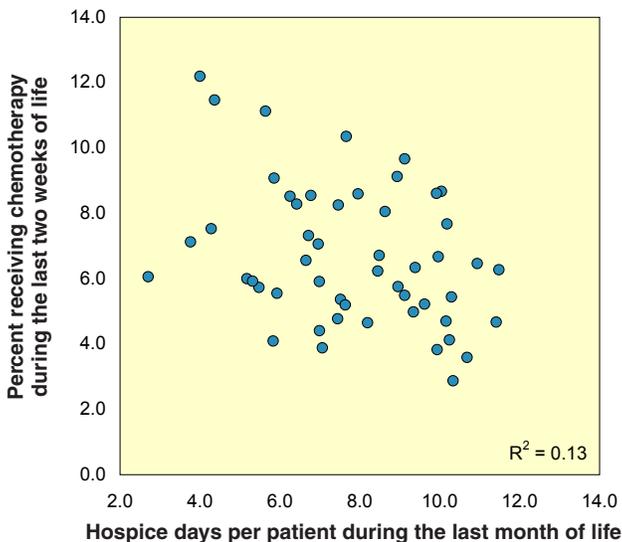
**Figure 31. The relationship between the average number of hospice days and intensive care days per cancer patient during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 137 academic medical centers. There was no relationship between the amount of time cancer patients spent in hospice and in intensive care during the last month of life ( $R^2 = 0.00$ ).



**Figure 32. The relationship between the average number of hospice days per cancer patient and the percent of cancer patients receiving life-sustaining treatment during the last month of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

There was a moderate negative relationship between the amount of time spent in hospice care and the likelihood of receiving a life-sustaining procedure during the last month of life ( $R^2 = 0.21$ ) among the 114 academic medical centers with a sufficient number of cancer patients receiving life-sustaining procedures during the last month of life to report the measure.



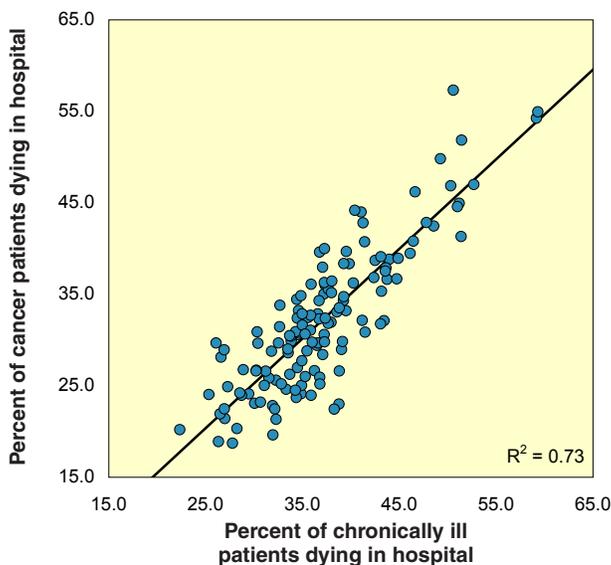
**Figure 33. The relationship between the average number of hospice days per cancer patient and the percent of cancer patients receiving chemotherapy during the last two weeks of life among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Each dot represents one of 51 academic medical centers with a sufficient number of patients receiving chemotherapy during the last two weeks of life to report the measure. The association between the amount of time spent in hospice and the likelihood of receiving chemotherapy during the last two weeks of life was slightly negative ( $R^2 = 0.13$ ).

## Cancer care as a reflection of the broader patterns of end-of-life care

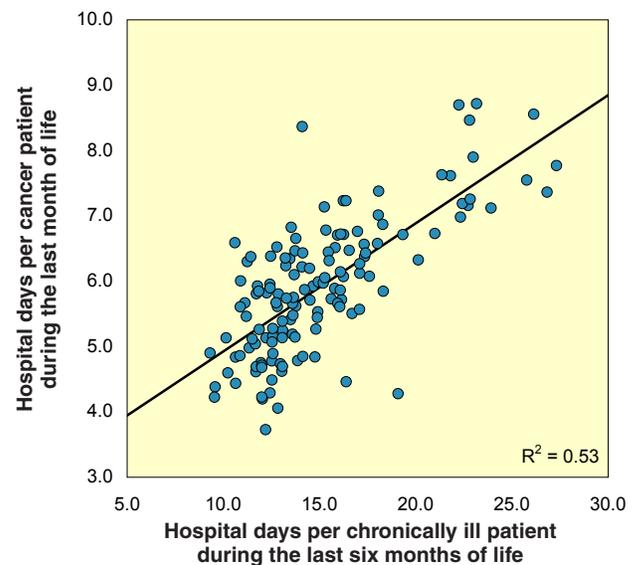
Medicare beneficiaries with serious cancer are usually cared for by highly specialized clinical teams. The care they provide, however, is often reflective of more general patterns of care received by patients with chronic illness. In other words, the style of care provided to cancer patients near the end of life is very similar to the care given to patients at the same hospital who die with other types of chronic disease, such as congestive heart failure, diabetes, dementia or chronic obstructive pulmonary disease.

Figures 34 to 37 show that there were strong associations in care patterns for patients who died with cancer and those who died with chronic illness in general. These associations were observed for the percent dying in the hospital, the number of hospital and ICU days, and the number of hospice days. The improvement of care for cancer patients may be accelerated by the recognition that care patterns often cut across many different patient types and care teams within a hospital.



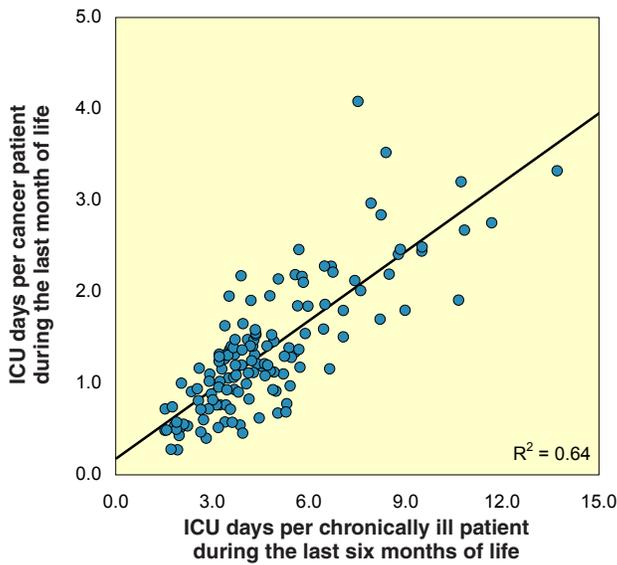
**Figure 34. The relationship between the percent of cancer patients and the percent of all chronically ill patients dying in hospital among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

The relationship between the percent of cancer patients and all chronically ill patients dying in a hospital was very strong among patients receiving most of their care at academic medical centers ( $R^2 = 0.73$ ). In other words, 73% of the variation in rates of death in hospital among cancer patients was explained by the variation among all patients with one of nine serious chronic illnesses (including cancer).



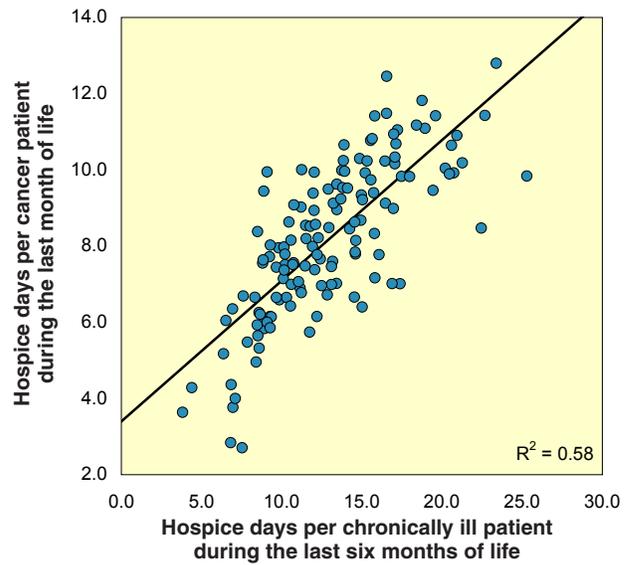
**Figure 35. The relationship between the average number of days spent in hospital among cancer patients (last month of life) and all chronically ill patients (last six months of life) among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

More than half of the variation in the average number of days cancer patients spent in the hospital during the last month of life was explained by the overall amount of time chronically ill patients spent in the hospital during the last six months of life ( $R^2 = 0.53$ ).



**Figure 36. The relationship between the average number of days spent in intensive care among cancer patients (last month of life) and all chronically ill patients (last six months of life) among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Nearly two thirds of the variation in the amount of time cancer patients spent in intensive care during the last month of life was explained by the variation in the amount of time chronically ill patients spent in intensive care during the last six months of life in general ( $R^2 = 0.64$ ).



**Figure 37. The relationship between the average number of hospice days among cancer patients (last month of life) and all chronically ill patients (last six months of life) among patients receiving most of their care at academic medical centers (deaths occurring 2003-07)**

Like the other measures described in this section, the number of days chronically ill patients spent in hospice during the last six months of life was a strong predictor of day rates among cancer patients during the last month of life ( $R^2 = 0.58$ ).

## Concluding thoughts

There is no greater challenge to patients, families and caregivers than when, against every hope and medical effort, illness worsens and death is imminent within weeks or months. Cancer patients, in particular, usually recognize the seriousness of their illness at the initial diagnosis and join with their doctors and nurses in the fight for a cure. Inability to achieve a cure is often felt to be a failure, and discussions of palliative and hospice care can sometimes be perceived as “giving up” by patients, families and clinicians. Discussions of end-of-life care are often polarized, framing patients’ choices as cure versus care, hospital versus hospice, and life versus death. This black and white view of the course of cancer and its care, whether it is embraced or simply followed as the local norm of care, is a disservice to patients whose wish is to live, but also to live well. Living well has a different meaning for each patient, and it is the responsibility of clinicians and health care systems to help patients articulate their goals for living and for their medical care, whether the expectation is to live for years or for a few months or weeks.

The patterns of end-of-life cancer care presented in this report are partly the expression of patient preferences, but much more of local approaches to care and patterns of practice. As well-intentioned as this care may be, in many hospitals and regions it reflects false assumptions about patient wishes, the difficulty of having serious conversations about end-of-life issues, and—at times—a failure to listen to the actual hopes and fears of patients and their families. Many patients find little opportunity to explore these preferences as the clinical team “fights” the battle against an illness that has no cure. The slow pace of adoption of early palliative care for patients with serious cancer is a tragic underservice of health care, leading to much unnecessary suffering. Progress has been made in palliative and hospice care in the past decades, but there remains more work to be done.

It may help both patients and clinicians to recognize that achieving both the longest and the most functional life is not a simple choice between curative and palliative or hospice care.<sup>22</sup> Palliative care early in the course of cancer illness can reduce discomfort from the disease and from curative treatments, and also legitimize the discussion of quality of life. For patients with poor prognosis disease, palliative and hospice care can actually prolong life, even as they improve its quality.<sup>23-25</sup> This Atlas report provides patients, clinicians, and health planners a guide to the regions and academic medical centers providing less intensive hospital care and higher levels of hospice services and to the places where further improvements in end-of-life care are needed.

## Methods overview

This report, “Quality of End-of-Life Cancer Care in Medicare Beneficiaries,” used both methods developed specifically for patients with poor prognosis cancer and for the care received by other chronically ill Medicare beneficiaries at the end of life. A brief discussion of the methods can be found in this section, with more detailed descriptions to be found in peer-reviewed journal articles.<sup>26,27</sup>

### Databases used in the analyses

Data sets used in the report included the Medicare Denominator file (information about beneficiary enrollment, age, gender and race), the 20% Carrier file (information about clinician care with patient diagnoses and procedures), the MedPAR file (information about inpatient stays including ICU use, hospital days and diagnoses), the Outpatient file (information about facility charges such as outpatient chemotherapy administration) and the Hospice file.

### Study populations

We identified a 20% sample of all Medicare beneficiaries who died between the ages of 66 and 99 years during the period 2003-07. We excluded beneficiaries without continuous Part A and Part B coverage in the last six months of life or who were enrolled in Medicare health maintenance organizations (i.e., Medicare Advantage). From these decedents, we identified those with poor prognosis cancer diagnoses<sup>28</sup> on at least one hospital claim or at least two clinician visits in the last six months of life. We then categorized decedents into one of 26 cancer types based on their predominant cancer diagnosis using a modified Clinical Classification Software (CCS) approach.<sup>29</sup>

**Table 1. Number of cancer decedents by cancer type**

CCS Category	Cancer Type	Hospital-specific		Hospital referral region-specific	
		Number of patients	% of Cohort	Number of patients	% of Cohort
19	Cancer of bronchus/lung	66,978	30.98	74,581	31.63
41-44	Cancer of uncertain primary: other and unspecified primary, secondary malignancies, malignant neoplasm without specification of site, neoplasms of unspecified nature or uncertain behavior	20,176	9.33	22,695	9.62
37-40	Hematologic cancer: Hodgkin's, Non-Hodgkin's lymphoma, leukemia, multiple myeloma	19,879	9.19	21,012	8.91
14, 15	Cancer of colon/rectum/anus	18,392	8.51	18,994	8.05
17	Cancer of pancreas	13,361	6.18	15,076	6.39
39	Cancer of prostate	13,164	6.09	13,889	5.89
24	Cancer of breast	12,015	5.56	12,583	5.34
16	Cancer of liver and intrahepatic bile duct	6,356	2.94	7,342	3.11
	Other	45,897	21.23	49,649	21.05
	Total	216,218	100%	235,821	100%

Health Care Costs and Utilization Project - Agency for Healthcare Research and Quality. Clinical Classification Software (CCS) for ICD-9-CM 2009.

Cohort members were assigned a CCS cancer category based on their predominant cancer diagnoses. Patients whose predominant ICD-9 codes resulted in assignment to the vaguely defined CCS cancer categories 41-44 were reassigned to more narrowly defined CCS categories if they had one or more cancer diagnoses belonging to a more specific CCS category. For patients without a specific cancer diagnosis, assignment to a more narrowly defined CCS category was achieved, when possible, by including a broader range of cancer diagnoses (ICD-9 codes 140-208 or 239.0-239.9 excluding V codes) in cancer diagnosis events. Ties were resolved by assigning the patient to the CCS category corresponding to the diagnosis most proximal to death.

Decedents with hospitalization were assigned to the hospital providing the most cancer care hospitalizations in the last six months of life. These were identified as inpatient stays with a primary diagnosis of cancer (ICD-9 codes 140-209, 236-239 excluding V codes) or secondary diagnosis of a poor prognosis cancer ICD-9 code. We restricted the hospitals in this report to National Cancer Institute (NCI) cancer centers and non-NCI-affiliated academic medical centers (AMC) using the NCI web site member list (confirmed by NCI staff) and the American Association of Medical Colleges Council of Teaching Hospitals and Health Systems 2007 hospital academic affiliation definitions. Hospitals not in NCI or AMC groups were categorized as community hospitals; while not discussed in this report, measures of the care they provided to poor prognosis cancer patients can be found on the Dartmouth Atlas web site ([www.dartmouthatlas.org](http://www.dartmouthatlas.org)).

**Appendix Table. Utilization of care during the last month of life among cancer patients dying between 2003 and 2007 and receiving most of their care at selected academic medical centers.**

Hospital Name	City	Number of deaths among cancer patients assigned to hospital	Percent of cancer patients dying in hospital	Percent of cancer patients admitted to hospital during the last month of life	Hospital days per cancer patient during the last month of life	Percent of cancer patients admitted to intensive care during the last month of life
University of Alabama Hospital	Birmingham, AL	208	30.6	59.9	5.1	23.8
St. Joseph's Hospital & Medical Center	Phoenix, AZ	82	18.9	58.5	4.8	34.7
University Medical Center	Tucson, AZ	85	29.7	61.7	4.9	37.3
UAMS Medical Center	Little Rock, AR	132	30.4	57.9	5.9	30.7
City of Hope National Medical Center	Duarte, CA	99	35.3	65.4	6.1	19.0
Loma Linda University Medical Center	Loma Linda, CA	109	24.1	57.3	5.3	37.8
Cedars-Sinai Medical Center	Los Angeles, CA	348	51.9	72.3	7.9	40.1
UCLA Medical Center	Los Angeles, CA	143	38.8	63.4	6.6	41.2
University of California Davis Medical Center	Sacramento, CA	108	26.3	52.3	3.7	34.4
UCSF Medical Center	San Francisco, CA	153	36.2	61.3	6.1	26.4
Stanford Hospital and Clinics	Stanford, CA	163	31.9	60.6	5.0	32.2
Bridgeport Hospital	Bridgeport, CT	119	42.8	68.2	6.5	36.1
Hartford Hospital	Hartford, CT	312	44.0	67.9	6.3	18.0
St. Francis Hospital and Medical Center	Hartford, CT	260	31.8	59.8	5.4	11.4

1. Blank cells indicate that there was not enough utilization among cancer patients during the last month of life to report the measure.

2. The statistical precision of these rates varies according to population size. A table for all hospitals with a sufficient population of cancer decedents, including both rates and confidence limits, is available on the Downloads page of our web site: <http://www.dartmouthatlas.org/downloads.aspx>.

All cancer decedents were also assigned to the hospital referral region of their residence. Hospital referral regions (N = 306) are geographic markets for tertiary care for Medicare beneficiaries that were defined using information about beneficiaries' travel for cardiothoracic and neurosurgery. More information about how hospital referral regions were defined is available on our web site.

## End-of-life care

For each patient, we identified hospitalizations, hospital days, intensive care unit (ICU) admissions and days, and the number of unique physicians providing care. We used discharge status of "expired" to identify patients dying in the hospital. We also measured the number of days of hospice use for each patient and late initiation of hospice service (within three or fewer days of death). We used specific billing codes (from the MedPAR, Carrier, and Outpatient files) to assess receipt of chemotherapy (administered by a clinician or facility) and three potentially life-sustaining procedures: (1) feeding tube placement (2) endotracheal intubation and (3) cardiopulmonary resuscitation.

## Statistical analyses

Although all of these patients died of serious cancer, groups of patients across hospitals or regions may have differed by other characteristics such as the composition of age, gender or race. All rates are adjusted with the following patient level characteristics: age (categorized as 66-69, 70-74, 75-79, 80-84, 85-99), race (black/non-black), gender, cancer type, and non-cancer chronic conditions.

ICU days per cancer patient during the last month of life	Percent of cancer patients receiving life-sustaining treatment during the last month of life	Percent of cancer patients receiving chemotherapy during the last two weeks of life	Percent of cancer patients enrolled in hospice during the last month of life	Hospice days per cancer patient during the last month of life	Percent of cancer patients enrolled in hospice during the last three days of life	Hospital Name
1.4	10.9		62.2	11.4		University of Alabama Hospital
1.5	13.5		67.4	10.9	13.0	St. Joseph's Hospital & Medical Center
2.0	13.7		50.6	7.0		University Medical Center
1.2	7.7	8.7	59.3	10.0	9.9	UAMS Medical Center
1.3			50.2	6.1		City of Hope National Medical Center
2.2	13.1		61.7	9.8	10.1	Loma Linda University Medical Center
2.4	18.3	11.5	33.7	4.4	8.3	Cedars-Sinai Medical Center
2.8	10.9		48.4	6.1	8.4	UCLA Medical Center
1.2	12.0		53.1	9.5		University of California Davis Medical Center
1.2	9.1		45.3	7.5		UCSF Medical Center
1.3			52.9	9.0	7.2	Stanford Hospital and Clinics
1.9	12.7		55.3	6.0	12.0	Bridgeport Hospital
0.8	9.1	4.1	44.6	5.8	9.4	Hartford Hospital
0.3	10.0		44.4	6.7	8.5	St. Francis Hospital and Medical Center

**Appendix Table (continued). Utilization of care during the last month of life among cancer patients dying between 2003 and 2007 and receiving most of their care at selected academic medical centers.**

Hospital Name	City	Number of deaths among cancer patients assigned to hospital	Percent of cancer patients dying in hospital	Percent of cancer patients admitted to hospital during the last month of life	Hospital days per cancer patient during the last month of life	Percent of cancer patients admitted to intensive care during the last month of life
Hospital of St. Raphael	New Haven, CT	250	30.9	63.2	5.7	22.5
Yale-New Haven Hospital	New Haven, CT	220	24.6	65.3	5.7	17.3
MedStar-Georgetown Medical Center	Washington, DC	103	38.7	61.1	6.4	22.2
Washington Hospital Center	Washington, DC	193	36.6	63.6	6.7	27.4
Shands at the University of Florida	Gainesville, FL	151	30.9	58.0	5.6	31.8
Shands Jacksonville Medical Center	Jacksonville, FL	95	29.4	67.1	4.8	26.2
Jackson Memorial Hospital	Miami, FL	118	36.0	59.7	7.0	32.1
H. Lee Moffitt Cancer Center	Tampa, FL	177	28.1	49.9	4.8	25.5
Tampa General Hospital	Tampa, FL	109	26.7	55.0	6.8	37.1
Emory University Hospital	Atlanta, GA	192	35.0	59.4	6.0	32.5
MacNeal Hospital	Berwyn, IL	102	25.6	65.1	4.5	29.5
Northwestern Memorial Hospital	Chicago, IL	273	37.9	62.0	6.1	24.2
Rush University Medical Center	Chicago, IL	194	33.2	68.8	6.1	34.7
University of Chicago Hospital	Chicago, IL	241	28.6	60.5	5.7	24.4
Evanston Northwestern Healthcare	Evanston, IL	324	18.7	58.8	5.2	42.8
Loyola University Medical Center	Maywood, IL	186	25.0	62.4	5.2	30.9
Advocate Christ Medical Center	Oak Lawn, IL	300	25.8	67.2	5.7	29.2
Advocate Lutheran General Hospital	Park Ridge, IL	266	26.6	69.4	5.2	31.0
Memorial Medical Center	Springfield, IL	215	32.9	62.6	5.8	21.2
Clarian Health Partners	Indianapolis, IN	337	28.4	55.1	4.6	25.8
University of Iowa Hospitals & Clinics	Iowa City, IA	173	24.0	48.1	4.1	17.4
University of Kansas Hospital	Kansas City, KS	104	32.5	58.1	6.4	28.8
University of Kentucky Hospital	Lexington, KY	121	25.9	60.8	5.7	29.1
Ochsner Clinic Foundation	New Orleans, LA	84	24.1	67.1	5.6	23.0
Maine Medical Center	Portland, ME	241	35.5	62.9	5.8	16.1
Johns Hopkins Bayview Medical Center	Baltimore, MD	108	23.0	61.1	4.3	25.5
Johns Hopkins Hospital	Baltimore, MD	239	23.7	57.0	5.5	18.5
University of Maryland Medical Center	Baltimore, MD	122	37.5	65.8	6.4	40.7
Beth Israel Deaconess Medical Center	Boston, MA	203	32.3	62.8	6.2	28.5
Boston Medical Center	Boston, MA	99	38.3	67.6	6.3	21.7
Brigham and Women's Hospital	Boston, MA	345	33.2	62.6	5.9	25.2
Massachusetts General Hospital	Boston, MA	394	30.9	56.9	5.6	15.0
Caritas St. Elizabeth's Medical Center	Brighton, MA	86	32.4	71.2	7.1	16.4
Lahey Clinic Hospital	Burlington, MA	176	36.3	71.8	6.5	33.9
Berkshire Medical Center	Pittsfield, MA	131	22.8	61.6	5.1	12.9
Baystate Medical Center	Springfield, MA	184	34.3	63.5	5.8	12.9
UMass Memorial Medical Center	Worcester, MA	202	33.1	62.6	5.4	19.5
St. Joseph Mercy Hospital	Ann Arbor, MI	247	22.5	60.8	4.2	36.6
University of Michigan Hospitals	Ann Arbor, MI	215	23.1	56.3	4.8	20.7
Harper University Hospital	Detroit, MI	150	29.0	70.8	6.5	23.1
Henry Ford Hospital	Detroit, MI	269	29.9	61.8	5.5	24.1

1. Blank cells indicate that there was not enough utilization among cancer patients during the last month of life to report the measure.

2. The statistical precision of these rates varies according to population size. A table for all hospitals with a sufficient population of cancer decedents, including both rates and confidence limits, is available on the Downloads page of our web site: <http://www.dartmouthatlas.org/downloads.aspx>.



ICU days per cancer patient during the last month of life	Percent of cancer patients receiving life-sustaining treatment during the last month of life	Percent of cancer patients receiving chemotherapy during the last two weeks of life	Percent of cancer patients enrolled in hospice during the last month of life	Hospice days per cancer patient during the last month of life	Percent of cancer patients enrolled in hospice during the last three days of life	Hospital Name
1.0	9.1	8.6	54.4	8.0	7.2	Hospital of St. Raphael
0.8	13.2		65.6	10.0	7.5	Yale-New Haven Hospital
1.3	17.2		46.7	7.0		MedStar-Georgetown Medical Center
1.3	11.0		45.5	6.6		Washington Hospital Center
1.9	12.6	8.6	57.8	9.9		Shands at the University of Florida
1.4	15.5		68.4	11.0		Shands Jacksonville Medical Center
2.5	21.7		53.1	7.2		Jackson Memorial Hospital
1.2	14.1	7.7	63.0	10.2	7.6	H. Lee Moffitt Cancer Center
2.1	12.7		65.6	10.6		Tampa General Hospital
2.2	13.2	6.2	55.1	8.4	8.9	Emory University Hospital
1.3			56.3	8.5	11.6	MacNeal Hospital
1.2	12.9	5.2	52.3	9.6	8.6	Northwestern Memorial Hospital
1.5	20.8		50.5	6.9	11.0	Rush University Medical Center
1.5	13.1	5.0	60.6	9.3	8.3	University of Chicago Hospital
2.8	5.8	3.6	72.1	10.7	13.3	Evanston Northwestern Healthcare
2.0	8.6		62.8	10.0	10.8	Loyola University Medical Center
1.2	15.0	7.3	54.8	6.7	13.3	Advocate Christ Medical Center
1.1	13.5	10.4	60.7	7.7	12.1	Advocate Lutheran General Hospital
1.1	10.8		45.6	7.6	6.4	Memorial Medical Center
1.1	9.7	5.8	54.9	9.0	7.7	Clarian Health Partners
0.6	10.5		62.9	12.5		University of Iowa Hospitals & Clinics
1.5			48.0	8.3		University of Kansas Hospital
1.4			56.6	10.2		University of Kentucky Hospital
1.4	12.5		67.0	9.8		Ochsner Clinic Foundation
0.5	4.7	5.6	32.7	5.9		Maine Medical Center
0.9	10.6		62.9	9.9		Johns Hopkins Bayview Medical Center
0.8	9.2	3.8	59.3	9.9	6.3	Johns Hopkins Hospital
2.4	16.6		49.8	7.6	10.2	University of Maryland Medical Center
1.6	12.7		49.1	7.1	10.3	Beth Israel Deaconess Medical Center
1.1			46.2	8.0		Boston Medical Center
1.0	10.5	4.8	48.7	7.4	6.5	Brigham and Women's Hospital
0.6	6.7		51.5	8.0	8.4	Massachusetts General Hospital
0.9			44.5	6.0		Caritas St. Elizabeth's Medical Center
2.2	14.9		45.0	5.7	10.0	Lahey Clinic Hospital
0.5	11.0	9.1	63.2	8.9	13.6	Berkshire Medical Center
0.5	8.8		47.4	8.2	6.5	Baystate Medical Center
0.8	8.9		46.7	7.7	5.8	UMass Memorial Medical Center
1.6	6.9	6.3	68.2	11.5	10.1	St. Joseph Mercy Hospital
0.8	11.8		65.1	10.8	9.1	University of Michigan Hospitals
1.3	12.6		64.6	7.6	13.6	Harper University Hospital
1.2	14.9		60.3	9.1	12.0	Henry Ford Hospital

**Appendix Table, continued. Utilization of care during the last month of life among cancer patients dying between 2003 and 2007 and receiving most of their care at selected academic medical centers.**

Hospital Name	City	Number of deaths among cancer patients assigned to hospital	Percent of cancer patients dying in hospital	Percent of cancer patients admitted to hospital during the last month of life	Hospital days per cancer patient during the last month of life	Percent of cancer patients admitted to intensive care during the last month of life
Sinai-Grace Hospital	Detroit, MI	103	35.2	75.3	7.2	24.2
St. John Hospital & Medical Center	Detroit, MI	236	32.7	78.1	7.2	46.1
McLaren Regional Medical Center	Flint, MI	162	24.0	72.1	5.7	25.9
Ingham Regional Medical Center	Lansing, MI	142	26.7	70.5	6.5	18.2
Beaumont Hospital	Royal Oak, MI	491	29.7	70.7	7.4	21.7
University of Minnesota Medical Center	Minneapolis, MN	106	24.9	59.6	5.5	25.5
St. Mary's Hospital	Rochester, MN	280	23.2	55.1	4.6	30.1
University of Missouri Hospital & Clinic	Columbia, MO	96	39.7	70.2	6.6	42.0
St. Luke's Hospital	Kansas City, MO	112	32.9	56.8	5.1	36.8
SSM St. Mary's Health Center	Richmond Heights, MO	114	25.2	67.2	5.3	29.1
Barnes-Jewish Hospital	St. Louis, MO	405	29.0	61.6	5.6	19.2
Nebraska Medical Center	Omaha, NE	155	39.6	66.9	6.7	41.6
Dartmouth-Hitchcock Medical Center	Lebanon, NH	201	26.0	52.2	4.4	16.2
Cooper Health System	Camden, NJ	87	40.7	74.1	6.7	49.2
Monmouth Medical Center	Long Branch, NJ	109	20.2	69.7	5.4	35.1
Robert Wood Johnson University Hospital	New Brunswick, NJ	217	42.5	61.4	7.2	31.0
Newark Beth Israel Medical Center	Newark, NJ	81	36.7	71.8	8.7	41.8
Albany Medical Center	Albany, NY	82	32.1	54.3	4.5	15.2
Montefiore Medical Center	Bronx, NY	223	32.1	64.1	6.6	12.1
Maimonides Medical Center	Brooklyn, NY	176	54.3	69.8	7.8	
New York Methodist Hospital	Brooklyn, NY	151	54.9	73.6	8.6	17.1
Kaleida Health-Buffalo General Hospital	Buffalo, NY	239	29.7	61.1	5.8	19.4
Roswell Park Cancer Institute	Buffalo, NY	92	40.0	62.7	6.3	18.3
Mary Imogene Bassett Hospital	Cooperstown, NY	117	33.8	69.0	6.3	36.4
North Shore University Hospital	Manhasset, NY	429	46.9	67.8	7.6	19.1
Winthrop-University Hospital	Mineola, NY	217	40.8	69.2	8.5	23.1
Long Island Jewish Medical Center	New Hyde Park, NY	206	47.0	67.9	7.0	14.2
Beth Israel Medical Center	New York, NY	207	41.3	71.1	7.5	21.8
Lenox Hill Hospital	New York, NY	137	49.8	61.1	7.1	12.5
Memorial Sloan-Kettering Cancer Center	New York, NY	665	34.3	56.3	6.3	8.9
Mount Sinai Hospital	New York, NY	304	45.0	65.6	7.2	16.9
New York University Medical Center	New York, NY	220	42.9	63.2	7.4	31.3
New York-Presbyterian Hospital	New York, NY	490	46.2	63.9	7.6	19.2
St. Luke's-Roosevelt Hospital Center	New York, NY	129	39.5	64.7	6.7	14.9
St. Vincent's Hospital	New York, NY	131	30.4	57.9	7.3	16.8
Strong Memorial Hospital	Rochester, NY	138	22.4	55.7	4.8	16.3
Staten Island University Hospital	Staten Island, NY	156	44.6	74.0	6.9	24.6
Stony Brook University Hospital	Stony Brook, NY	125	44.2	68.0	6.8	15.6
Upstate Medical University	Syracuse, NY	140	39.1	58.8	6.4	14.8
Westchester Medical Center	Valhalla, NY	81	57.3	57.8	8.7	16.2
University of North Carolina Hospitals	Chapel Hill, NC	180	31.5	61.0	5.5	29.2

1. Blank cells indicate that there was not enough utilization among cancer patients during the last month of life to report the measure.

2. The statistical precision of these rates varies according to population size. A table for all hospitals with a sufficient population of cancer decedents, including both rates and confidence limits, is available on the Downloads page of our web site: <http://www.dartmouthatlas.org/downloads.aspx>.



ICU days per cancer patient during the last month of life	Percent of cancer patients receiving life-sustaining treatment during the last month of life	Percent of cancer patients receiving chemotherapy during the last two weeks of life	Percent of cancer patients enrolled in hospice during the last month of life	Hospice days per cancer patient during the last month of life	Percent of cancer patients enrolled in hospice during the last three days of life	Hospital Name
1.3	14.3		47.9	6.7		Sinai-Grace Hospital
2.5	14.9	9.1	57.0	5.9	19.3	St. John Hospital & Medical Center
1.0	9.7	9.7	71.1	9.1	14.3	McLaren Regional Medical Center
0.7			65.2	8.7	11.1	Ingham Regional Medical Center
1.1	15.6	8.3	62.2	7.5	13.6	Beaumont Hospital
1.1			59.0	9.5	10.2	University of Minnesota Medical Center
1.2	6.6		55.1	9.5	10.0	St. Mary's Hospital
2.0	15.7		43.9	7.8		University of Missouri Hospital & Clinic
2.3	12.6		54.2	9.2		St. Luke's Hospital
1.4			63.1	7.8	17.3	SSM St. Mary's Health Center
0.8	14.0	4.6	56.9	8.2	10.8	Barnes-Jewish Hospital
3.0	9.5		43.9	6.1	9.6	Nebraska Medical Center
0.5	9.4	5.4	42.1	7.5		Dartmouth-Hitchcock Medical Center
3.5	17.9		50.5	7.8	13.3	Cooper Health System
1.7			73.0	9.0	15.6	Monmouth Medical Center
1.9	16.6	8.5	47.5	6.8	8.7	Robert Wood Johnson University Hospital
2.7	16.7		46.0	5.0		Newark Beth Israel Medical Center
0.5			51.1	8.5		Albany Medical Center
0.6	12.4	6.1	18.6	2.7		Montefiore Medical Center
	22.9	7.5	31.1	4.3		Maimonides Medical Center
0.9	26.7		21.0	3.6		New York Methodist Hospital
0.8	9.3	5.2	50.7	7.6	11.9	Kaleida Health-Buffalo General Hospital
0.7			46.8	6.4		Roswell Park Cancer Institute
2.2	11.0		51.3	7.0	11.6	Mary Imogene Bassett Hospital
0.9	15.1	8.5	41.2	6.3	5.1	North Shore University Hospital
1.5	10.3	11.1	44.4	5.6	11.6	Winthrop-University Hospital
0.6	12.8	5.7	33.7	5.5		Long Island Jewish Medical Center
1.1	18.7		43.6	6.4	7.5	Beth Israel Medical Center
0.5	20.8	12.2	28.7	4.0		Lenox Hill Hospital
0.4	8.2	4.4	41.7	7.0	3.4	Memorial Sloan-Kettering Cancer Center
1.0	16.3	6.0	28.1	5.2	5.1	Mount Sinai Hospital
1.8	14.7	5.9	32.4	5.3		New York University Medical Center
1.2	17.5	7.1	24.9	3.8	4.1	New York-Presbyterian Hospital
0.5	12.6		41.8	7.8		St. Luke's-Roosevelt Hospital Center
1.1	12.2		35.8	6.2		St. Vincent's Hospital
0.7	8.7		61.9	9.4	10.6	Strong Memorial Hospital
0.9	16.1		41.5	6.0	7.7	Staten Island University Hospital
0.7	13.7		49.1	8.0		Stony Brook University Hospital
1.0	9.2		41.2	8.4		Upstate Medical University
1.3	18.1		18.6	2.8		Westchester Medical Center
1.4	14.3		59.6	9.9	9.2	University of North Carolina Hospitals

**Appendix Table, continued. Utilization of care during the last month of life among cancer patients dying between 2003 and 2007 and receiving most of their care at selected academic medical centers.**

Hospital Name	City	Number of deaths among cancer patients assigned to hospital	Percent of cancer patients dying in hospital	Percent of cancer patients admitted to hospital during the last month of life	Hospital days per cancer patient during the last month of life	Percent of cancer patients admitted to intensive care during the last month of life
Carolinas Medical Center	Charlotte, NC	219	36.4	63.2	6.4	33.9
Duke University Hospital	Durham, NC	348	29.8	53.4	5.1	20.7
Pitt County Memorial Hospital	Greenville, NC	230	38.9	58.5	4.9	26.3
North Carolina Baptist Hospital	Winston-Salem, NC	232	33.5	63.1	6.2	32.1
Akron General Medical Center	Akron, OH	189	21.4	67.5	5.3	20.8
Summa Health System	Akron, OH	175	26.8	67.7	5.9	29.0
University Hospital	Cincinnati, OH	102	26.6	69.2	6.0	40.2
Cleveland Clinic Foundation	Cleveland, OH	347	32.4	55.9	6.0	19.0
MetroHealth Medical Center	Cleveland, OH	80	34.4	66.3	4.8	28.7
University Hospitals of Cleveland	Cleveland, OH	241	24.2	65.3	4.7	23.0
Ohio State University Medical Center	Columbus, OH	141	27.0	59.5	5.7	23.4
Western Reserve Care System	Youngstown, OH	128	34.9	62.5	4.7	12.5
Oklahoma University Medical Center	Oklahoma City, OK	90	30.9	50.8	4.3	22.6
St. Luke's Hospital	Bethlehem, PA	218	20.3	66.6	6.2	31.8
Geisinger Medical Center	Danville, PA	128	30.5	65.9	4.9	17.1
Penn State Hershey Medical Center	Hershey, PA	188	36.1	60.2	6.0	37.6
Fox Chase Cancer Center	Philadelphia, PA	111	28.9	60.7	6.8	30.3
Hospital of the University of Pennsylvania	Philadelphia, PA	178	38.3	57.5	5.9	27.7
Thomas Jefferson University Hospital	Philadelphia, PA	189	34.7	60.0	6.7	42.4
Allegheny General Hospital	Pittsburgh, PA	124	38.0	71.5	8.4	46.0
Mercy Hospital of Pittsburgh	Pittsburgh, PA	81	31.6	63.8	6.7	16.8
UPMC Presbyterian Shadyside	Pittsburgh, PA	370	27.7	65.3	6.1	29.3
Lankenau Hospital	Wynnewood, PA	97	31.1	70.1	6.1	43.7
York Hospital	York, PA	216	29.6	65.5	5.6	20.2
Rhode Island Hospital	Providence, RI	165	29.8	62.2	5.9	25.4
MUSC Medical Center	Charleston, SC	124	24.5	60.6	5.0	28.7
Erlanger Medical Center	Chattanooga, TN	131	28.8	61.6	6.4	22.3
University of Tennessee Medical Center	Knoxville, TN	133	36.8	65.6	6.4	26.8
Vanderbilt University Medical Center	Nashville, TN	156	25.2	54.4	4.7	33.5
University of Texas Medical Branch Hospitals	Galveston, TX	110	25.0	54.7	4.7	17.4
University of Texas M.D. Anderson Cancer Ctr	Houston, TX	613	28.8	57.7	5.8	25.8
University Medical Center	Lubbock, TX	80	30.6	62.2	5.9	16.3
Scott and White Memorial Hospital	Temple, TX	136	21.9	64.4	4.4	15.4
University of Utah Hospital	Salt Lake City, UT	125	24.1	58.0	4.2	33.5
Fletcher Allen Health Care	Burlington, VT	166	29.8	61.9	5.1	13.8
University of Virginia Medical Center	Charlottesville, VA	227	30.7	58.3	5.1	25.7
VCU Health System	Richmond, VA	118	31.8	65.6	5.8	25.4
University of Washington Medical Center	Seattle, WA	105	21.3	44.6	4.2	12.2
West Virginia University Hospitals	Morgantown, WV	102	26.6	59.2	5.7	32.6
University of Wisconsin Hospital & Clinics	Madison, WI	178	22.5	55.7	4.6	19.6
Froedtert Memorial Lutheran Hospital	Milwaukee, WI	164	19.6	63.2	4.7	18.7

1. Blank cells indicate that there was not enough utilization among cancer patients during the last month of life to report the measure.

2. The statistical precision of these rates varies according to population size. A table for all hospitals with a sufficient population of cancer decedents, including both rates and confidence limits, is available on the Downloads page of our web site: <http://www.dartmouthatlas.org/downloads.aspx>.



ICU days per cancer patient during the last month of life	Percent of cancer patients receiving life-sustaining treatment during the last month of life	Percent of cancer patients receiving chemotherapy during the last two weeks of life	Percent of cancer patients enrolled in hospice during the last month of life	Hospice days per cancer patient during the last month of life	Percent of cancer patients enrolled in hospice during the last three days of life	Hospital Name
2.5	13.6	4.7	54.1	10.2		Carolinas Medical Center
0.9	9.1	4.7	57.4	11.4	4.9	Duke University Hospital
1.5	9.1	5.5	45.8	9.1		Pitt County Memorial Hospital
1.5	14.6	5.4	59.3	10.3	6.4	North Carolina Baptist Hospital
0.4		6.7	69.2	8.5	13.0	Akron General Medical Center
1.4	9.7		63.8	9.2	10.4	Summa Health System
2.1	19.3		63.2	8.6	12.4	University Hospital
0.7	11.1	2.9	56.9	10.3	5.0	Cleveland Clinic Foundation
1.5			63.4	11.4		MetroHealth Medical Center
0.7	10.6		70.6	11.1	14.3	University Hospitals of Cleveland
1.4	13.7		53.0	8.1		Ohio State University Medical Center
0.6	9.3		42.3	7.4		Western Reserve Care System
0.9	13.9		52.1	9.8		Oklahoma University Medical Center
1.8	9.2	6.3	65.6	9.4	12.2	St. Luke's Hospital
0.5			51.6	7.5	10.7	Geisinger Medical Center
2.3	14.1	7.1	44.1	7.0	6.7	Penn State Hershey Medical Center
1.7	11.3		63.8	9.7	11.5	Fox Chase Cancer Center
1.3	14.7		53.0	7.8	8.7	Hospital of the University of Pennsylvania
3.3	12.1		52.4	6.7	10.9	Thomas Jefferson University Hospital
4.1	24.8		43.5	6.7		Allegheny General Hospital
1.1			55.2	7.4	14.0	Mercy Hospital of Pittsburgh
1.2	11.7	3.9	53.5	7.1	13.1	UPMC Presbyterian Shadyside
3.2	14.5		56.3	8.2		Lankenau Hospital
0.9	8.2	5.9	47.3	7.0	10.5	York Hospital
1.4	9.8	8.1	58.7	8.6	12.0	Rhode Island Hospital
1.8	7.4		65.8	11.8	9.3	MUSC Medical Center
1.3	7.7		60.2	9.9		Erlanger Medical Center
1.0	9.0	8.3	44.7	6.4		University of Tennessee Medical Center
2.1	11.0		58.0	10.7	7.0	Vanderbilt University Medical Center
0.7			63.4	11.2		University of Texas Medical Branch Hospitals
1.8	6.6	6.7	61.2	10.0	7.2	University of Texas M.D. Anderson Cancer Ctr
1.1			66.7	12.8		University Medical Center
0.5	9.0		61.2	8.5	12.2	Scott and White Memorial Hospital
1.5			62.1	9.4	10.8	University of Utah Hospital
0.3	10.0	6.6	46.6	6.7	9.8	Fletcher Allen Health Care
1.2	12.2	4.1	51.3	10.2		University of Virginia Medical Center
1.6			49.1	8.6		VCU Health System
1.2			57.9	10.2		University of Washington Medical Center
2.2	10.7		51.3	9.5		West Virginia University Hospitals
0.6		6.5	61.1	10.9	6.0	University of Wisconsin Hospital & Clinics
0.5	6.7		66.2	10.8	7.8	Froedtert Memorial Lutheran Hospital

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**The Dartmouth Atlas Project** works to accurately describe how medical resources are distributed and used in the United States. The project offers comprehensive information and analysis about national, regional, and local markets, as well as individual hospitals and their affiliated physicians, in order to provide a basis for improving health and health systems. Through this analysis, the project has demonstrated glaring variations in how health care is delivered across the United States.

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