

# The Study of High-Cost Oncology Patients to Improve Care & Curb Costs





Costs are rising in oncology. When you look at why health-care costs are rising, 91 percent is due to the increased price of drugs, medical devices, and hospital care.<sup>1</sup> These costs can be divided into three general categories for all of health-care: 1) a growing population, 2) changing thresholds, and 3) innovation. Specific to oncology, our increasing patient population is primarily the elderly. An example of our changing thresholds is the use of *Oncotype DX* testing to inform treatment decision-making for women who are node-negative. Innovation encompasses everything from oral oncolytics and targeted therapy to improvements in radiation oncology technology and equipment. Bottom line: when it comes to rising costs in healthcare, oncology is in the crosshairs.

### Rise of the ACOs

Signed into law in 2010, the Affordable Care Act looked to control these rising costs with the creation of Accountable Care Organizations (ACOs) where physicians, hospitals, and payers work together to provide coordinated, high-quality care. The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time, while avoiding duplication of services and preventing medical errors. When an ACO succeeds—both in delivering high-quality care and spending healthcare dollars more wisely—it will share the savings it achieves among participants (at least initially). ACOs were designed to use the financial benefit realized from cost-savings to both empower providers and to help them improve their clinical knowledge so that they can help restructure the delivery of care to reduce redundancy. How? The ACO allows providers and hospitals to mine data, including Medicare claims data, and employ analytics to study their specific patient populations and marketplace factors to identify both intuitive—and non-intuitive—opportunities to save.

While there are many assumptions about who comprises the most expensive patients, at Cone Health we defined our “hot-spotters” as the highest spending 5% because—across healthcare—the top 5% of patients spend over 50% of healthcare dollars.<sup>2</sup>

In 2012, Cone Health System, Greensboro, N.C., helped develop Triad Healthcare Network, a provider-led collaborative ACO between community physicians and the healthcare system aimed at improving the care delivered to our patient population. Our ACO participated in the Medicare Shared Savings Program in 2014 and 2015. In our first year, the ACO saved \$21.5 million. It was in the top percentile, receiving a \$10.5 million bonus. In 2015, Triad Healthcare Network was named 5th in the nation for quality in the Medicare Shared Savings Program. In 2016, Cone Health participated in the next generation ACO model.

As part of an ACO, Cone Health has access to Medicare claims data on patients—not just the fees generated in the cancer center. As such, we learned about spending in oncology, and we are now leveraging these findings to help reduce costs. This article shares how we identified our high-cost patients or “hot-spotters” and put processes and systems in place to not only improve care for these patients but also reduce costs.

### Defining the Term “Hot-Spotter”

Our ACO has more than 30,000 Medicare beneficiaries, so we knew immediately we could not study and reduce costs on every one of those patients. We understood that we needed to focus on a smaller sub-group. The question became: How do we pick the right patient sub-population? We could study just oncology patients. We could study patients with advanced disease. In the end we decided it was as simple as starting with the patients who spend the most healthcare dollars.

The concept of “hot-spotters” started in 2007 when Jeffrey Brenner, MD, a public health family practitioner working in Camden, N.J., started treating chronically sick patients who accounted for a significant percentage of the healthcare costs in his area. He operated under a hypothesis that people who had the highest costs in the healthcare system were also receiving the worst care. By helping this specific patient population, Dr. Brenner believed he could improve care and lower healthcare costs—and not just for these patients, but for the entire city. Dr. Brenner’s approach was to apply law enforcement models of assigning more resources to high-incident areas. For example, he suggested placing an outpatient clinic in a public housing building that had a high rate of ED (emergency department) utilization and hospital inpatient admissions. After three years under Dr. Brenner’s model, patients who averaged 62 hospital and ER visits per month dropped by 40 percent. Their hospital bills decreased from \$1.2 million per month to just over half a million—a 56 percent reduction. By focusing attention on the high-cost patients, i.e., “hot-spotters,” Dr. Brenner was able to make drastic changes to overall healthcare costs and improve the quality of the care through earlier interventions and improved access.

### Identifying Our “Hot-Spotters”

While there are many assumptions about who comprises the most expensive patients, at Cone Health we defined our “hot-spotters” as the highest spending 5 percent because—across healthcare—the top 5 percent of patients spend over 50 percent of healthcare dollars.<sup>2</sup>

As part of our ACO efforts, Cone Health established several service line clinical practice committees to study costs and look for cost-saving opportunities. As you might imagine, our providers’ reflex reaction to cost-cutting was defensive, with many wanting to protect or exempt specific patient populations from any cost-cutting efforts. For example, our breast oncologist requested to exclude breast cancer patients and two specific drugs. Our radiation oncologists (including me) wanted to exclude stereotactic radiosurgery, citing that while these procedures are high-cost, they are low-risk and highly effective. In the end, our providers agreed to let go of all clinical assumptions and biases, and instead take a deep dive into our data.

Table 1. Total Cost of Care for “Hot-Spotters”

	Total Group
Minimum	\$ 50,053
Maximum	\$ 471,905
Mean	\$ 79,882
Median	\$ 69,435
Total	\$ 17,254,595

We started by looking at one year of claims data (2014) for more than 31,000 Medicare beneficiaries. Of these, 3,942 had a cancer diagnosis in their CMS Hierarchical Condition Categories (HCC), and from these we formed three cohorts. The low-cost cohort (55 percent of the patients) had annual claims totaling less than the ACO mean for cost of care. Our intermediate-cost patients (29 percent) incurred claims exceeding the ACO mean for cost, and our “hot-spotters,” the top five percent, incurred claims that totaled more than \$50,000 per patient.

We soon found out that our data had some limitations. We identified 216 “hot-spotters” with a cancer diagnosis in their HCC list, and we had a lot of information about their Medicare claims, but the picture was blurry. For example, while we knew the HCCs and the cost of care, we didn’t really know why the costs were incurred or how we could influence them. To learn more about our “hot-spotters” we had to move from data mining to data collection. We arranged for a pre-med student to perform chart reviews to learn more about these patients, specifically cancer type, cancer stage, treating oncologist, and treatment details to build a clear profile of our “hot-spotter” population. Here’s what we found.

Some patients had a cancer diagnosis; but, not all were active oncology patients. This was one of the limitations of the data. Cancer diagnoses can stay on patient records long after the cancer is gone. For example, one patient was a Stage I breast cancer patient treated with lumpectomy and radiation 15 years ago. However, the patient underwent left ventricular assist device (LVAD) placement during the year we were pulling Medicare claims data, which put her into the “hot-spotter” category. We went back and filtered our 216 “hot-spotters” to only include patients with three cancer center visits during the study period, which left us with 70 patients. In other words, these 70 patients were followed up more than every six months. At the end of

2014, 90 percent of the patients were still alive and 11 percent had died. In terms of costs, the minimum cost spent in the “hot-spotter” group was \$50,000 and the maximum was \$472,000 (Table 1, left). Total cost of care for these 70 “hot-spotters” was \$17 million.

### Identifying “Hot-Spotter Trends”

We looked at the detailed medical characteristics of these 70 patients and recorded the data in a chart audit. Data points included:

- Number of medical oncology visits
- Plan provider
- Body mass index
- Histology
- Diagnosis date
- Stage
- Lymph node involvement
- Metastases of the brain, bone, lung, liver, or muscle
- Type of surgery (if any)
- Type of radiation (if any)
- Type of chemotherapy (if any)
- Type of immunotherapy (if any)
- Complications
- Date of final treatment.

Here’s what the data revealed.

Our “hot-spotters” had a variety of diagnoses, not really predominated by any one diagnosis. Although there were more blood and lymphatic malignancies and lung cancers, we found a relatively even distribution of presenting cancer types (Figure 1, right). We also found that all stages were represented. Stage IV was the most common at 33 percent, and we also had a high percentage of un-staged patients, which indicates blood and lymphatic malignancies (Table 2, page 50). These data alleviated some concerns from medical oncology that their personal subset of patients would represent a large percentage of the “hot-spotters.” Across physicians there was a relatively even distribution of “hot-spotters,” which aligned closely with physician office productivity. With no predominant physician or sub-specialty treating these 70 patients, data showed that the type of cancer or the treating physician were not driving the high costs of our “hot-spotters.”

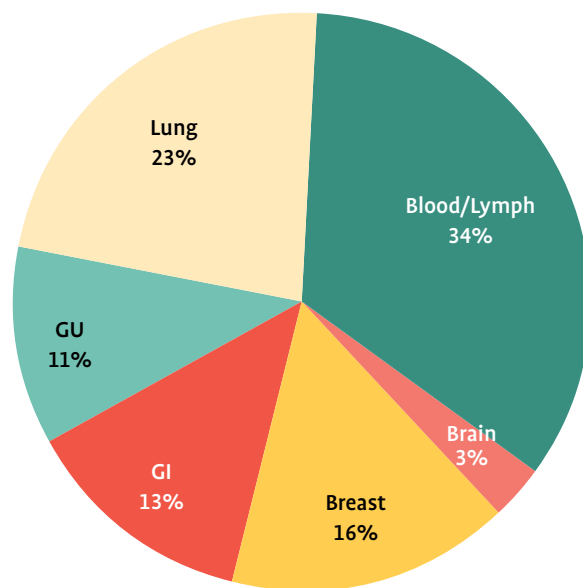
2014 data on our “hot-spotters” revealed that these patients had received a variety of treatment modalities:

- Chemotherapy: 87 percent
- Immunotherapy: 56 percent
- Radiation treatment: 45 percent
- Surgery: 44 percent.

When we compared our “hot-spotter” data against our cancer registry we found that blood and bone marrow malignancy

Figure 1. “Hot-Spotters” by Diagnosis

Primary Tumor Site



patients were 9.41 times as likely to be a “hot-spotter” (Figure 2, page 51). Breast cancer patients were half as likely to be “hot-spotters,” and that was statistically significant. Respiratory cancer patients were more likely to be “hot-spotters,” but that was not statistically significant.

When we compared “hot-spotter” data against our tumor registry for tumor stage (Figure 3, page 52), Stage I patients were 20 percent more likely to be “hot-spotters,” and that was significant. Stage IV patients were almost twice as likely to be “hot-spotters,” and unknown stage patients were also twice as likely to be “hot-spotters,” also significant.

Going into the study, I had suspicions about the role body mass index (BMI) might play, noting that patients with a high BMI sometimes have increased complications with treatment. However, 60 percent of our “hot-spotters” were overweight and 31 percent were obese. When we compared these percentages to the population of North Carolina, at 64.9 percent overweight and 27 percent obese, we found no significant relationship between BMI and cost of care in this population of active oncology patients.

### How & Why Our “Hot-Spotters” Spent Money

Data revealed that 90 percent of our “hot-spotter” patients had ED visits—a median of 4.5 ED visits and a maximum of 20 ED visits during the study year (2014). Sixty percent of the 70 “hot-

**Table 2. “Hot-Spotters” by Stage**

Stage	Number	Percentage
I	5	7%
II	10	14%
III	12	17%
IV	23	33%
No Stage	20	29%

spotters” were hospitalized, with a median of one hospitalization and a maximum of nine hospitalizations.

Our next step was to identify why our “hot-spotters” were going to the ED and being admitted to the hospital. We found that our oncology “hot-spotters” were patients with multiple medical co-morbidities (Table 3, page 53). Thirty-eight percent had renal failure. A similarly high percentage had congestive heart failure (33 percent) and chronic obstructive pulmonary disease (32 percent). Bottom line: these medical co-morbidities were driving up the cost of care as much as the cancer diagnosis itself. Table 4, page 53, shows the top five costs by category. While chemotherapy was the top cost, it only represented one-third of the overall charges for our “hot-spotter” patients. In other words, two-thirds of the costs for these “hot-spotters” were unrelated to chemotherapy.

Interestingly, as we were compiling the results of our “hot-spotter” study, another study was published in the *British Medical Journal*, looking at the U.S. Veterans Affairs (VA) healthcare system.<sup>3</sup> Study researchers also looked at the five percent highest-cost patients in the VA, and found that they accounted for 47 percent of total VA costs. Similar to our “hot-spotters” study, this study found that two-thirds of these patients had chronic conditions affecting three or more body systems. In conclusion, researchers suggested patients with multi-morbidity need interventions that coordinate and maximize efficiency across multiple conditions.

### Identifying Opportunities for Cost-Savings

So, how do we use all of these “hot-spotter” data to help reduce costs? Are there ways to identify “hot-spotters” in advance—to profile future “hot-spotters?” For example, by focusing on patients with three or more significant co-morbidities and developing a co-morbidity scoring system, perhaps weighting congestive heart failure more highly than others. While this may work, the meth-

odology is not validated and will need to be studied. We could target individual “hot-spotters” prospectively, or develop systems to target the areas that lead to high “hot-spotter” spending, and some of those ideas are detailed below.

At Cone Health, our first step was to pull data on how some of these costs were generated, focusing on processes and/or programs already in place and processes and/or programs that could be developed to improve care and reduce costs at our cancer center.

### Breast Cancer & Congestive Heart Failure

A patient receiving chemotherapy for breast cancer and who is at-risk for developing congestive heart failure may require the services of cardiology. Specifically, women receiving Herceptin are at high-risk for developing congestive heart failure; if these patients also receive Adriamycin, the risk may be as high as 30 percent. Unless there is a seamless transition of care from oncology to cardiology, these patients may be at-risk of ending up in the ED or the hospital with congestive heart failure. At Cone Health, a Breast Cancer Heart Failure Clinic existed prior to this “hot-spotter” study—and our study helped support the existence of these cross-departmental clinics and/or programs. Cone Health had developed this clinic after a few patients receiving systemic therapy for breast cancer developed full-blown congestive heart failure. Now patients receiving Herceptin are prospectively referred to cardiology, and screened for cardiovascular risk factors to assess for left ventricular ejection fraction dysfunction. The clinic has seen more than 200 women and offers screening and echocardiograms. While these services are expensive, patients who experience worsening ejection fraction can be told to stop or reduce Herceptin. At Cone Health, for all patients who received this intervention and got dose reductions, normal cardiac function returned.

### The High Cost of Death

Our data revealed that one of the high-cost items was the cost of death. Eleven percent of “hot-spotters” died during the study year (2014), and 34 percent died in the subsequent year (2015). The patients who died were twice as likely to have an ED visit. The year after their “hot-spotter” year, in 2015, overall costs went down, but 42 percent stayed “hot-spotters.” So the data showed that these patients had chronic issues over multiple years. In 2015, 24 percent of these “hot-spotter” patients transitioned to intermediate- or low-cost care, suggesting that these patients had had a health crisis in 2014, but then may have recovered from it.

Looking at these data, we asked ourselves: how could we reduce the cost of death? Certainly patients without goals of care, and without hospice support, go to the ED, and all too often die in the ICU. Patients without DNR (do not resuscitate) orders may spend their final days and weeks on a ventilator. Studies have found that each patient enrolled in hospice will save \$19,000

in their final year of life,<sup>4</sup> and each patient seen by palliative care specialists can reduce hospital costs by \$7,000.<sup>5</sup> Based on these data, in 2015 we launched a pilot study integrating palliative care into our brain and spine oncology clinic. During the six-month study, a nurse practitioner (NP) joined the clinic one morning a week (0.1 FTE). The study period included 14 clinics with 180 patients. Of these, 24 were referred to the NP, and goals of care were established and advanced directive discussions were documented in 100 percent of those referrals. Do not resuscitate orders were activated in 37.5 percent and documented in 54 percent. Medical orders for scope of treatment forms were introduced in 87.5 percent and completed in 25 percent. In terms of change of therapy, 33 percent of patients enrolled—or seen by palliative care—were enrolled in hospice. So, extrapolating from the previous figures, adding 0.1 FTE to our brain and spine oncology clinic led to a cost savings of \$364,000 over six months.

### ED Visits & Hospital Admissions

We then looked at opportunities to realize cost-savings around

ED visits and hospital admissions, or at least reducing the incidence of ED visits hospital admissions. Here's what we found.

Our cancer patients have problems at inconvenient times. It may be during the day, when the oncologists' clinic schedules are full, and they are not able (or amenable) to adding on patients. In the past, many of these patients were advised to go to the ED for more timely attention to their complaints. We also found that a large number of our patients relied on the ED for pain management. In the year we pulled data for our "hot-spotter" study, 961 cancer patients had 1,448 ED visits, and 23 percent of these visits were related to pain management.

We addressed these issues with a two-pronged approach: 1) creation of a standardized triage phone assessment and 2) implementation of a symptom management clinic. In an effort to reduce ED utilization and reduce admissions, we created and staffed a new advanced practice provider position. The advanced practice provider saw patients at the clinic and, under the supervision of medical oncology, managed pain and other symptoms of their disease and side effects of treatment. The clinic is available

Figure 2. "Hot-Spotter" Data Compared to Registry Data by Diagnosis

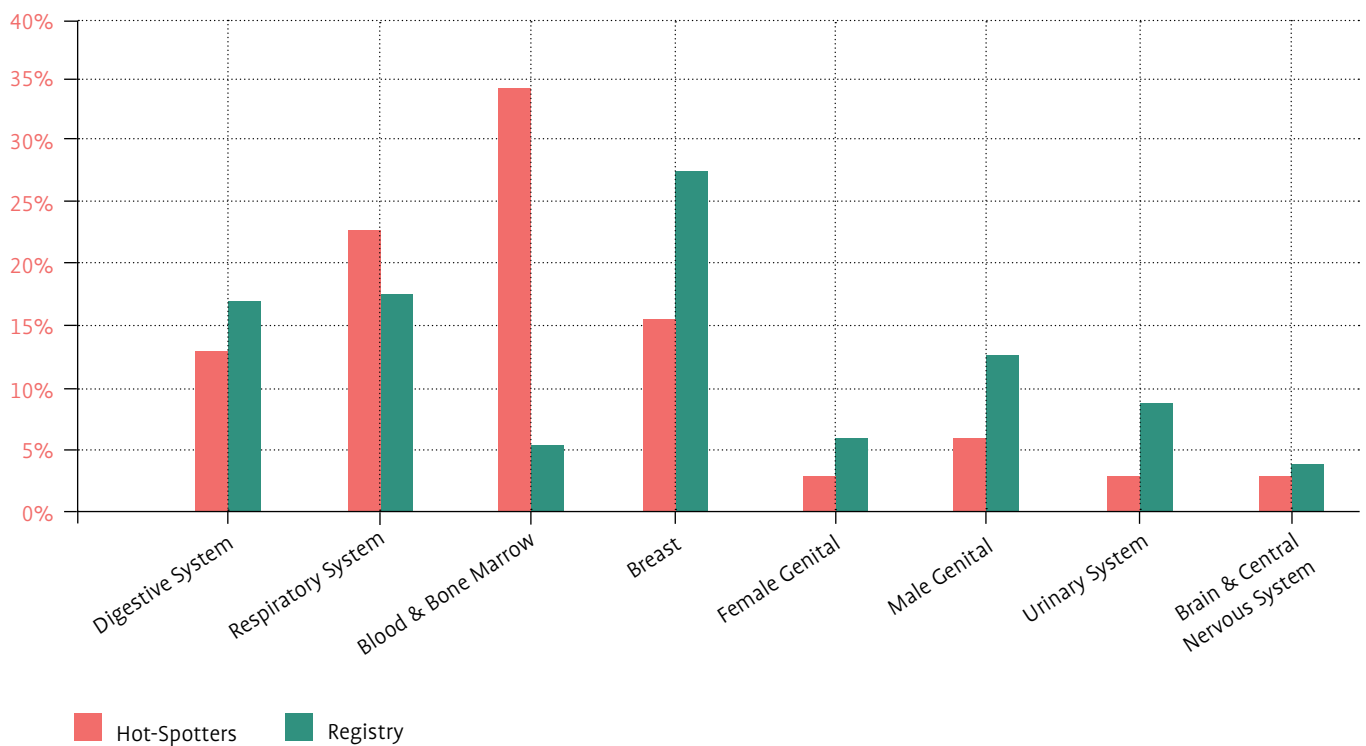
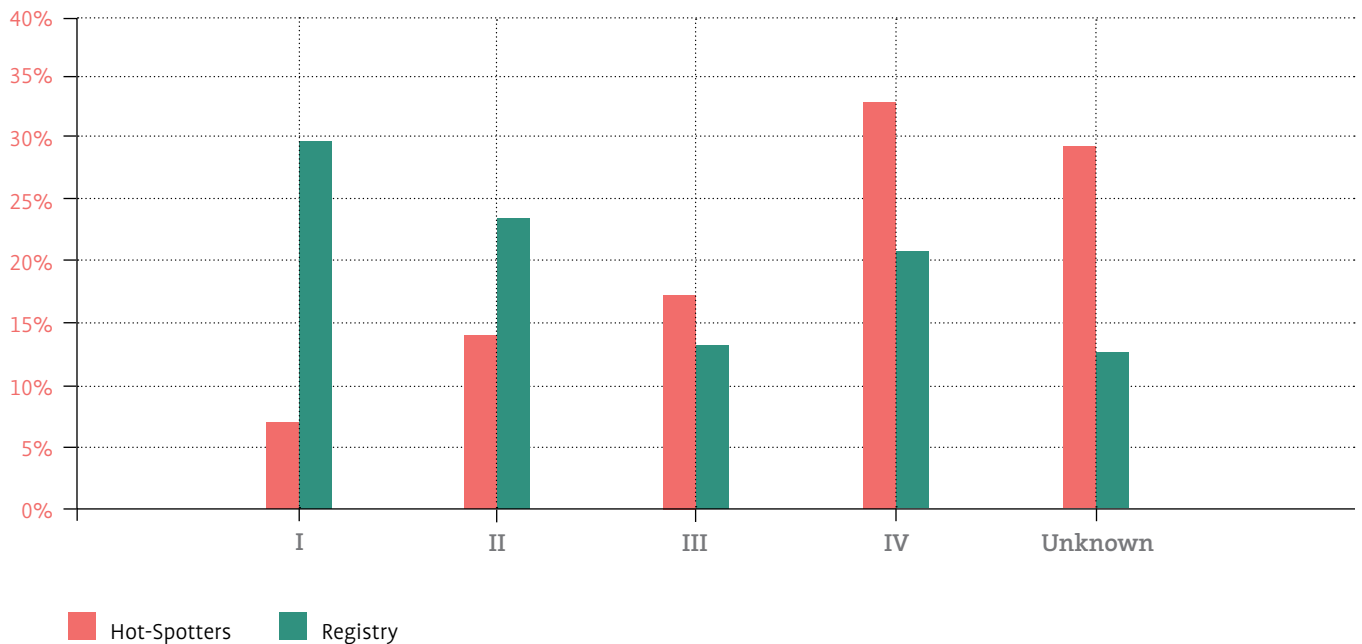


Figure 3. “Hot-Spotter” Data Compared to Registry Data by Stage



to treat most symptoms associated with cancer treatment. The top 10 conditions include anemia, nausea, dehydration, neutropenia, diarrhea, pain, vomiting, pneumonia, fever, and sepsis—all significant conditions, but not emergencies. The symptom management clinic is not used to treat patients presenting with active chest pain, acute respiratory distress, GI bleeds, stroke, or serious trauma, and the clinic does not accept patients brought in via EMS (emergency medical services). While not the first cancer center to implement a symptom management clinic, Cone Health has realized significant cost-savings and improved patient care. In the symptom management clinic’s first year, ED visits by cancer patients decreased 24.5 percent. This improvement is important because the hospital outpatient quality reporting program measure, OP35, looks at admissions and ED visits for patients receiving outpatient chemotherapy, and findings will affect future revenue.

### Blood & Bone Marrow Patients

There are many reasons why these patients are more likely to be “hot-spotters.” The drugs used to treat myeloma, leukemia, and lymphoma are expensive. In addition, Cone Health does not have a bone marrow transplant unit, so when acute blood cancer patients and potential bone marrow transplant patients are diagnosed, their care is transferred out of our network to any of three nearby academic medical centers. Once that occurs, our providers have limited control over any factors affecting their quality or cost of care. The “hot-spotter” study raised the possibility of Cone Health entering into an agreement with a

bone marrow transplant partner where we would ask for collaborative management—and potentially negotiated rates—in exchange for providing patient volumes for research, tissue banking, and fee-for-service revenue from the patients referred.

### Low-Cost Does Not Mean Low-Tech

Based on this study, Cone Health is comfortable making the statement that oncology providers should continue to promote high-tech treatments. Our “hot-spotter” data suggests that it is not just the advanced technology that is driving our rising health-care costs, but also the way we, as clinicians, are managing our patients. Based on these data, we believe that we can make process changes and improvements at Cone Health that will realize major cost-savings—without cutting patient access to high-tech treatments. For example, when you look at colostomy rates with IMRT versus conventional radiation for prostate cancer, the colostomy rates and all complication rates are lower, rectal bleeding rates are also lower with prostate IMRT. In another example, neutropenic fever admissions with targeted therapy are lower than they were with chemotherapy. As Cone Health turns its focus on developing a quality, integrated network of care, our plans include developing robust dashboards to track admissions and other key data and building multi-silo care teams—including primary care physicians—to collaborate on complex patients.

Our cancer patients cannot afford to lose the progress achieved from advances in technology. However, if the oncology community does not control its own spending, someone else will. As an




**Table 3. “Hot-Spotters” with Co-Morbidities**

Oncology Data: Hot-Spotters Co-Morbid Conditions	
CHF	33%
COPD	32%
Dialysis, Renal failure	38%
Septicemia	19%
Protein-calorie malnutrition	19%
Disorders of immunity	17%
Coag defect	23%
Feeding tube	12%

**Table 4. “Hot-Spotter” Co-Morbidities by Cost**

Original	
Category	% of total
Chemotherapy	33%
Inpatient Admissions	19%
Observation	13%
Surgical	9%
Dialysis	3%

example, you need look no further than 2015 when CMS cut reimbursement for stereotactic radiation by seven percent. When payers cut spending, an appropriate metaphor would be like someone “mowing the grass,” and the tallest blade of grass is the first to be cut down. When payers look at the oncology landscape, these tall blades of grass are the more expensive drugs, the more advanced radiation oncology treatments, and immunotherapy. Recognizing that our “hot-spotters” are really the tall blades of grass, I suggest providers mow their own grass by improving their management of these high-cost patients. Remember: when patients under your care are spending money in the ED and in the hospital, your cancer center is responsible for those costs—and you’re not receiving any revenue from these services. Study your own “hot-spotters” and look for ways to control their costs. Build multidisciplinary safety nets. Be ready for unanticipated sick patients during office hours and after-hours. Start mowing your own grass. 

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**References**

1. Moses H, Matheson DHM, Dorsey ER. The anatomy of health care in the United States. *JAMA*. 2013;310(18):1947-1964.
2. Pingree SB. Tackling the “hotspotter” patient challenge. *Harvard Bus Rev*. Available online at: [hbr.org/2013/11/tackling-the-hotspotter-patient-challenge](http://hbr.org/2013/11/tackling-the-hotspotter-patient-challenge). Last accessed April 6, 2017.
3. Zulan DM, Pal Chee C, Wagner TH, Yoon J, et. al. Multimorbidity and healthcare utilisation among high-cost patients in the U.S. Veterans Affairs Health care system. *BMJ Open*. 2015;5:e007771.
4. Obermeyer Z, et al. Association between Medicare hospice benefit and health care utilization and costs for patients with poor-prognosis cancer. *JAMA*. 2014;312(18):1888-1896.
5. Morrison RS, et al. Palliative care consultation teams cut hospital costs for Medicaid beneficiaries. *Health Aff*. 2011 Mar;30(3):454-463.

**OUR PROGRAM AT-A-GLANCE**

Cone Health is located in Greensboro, in the center of North Carolina. It is an integrated not-for-profit network of healthcare providers serving multiple counties with 11,000 employees and 1,300 physicians. We have 100 locations, including 6 hospitals, 3 ambulatory care centers, 3 outpatient surgery centers, 4 urgent care centers, a retirement community, and more than 100 physician practice sites. Cone Health hospitals sit in the middle of an academic triangle, bordered by Wake Forest, Duke,

and UNC Chapel Hill. So, our health system is under some geographic pressure to offer high-quality care. Cone Health Cancer Center is accredited by the American College of Surgeons with multiple commendations. We have several multidisciplinary clinics. Eighteen medical oncologists and six radiation oncologists see more than 3,000 new patients annually. We offer state-of-the-art radiation oncology technology, including TomoTherapy, radiosurgery, and brachytherapy.