Breast Cancer Statistics

Aside from non-melanoma skin cancer, breast cancer is the most common cancer among women in the United States. It is also one of the leading causes of cancer death among women of all races and Hispanic origin populations. For more information, visit Cancer Among Women.

In 2008 (the most recent year numbers are available)—

- 210,203 women in the United States were diagnosed with breast cancer.*†
- 40,589 women in the United States died from breast cancer.*†

*Incidence and death counts cover approximately 100% of the U.S. population.

†Source: U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999–2008 Incidence and Mortality Web-based Report.* Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention, and National Cancer Institute; 2012. Available at: http://www.cdc.gov/uscs.

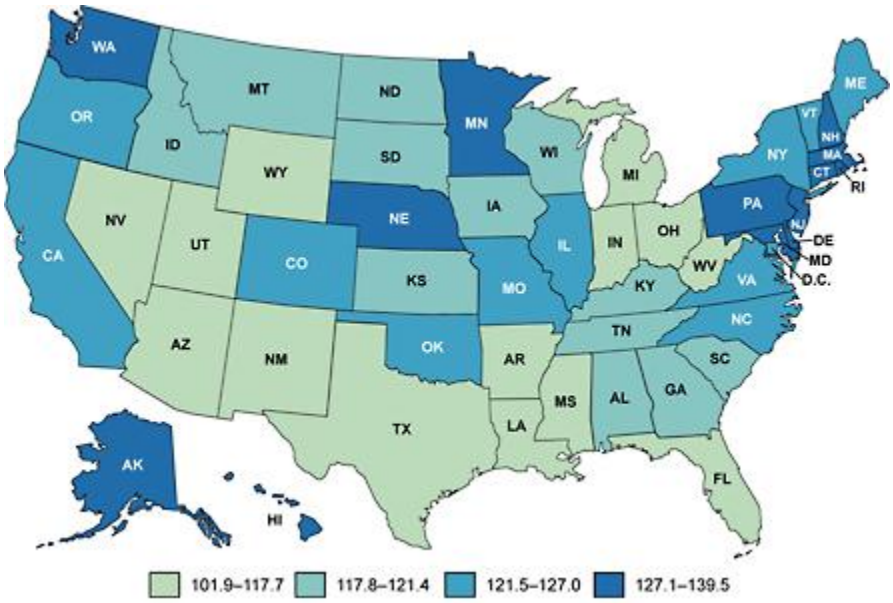
Breast Cancer Rates by State

In the following maps, the U.S. states are divided into groups based on the rates at which women developed or died from breast cancer in 2008, which is the most recent year with numbers available. The rates are the numbers out of 100,000 women who developed or died from breast cancer each year.

Incidence of Breast Cancer by State

The number of people who get breast cancer is called the **breast cancer incidence.** In the United States, the risk of getting breast cancer varies from state to state.

Female Breast Cancer Incidence Rates* by State, 2008†



Color on Map	Interval	States
	101.9 to 117.7	Arizona, Arkansas, Florida, Indiana, Louisiana, Michigan, Mississippi, Nevada, New Mexico, Ohio, Texas, Utah, West Virginia, and Wyoming
	117.8 to 121.4	Alabama, Georgia, Idaho, Iowa, Kansas, Kentucky, Montana, North Dakota, South Carolina, South Dakota, Tennessee, and Wisconsin
	121.5 to 127.0	California, Colorado, District of Columbia, Illinois, Maine, Missouri, New York, North Carolina, Oklahoma, Oregon, Vermont, and Virginia
	127.1 to 139.5	Alaska, Connecticut, Delaware, Hawaii, Maryland, Massachusetts, Minnesota, Nebraska, New Hampshire, New

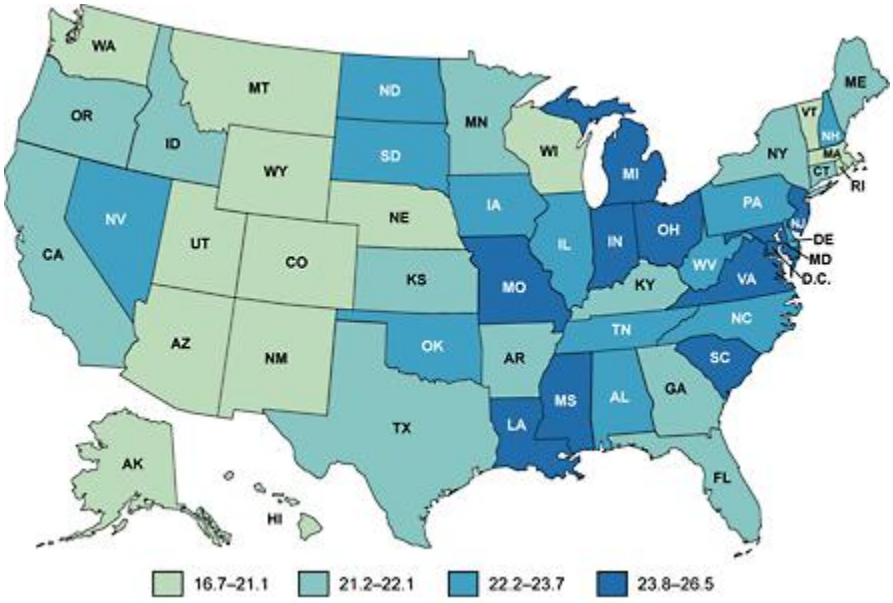
		Jersey, Pennsylvania, Rhode Island, and Washington

*Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.
†Source: U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999–2008 Incidence and Mortality Web-based Report.* Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention, and National Cancer Institute; 2012. Available at: http://www.cdc.gov/uscs.

Deaths from Breast Cancer by State

Rates of dying from breast cancer also vary from state to state.

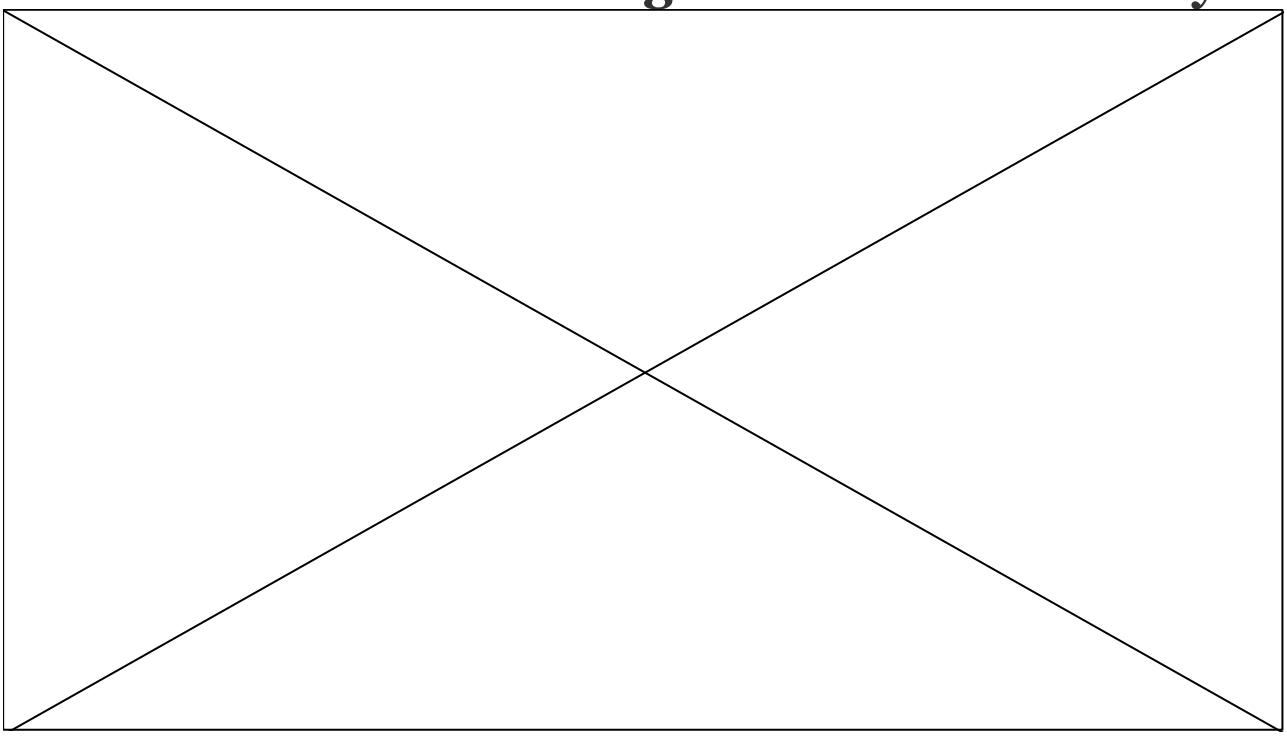
Female Breast Cancer Death Rates* by State, 2008†



Color on Map	Interval	States
	16.7 to 21.1	Alaska, Arizona, Colorado, Hawaii, Massachusetts, Montana, Nebraska, New Mexico, Rhode Island, Utah, Vermont, Washington, Wisconsin, and Wyoming
	21.2 to 22.1	Arkansas, California, Connecticut, Florida, Georgia, Idaho, Kansas, Kentucky, Maine, Minnesota, New York, Oregon, and Texas
	22.2 to 23.7	Alabama, Delaware, Illinois, Iowa, Nevada, New Hampshire, North Carolina, North Dakota, Oklahoma, Pennsylvania, South Dakota, Tennessee, and West Virginia
	23.8 to 26.5	District of Columbia, Indiana, Louisiana, Maryland, Michigan, Mississippi, Missouri, New Jersey, Ohio, South Carolina, and Virginia

*Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.
†Source: U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999–2008 Incidence and Mortality Web-based Report.* Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention, and National Cancer Institute; 2012. Available at: http://www.cdc.gov/uscs.

Price of Survival: Mammogram Costs Deter Many



"Our study supports the idea that eliminating co-pays for mammograms would be an important consideration for Medicare and health insurance programs in order to increase screening rates nationally."

But even in the group of women with full-coverage plans, the screening rate was still only 77.5 percent. While this is better in comparison to the 69.2 percent screening rate for women in cost-sharing plans, the statistic speaks to the fact that there are several other barriers to women getting regular breast cancer screenings in addition to the financial burden.

More Women at Risk

After mammography was shown to be an effective screening tool for breast cancer in the 1980s, the use of mammography in the United States increased rapidly. According to a study published last May in the journal Cancer, 70 percent of women reported having a recent mammogram in 2000. These mammography screening rates remained steady until about 2003, when screening rates started to decline among women aged 50 and older.

Although it may be impossible to pinpoint the exact cause of the decline in mammography screening rates, breast cancer and health policy experts believe there are a number of barriers.

More Money for Mammograms **Watch Video**

"I suspect patients' fear, lack of knowledge of efficacy [of mammography screenings], physical discomfort during the procedure, denial, geographic barriers, lack of primary care doctor and inability to pay are all factors," said Dr. Alan Sager, professor of health policy and director of the health reform program at Boston University's School of Public Health.

Moreover, because only about 75 percent of women whose mammogram costs are fully covered actually go in for their mammogram, a number of experts believe the cause for the decline in screening rates is due more to lack of knowledge about the importance of mammography screening than the financial burden alone.

"The more important story is that some Americans remain so unconvinced about mammograms that they are deterred by a $10 co-payment," said David Dranove, distinguished professor of health industry management at Northwestern University in Chicago.

"We are not talking about putting people into bankruptcy here; that is less than 3 cents per day."

According to statistics from the American Cancer Society, an estimated 178,480 women are expected to be diagnosed with invasive breast cancer in the United States during 2007. An estimated 40,460 women will die from breast cancer. This means that breast cancer is the No. 2 killer of women in the United States, second only to heart disease.

A study published in the 2003 issue of the New England Journal of Medicine found that over a 10-year period, between two and six out of every 1,000 women will have their lives saved by mammography.

But despite the numerous studies showing that regular mammography screenings have decreased breast cancer mortality rates by finding the cancer at earlier, more treatable stages, many women remain unconvinced of the importance of getting regular mammograms.

"The big problem is not insurance, it is ignorance," Dranove explained.

Dollars and Sense

But in Arlene Brown's case, ignorance had nothing to do with her decision to defer her yearly mammograms. Brown is well aware of the importance of regular mammography screenings, as she herself is at high risk for developing breast cancer. Her mother and both of her grandmothers had breast cancer.

Treatments and drugs

By Mayo Clinic staff

Lumpectomy

Simple mastectomy and modified radical mastectomy

Sentinel node biopsy

Radiation therapy

Living With Cancer

Subscribe to our **Living With Cancer** e-newsletter to stay up to date on cancer topics.

Sign up now

Your doctor determines your breast cancer treatment options based on your type of breast cancer, its stage, whether the cancer cells are sensitive to hormones, your overall health and your own preferences. Most women undergo surgery for breast cancer and also receive additional treatment, such as chemotherapy, hormone therapy or radiation.

There are many options for breast cancer treatment, and you may feel overwhelmed as you make complex decisions about your treatment. Consider seeking a second opinion from a breast specialist in a breast center or clinic. Talk to other women who have faced the same decision.

Breast cancer surgery
Operations used to treat breast cancer include:

- **Removing the breast cancer (lumpectomy).** During lumpectomy, which may be referred to as breast-sparing surgery or wide local excision, the surgeon removes the tumor and a small margin of surrounding healthy tissue. Lumpectomy is typically reserved for smaller tumors that are easily separated from the surrounding tissue.
- **Removing the entire breast (mastectomy).** Mastectomy is surgery to remove all of your breast tissue. Mastectomy can be simple, meaning the surgeon removes all of the breast tissue — the lobules, ducts,

fatty tissue and some skin, including the nipple and areola. Or mastectomy can be radical, meaning the underlying muscle of the chest wall is removed along with breast tissue and surrounding lymph nodes in the armpit. Radical mastectomies are less commonly done today. Some women may be able to undergo a skin-sparing mastectomy, which leaves the skin overlying the breast intact and may help with reconstruction options.

- **Removing one lymph node (sentinel node biopsy).** Breast cancer that spreads to the lymph nodes may spread to other areas of the body. Your surgeon determines which lymph node near your breast tumor receives the lymph drainage from your cancer. This lymph node is removed using a procedure called sentinel node biopsy and tested for breast cancer cells. If no cancer is found, the chance of finding cancer in any of the remaining lymph nodes is small and no other nodes need to be removed.
- **Removing several lymph nodes (axillary lymph node dissection).** If cancer is found in the sentinel node, your surgeon may remove additional lymph nodes in your armpit. However, there is good evidence that removal of additional affected lymph nodes does not improve survival in cases of early breast cancer following a lumpectomy, chemotherapy and whole-breast irradiation for tumors less than 2 inches (5 centimeters) in size, and where the cancer has spread to just a few lymph nodes in the armpit. In such cases, chemotherapy and radiation treatment after the lumpectomy have proved to be equally effective. This avoids the serious side effects, including chronic swelling of the arm (lymphedema), that often occur after lymph node removal.

  However, axillary lymph node dissection may still be performed if the sentinel lymph node contains cancer following a mastectomy, in the case of larger breast tumors or when a lymph node is large enough to be felt on physical exam. It may also be performed in situations when a woman elects to receive partial breast irradiation.

  Complications of breast cancer surgery depend on the procedures you choose. Surgery carries a risk of bleeding and infection.

  Some women choose to have breast reconstruction after surgery. Discuss your options and preferences with your surgeon. Consider a referral to a plastic surgeon before your breast cancer surgery. Your options may include reconstruction with a synthetic breast implant or reconstruction using your own tissue. These operations can be performed at the time of your mastectomy or at a later date.

  Radiation therapy
  Radiation therapy uses high-powered beams of energy, such as X-rays, to kill cancer cells. Radiation therapy is typically done using a large machine that aims the energy beams at your body (external beam radiation). But radiation can also be done by placing radioactive material inside your body (brachytherapy).

  External beam radiation is commonly used after lumpectomy for early-stage breast cancer. Doctors may also recommend radiation therapy after mastectomy for larger breast cancers. When external beam radiation is used after a woman has tested negative on a sentinel node biopsy, there is evidence that the chance of cancer occurring in other lymph nodes is significantly reduced.

Side effects of radiation therapy include fatigue and a red, sunburn-like rash where the radiation is aimed. Breast tissue may also appear swollen or more firm. Rarely, more-serious problems may occur, including arm swelling (lymphedema), broken ribs, and damage to the lungs or nerves.

Chemotherapy
Chemotherapy uses drugs to destroy cancer cells. If your cancer has a high chance of returning or spreading to another part of your body, your doctor may recommend chemotherapy to decrease the chance that the cancer will recur. This is known as adjuvant systemic chemotherapy.

Chemotherapy is sometimes given before surgery in women with larger breast tumors. Doctors call this neoadjuvant chemotherapy. The goal is to shrink a tumor to a size that makes it easier to remove with surgery. This may also increase the chance of a cure. Research is ongoing into neoadjuvant chemotherapy to determine who may benefit from this treatment.

Chemotherapy is also used in women whose cancer has already spread to other parts of the body. Chemotherapy may be recommended to try to control the cancer and decrease any symptoms the cancer is causing.

Chemotherapy side effects depend on the drugs you receive. Common side effects include hair loss, nausea, vomiting, fatigue and a small increased risk of developing infection.

Hormone therapy
Hormone therapy — perhaps more properly termed hormone-blocking therapy — is often used to treat breast cancers that are sensitive to hormones. Doctors sometimes refer to these cancers as estrogen receptor positive (ER positive) and progesterone receptor positive (PR positive) cancers.

Hormone therapy can be used after surgery or other treatments to decrease the chance of your cancer returning. If the cancer has already spread, hormone therapy may shrink and control it.

Treatments that can be used in hormone therapy include:

- **Medications that block hormones from attaching to cancer cells.** Tamoxifen is the most commonly used selective estrogen receptor modulator (SERM). SERMs act by blocking estrogen from attaching to the estrogen receptor on the cancer cells, slowing the growth of tumors and killing tumor cells. Tamoxifen can be used in both pre- and postmenopausal women. Possible side effects include fatigue, hot flashes, night sweats and vaginal dryness. More significant risks include cataracts, blood clots, stroke and uterine cancer.
- **Medications that stop the body from making estrogen after menopause.** One group of drugs called aromatase inhibitors blocks the action of an enzyme that converts androgens in the body into estrogen. These drugs are effective only in postmenopausal women. Aromatase inhibitors include anastrozole (Arimidex), letrozole (Femara) and exemestane (Aromasin). Side effects of aromatase inhibitors include joint and muscle pain, as well as an increased risk of bone thinning (osteoporosis). Another drug, fulvestrant (Faslodex), directly blocks estrogen, which keeps tumors from getting the estrogen they need to survive. Fulvestrant is generally used in postmenopausal women for whom other hormone-blocking

therapy is not effective or who can't take tamoxifen. Side effects that may occur include fatigue, nausea and hot flashes. Fulvestrant is given by injection once a month.

- **Surgery or medications to stop hormone production in the ovaries.** In premenopausal women, surgery to remove the ovaries or medications to stop the ovaries from making estrogen can be an effective hormonal treatment. This type of surgery is known as prophylactic oophorectomy and may be called surgical menopause.

Targeted drugs
Targeted drug treatments attack specific abnormalities within cancer cells. Targeted drugs approved to treat breast cancer include:

- **Trastuzumab (Herceptin).** Some breast cancers make excessive amounts of a protein called human growth factor receptor 2 (HER2). Trastuzumab targets this protein that helps breast cancer cells grow and survive. If your breast cancer cells make too much HER2, trastuzumab may help block that protein and cause the cancer cells to die. Side effects may include heart damage, headaches and skin rashes.
- **Lapatinib (Tykerb).** Lapatinib targets the HER2 protein and is approved for use in advanced metastatic breast cancer. Lapatinib is reserved for women who have already tried trastuzumab and their cancer has progressed. Potential side effects include nausea, vomiting, diarrhea, fatigue, mouth sores, skin rashes, and painful hands and feet.
- **Bevacizumab (Avastin).** Bevacizumab is a drug designed to stop the signals cancer cells use to attract new blood vessels. Without new blood vessels to bring oxygen and nutrients to the tumor, the cancer cells die. Possible side effects include fatigue, high blood pressure, mouth sores, headaches, slow wound healing, blood clots, heart damage, kidney damage, high blood pressure and congestive heart failure. Research suggests that although this medication may help slow the growth of breast cancer, it doesn't appear to increase survival times. For this reason, bevacizumab isn't approved by the Food and Drug Administration to treat breast cancer. But doctors may prescribe it for what's known as off-label use. Use of bevacizumab in breast cancer is controversial.

Side effects of targeted drugs depend on the drug you receive. Targeted drugs can be very expensive and aren't always covered by health insurance.

Clinical trials
Clinical trials are used to test new and promising agents in the treatment of cancer. Clinical trials represent the cutting edge of cancer treatment, but they're by definition unproven treatments that may or may not be superior to currently available therapies. Talk with your doctor about clinical trials to see if one is right for you.

Examples of treatments being studied in breast cancer clinical trials include:

- **New combinations of existing drugs.** Researchers are studying new ways of combining existing chemotherapy, hormone therapy and targeted-therapy drugs. Testing new combinations may help determine if certain breast cancers are more susceptible to specific combinations.
- **Bone-building drugs to prevent breast cancer recurrence.** Previous research found that adding a bone-building drug to hormone therapy treatment after surgery for premenopausal women reduced the risk of breast cancer recurrence. The drug used in the study, zoledronic acid (Reclast, Zometa), is a type of drug called a bisphosphonate that's used to treat bone loss (osteoporosis) and other bone diseases. The group of women who received zoledronic acid experienced fewer cancer recurrences than did the group that didn't receive the drug during the study, which lasted four years. But, newer studies haven't shown that zoledronic acid improves breast cancer risk of recurrence.
- **Using higher doses of radiation over a shorter period of time on a smaller portion of the breast.** Researchers are studying partial breast irradiation in women who've undergone lumpectomy. Partial breast irradiation involves higher doses of radiation aimed at only a portion of the breast, rather than the entire breast. Radiation used in partial breast irradiation can come from a machine outside your body, or it can come from tubes or catheters placed within the breast tissue.

Reducing Cost, Improving Quality Care through Individual Choices: Taking a Place at the Table

Thomas J. Smith, MD, and
Rebecca Kirch, JD

Thomas J. Smith, MD Rebecca Kirch, JD

Cancer and general care costs are rising unsustainably and without associated improvements in care quality. These escalating costs impose unbearable burdens on our increasingly vulnerable Medicare and Medicaid systems, positioning the growing "health care bubble" in queue as our nation's next major financial implosion. Insurance policy premiums went up 9% last year alone and show no sign of abating.[1]

How our current health system and workforce will address the rising numbers and needs of survivors, people living with chronic conditions and concerns of their caregivers, and the 50 million uninsured remain our most pressing challenges in professional practice and public policy.

The Health Care Bubble

Although we might simply classify ourselves as victims of the quality/cost crisis (i.e., we do not cause the high prices of new drugs), we can instead choose to be part of the solution by making changes in how we practice.

We are the ones who order the computed tomography (CT) plus the positron emission tomography (PET) scan when just the CT scan would let us make decisions just as well regarding solid tumors.

We are the ones use pemetrexed for adenocarcinoma of the lung instead of docetaxol when single-agent trials show equivalency in response rate, toxicity, and survival.[2]

5 Ways to Improve Care Quality and to Reduce Costs

1. Restrict surveillance of treated patients with cancer to those tests that have been shown to improve outcomes
2. Reduce use of white cell growth factors to the indications approved by ASCO, the European Organisation for Research and Treatment of Cancer, and the National Comprehensive Cancer Network, and prescribe dose reduction unless dose maintenance is proven better
3. Improve care quality and quality of life for all patients and families by integrating palliative care alongside disease-directed treatment to help address pain, symptoms, and distress
4. Improve care quality near the end of life

And we are the ones who use combination chemotherapy for metastatic breast cancer "to be aggressive," which requires pegylated filgrastim (at $2,200 to $4,800 per injection) to avoid neutropenia that would be less likely to occur with use of a single agent that gives equivalent response and survival.

> by involving hospice earlier— start with an information visit 3 to 6 months before death
> 5. For most diseases, do not administer chemotherapy to patients with poor performance status, or after progression on three lines of chemotherapy

We might also drive costs higher by not doing some things. Palliative care provides relief from the symptoms, pain, and stress of serious illness to improve quality of life for both the patient and the patient's family. Palliative care teams are built to work with a patient's other doctors to provide an extra layer of support. Palliative care is appropriate at any age and at any stage in a serious illness, and it can be provided together with curative treatment. The evidence is clear that providing palliative care with disease-directed treatment improves care quality, reduces costs, and may even increase survival. Yet many of us remain reluctant to talk about palliative care with our patients or to integrate it into our daily practices.

Similarly, 60% of us prefer to not have discussions with patients with lung cancer about hospice, advance medical directives, and prognosis until "There is no more chemo left to give."[2] This explains why 50% of patients with lung cancer who have 2 months to live have never heard of hospice from their doctors[3] and one-third of patients enter hospice with fewer than 7 days to live.[4]

Communication skills training and palliative care consults are available to help us feel more comfortable discussing difficult truths with patients and families.

We can do better in delivering on the promise of patient-centered and family-focused care by having discussions with people about how long they have to live (estimates are possible), care options that include concurrent palliative care, and have a "hospice information" visit earlier in the illness. All of the data suggest that people will live longer and better with this approach, and with fewer hospital admissions/readmissions and higher patient and family satisfaction and trust.

Maintaining Quality: Making Clinical Choices

Undoubtedly we all want to do everything we can clinically to save lives and prevent suffering. In all cases, but particularly when people are facing serious illness that cannot be cured, quality care delivery must be guided by personal choice.

Most people want to be at home, not in the hospital. They want to know their prognoses, their options, and they want reassurances that they will not be abandoned if they "fail" therapies.

Organizations such as U.S. Oncology have developed pathways that give equal or better survival with one-third less cost. It's not magic—just use less expensive generic drugs when they are equally effective, limit the number of "lines" of chemotherapy to those that are evidence based, and discuss palliative care earlier in the course of illness. For example, we should make it routine practice to ask patients and families about their quality of life frequently by asking questions such as, "How are your spirits? Are you able to do the things you need to do?" Then we should incorporate the resulting information into treatment planning.

> "There is no better time than now to organize as a professional force in partnership with patient advocacy organizations to promote practice change and public policies that will lead to delivering better quality care and to reducing costs."

We can introduce patients and families to palliative care by describing it as an "extra layer of support" that is helpful "at every point in care," and we can consider referral for early palliative care consultations.

Finally, we can involve hospice earlier in the course of illness and appoint someone in the office to have advance-directive discussions.

(For more suggestions as to how individual physicians can contribute to addressing the cost-of-care dilemma, **see the editorial by Dr. Lowell Schnipper on ASCO's Top Five list**.)

Political Action in Support of Palliative Care

Promoting quality of life and preventing suffering for every patient in every care setting are essential aspects of delivering high-quality and patient-centered care. We still want to cure as many people as we can and have the best survivorship rate possible. However, we must help transform U.S. health care to align with what patients and families want, and we must equip practitioners with communication skills to help patients identify and discuss their choices.

The American Cancer Society (ACS) and its advocacy affiliate, ACS Cancer Action Network (CAN), together are taking action to integrate palliative care earlier in the care continuum as an essential element of providing quality patient-centered care. Despite the benefi ts, palliative care remains a mystery to a large majority of Americans (70% are "not at all knowledgeable" of palliative care).[6] In addition, most physicians mistakenly equate palliative care exclusively with "hospice" or "end-of-life" care. Once consumers understand what palliative care is—an increased team-based emphasis on symptom management and patient choice—they want it, overwhelmingly (92%).[7]

ACS CAN is now building Congressional interest around a new suite of quality-of-life legislative proposals addressing key research, workforce, and access barriers to this more comprehensive model of patient-centered care. Advocacy activities will also include ongoing efforts to improve the balance of federal and state pain policies to ensure patients and survivors can access necessary pain medications and care.

Take-Home Message

Some Facts about the Cost of Cancer Care in the United States[5]

- Medical care costs more in the United States than in any other country, without better results. **Per year, we spend $8,100/person** vs. Canada's $4,500/person.
- Nearly **1 million families suffered medical bankruptcy** in 2011.
- Approximately **8% of lung cancer families are bankrupt** due to the cost of care.
- The cost of insurance for a family of four has increased from **$6,000** to more than **$15,000** in the past 11 years.
- Approximately **25% of all Medicare funds** are spent in the last year of life, and more than **9%** ($50 billion) are spent in the **last month of life**.
- Much of the **cost of care is under our control** including imaging and chemotherapy choices, integration of palliative care, use of home

We can no longer afford to be innocent bystanders by default while care delivery and payment reforms happen around us. Actionable steps exist right now to improve what happens with care quality, costs, and with the patient and family care experience.

> hospice, and avoidance of chemotherapy and hospitalization near the end of life.

There is no better time than now to organize as a professional force in partnership with patient advocacy organizations to promote practice change and public policies that will lead to delivering better quality care and to reducing costs. As with any change—even change for the better—these actions may initially stir grumbles among some patients and our own colleagues, but change is coming regardless of whether we embrace it.

In the name of providing truly patient-centered quality care, let us all choose to take our place at the table.

(For more on this topic, access Virtual Meeting to watch yesterday's Education Session, "Costs of Cancer Care: Affordability, Access, and Policy," of which Dr. Smith is Chair.)

About the Authors: *Dr. Smith is director of palliative care at the Sidney Kimmel Comprehensive Cancer Center, Johns Hopkins Medicine. He has been an ASCO member for 23 years. Ms. Kirch is director, Quality of Life & Survivorship at the American Cancer Society. She also serves as a quality cancer care knowledge expert for the ACS's advocacy initiatives and activities to improve quality of life and to reduce suffering for patients, survivors, and caregivers.*

References

1. The Kaiser Family Foundation and Health Research and Educational Trust. Employer Health Benefits: 2011 Annual Survey. http://ehbs.kff.org/ pdf/2011/8225.pdf. Accessed February 22, 2012.
2. Keating NL, Landrum MB, Rogers SO Jr, et al. Physician factors associated with discussions about end-of-life care. *Cancer*. 2010;116(4):998-1006.
3. Huskamp HA, Keating NL, Malin JL, et al. Discussions with physicians about hospice among patients with metastatic lung cancer. *Arch Intern Med*. 2009;169(10):954-962.
4. NHPCO Facts and Figures: Hospice Care in America. National Hospice and Palliative Care Organization website. http://www.nhpco.org/files/ public/Statistics_Research/2011_ Facts_Figures.pdf. Accessed February 22, 2012.
5. Smith TJ, Hillner BE, Kelly R. Reducing the Cost of Cancer Care: How to Bend the Curve Downwards. In: *2012 ASCO Annual Meeting Educational Book*. American Society of Clinical Oncology: 2012; Alexandria, VA.
6. 2011 Public Opinion Research on Palliative Care: A Report Based on Research Public Opinion Strategies. Center to Advance Palliative Care website. http://www.capc.org/tools-for-palliative-care-programs/marketing/ public-opinion-research/2011-public-opinion-research-on-palliative-care. pdf. Accessed February 22, 2012.
7. Meier DE, Brawley OW. Palliative care and the quality of life. *J Clin Oncol*. 2011;29(20):2750-2752.

The Economics of Lung Cancer

Cost realities raise questions about role of screening, personalized medicine, and palliative care in lung cancer

The interests of cost containment and value are increasingly at odds in medicine, and their often dichotomous relationship raises difficult questions for treating clinicians at a time when innovation and research continue to push the science of care forward, according to the presentations at Friday's Education Session "The Cost of Lung Cancer Care: Screening, Personalized Medicine, and Palliative Care."

Recent health care reform measures in Washington have pushed economic cognizance to the forefront in medicine. The perceived benefi t of a given medical therapy (defined loosely as its effectiveness in relation to its safety) may no longer be a stand-alone metric for its widespread adoption in a health care system increasingly seeking demonstrations of cost effectiveness.

The stark reality in lung cancer—a disease that already accounts for close to 10% of the approximately $125 billion that the U.S. health care system spends on cancer—is that despite recent evidence that wider screening with low-dose computed tomography (LDCT) may prove benefi cial in shifting the treatment paradigm to earlierstage tumors, the return on investment may not meet performance benchmarks that would justify its implementation. Likewise, cancer therapy in general has started a shift toward personalized medicine, and trials have demonstrated the efficacy of this treatment philosophy in lung cancers; however, again, it appears to be too early to tell if the strategy will add enough quality-of-life years to suggest its utility.

The sometimes harsh realities of medical economics may be most apparent in issues surrounding end-of-life care, Session Speaker Craig Earle, MD, of the Ontario Institute for Cancer Research, Canada, said during the session. The thought of potentially stopping care for patients in their final stages of life raises ethical dilemmas and questions of rationing care, despite 41% of overall expenditures in lung cancer occurring in the late stages of disease.

Yet, according to Dr. Earle, there may be some ethical basis for potentially stopping care, as there may be clinical and quality-of-life benefits for the shift to palliative care, aside from the economic benefi t.

"What we do influences the cost of care towards the end of life," Dr. Earle said. "There are limits on the effectiveness of continuing aggressive care to very near death for patients. There are benefits to considering the early institution of palliative care in this setting."

LDCT Screening: Ready for National Adoption?

Results from the National Lung Screening Trial (NLST), published in 2011, suggest that a screening protocol with three annual LDCT scans, despite a high rate of false positives, correlated with a higher rate of reduction in lung cancer and overall mortality compared with chest x-rays. Subsequently, several professional organizations, including ASCO, released guidelines recommending the use of LDCT screening protocols, specifically because of the potential to positively affect millions of individuals who would be eligible for screening under the NLST criteria.

However, asked Bernardo Haddock L. Goulart, MD, MS, of the Fred Hutchinson Cancer Research Center, given that the U.S. health care system already spends almost $13 billion annually on lung cancer, would wider adoption of LDCT at a price tag of anywhere between $2 billion and $4 billion be affordable on a national scale? More to the point, he asked, would the practice offer good value for the money spent?

"When considering cost, one also needs to consider the value or benefits of that intervention," Dr. Goulart said. "If we take the number needed to screen to avoid one lung cancer death in 320 individuals, as reported by the NLST, then if we adopt screening at a national level, we would potentially avoid 8,000 to 18,000 lung cancer deaths per year, suggesting that although costly, low-dose CT screening may offer value to society."

Fifty-seven percent to 70% of the costs of LDCT screening is derived from the actual performance of the test itself, while the remainder results from follow up on positive tests. Therefore, the effect of false-positive results and overdiagnosis is by no means insignifi cant. The number of individuals screened also represents a notable driver of cost. As a result, Dr. Goulart said, there are any number of research opportunities surrounding LDCT to codify precisely who would benefit from it and how to streamline its use before drawing any conclusions as to its ultimate cost effectiveness.

To date, several cost-effectiveness analyses have returned divergent results on national LDCT adoption, but their interpretation is limited by methodologic differences, Dr. Goulart said. On the aggregate, most published studies suggest an expense of $100,000 or less per quality-of-life year added, which is a widely accepted benchmark for acceptability in incremental cost-effectiveness ratio studies that relate benefi ts of an intervention to its cost. Yet, LDCT screening may be significantly cost-beneficial if it can lead to higher smoking- cessation rates, which has been shown in some studies, Dr. Goulart said.

Clinical Data Will Drive Personalized Medicine Costs

An interpretation of the cost effectiveness of personalized therapy in lung cancer may be relative to the profi le of patients treated. According to Natasha B. Leighl, MD, MMSc, of Princess Margaret Hospital, University of Toronto, Canada, an analysis of erlotinib therapy suggested a cost of $94,638 (Canadian dollars) per year of life gained. But, for patients classifi ed as "never smokers," the cost in Canadian dollars of adding a life year dropped to $39,487, compared with $504,911 for current or former smokers. For those patients with high epidermal growth factor receptor copy counts (corresponding to the particular mutation targeted with erlotinib therapy), the cost was $33,353, compared with $109,792 for patients with low copy counts.

In the context of nontargeted therapies, the cost-effectiveness of new treatments is fairly straightforward, where the target population is fi xed and an evaluation of an intervention considers appropriate comparators. With personalized medicine, however, the prospect of identifying patient subpopulations likely to benefi t from therapy multiplies implied costs. Thus, Dr. Leighl said, cost effectiveness of personalized medicine must consider testing as either bundled or unbundled to the cost of treatment.

"When we think about testing, the important thing to remember is that technology changes and changes rapidly" with the potential to dramatically affect associated costs, positively or negatively, Dr. Leighl said.

In the real-world setting, the adoption of personalized therapy will, therefore, be predicated on whether clinicians adopt testing, which, in turn, will depend on its cost and complexity. At its core, Dr. Leighl said, the cost effectiveness of personalized medicine will ultimately be driven by the clinical evidence and how it translates to everyday practice.

The Clinical Benefits of Palliative Care

The decision to stop aggressive treatment appears to contradict the training of oncologists to offer any intervention possible to benefi t the patient. Yet, clinicians may be doing more harm than good by ignoring the potential of palliative and hospice care.

At a base economic level, there is rationale to reduce the tremendous expenditure of time and resources and redirect them to patients more likely to benefi t. According to Dr. Earle, more importantly, published literature clearly shows that aggressive chemotherapy near the time of death is unrelated to the likelihood of success of treatment. In fact, he said, patients and their families have expressed greater satisfaction when options such as hospice care are presented to them at an earlier date, insofar as it may reduce the stress of having to deal with such decisions near the very end of life.

Far from being a situation in which physicians are abrogating a responsibility to safeguard patient well-being, early institution of symptomatic and/or palliative care does not adversely affect survival, Dr. Earle said. Instead of negatively affecting quality of life, the decision to stop treatment can, in fact, be positive, with the ancillary benefit of reducing use of valued resources that could serve other patients better, he said.

Cost of Cancer Care

Choosing Wisely®: ASCO Identifies Five Key Opportunities in Oncology to Improve Value of Patient Care

Also See:

- **ABIM Foundation Choosing Wisely® Campaign**
- **Top Five List in Oncology**
- ***Journal of Clinical Oncology*: American Society of Clinical Oncology Identifies Five Key Opportunities to Improve Care and Reduce Costs: The Top Five List for Oncology**
- **President's Perspective: Our Hope for the "Top Five" List in Oncology**
- **Top Five-Related Sessions at the 2012 ASCO Annual Meeting**
- **Top Five Frequently Asked Questions**
- **ASCO in Action: Brief on Top Five List | Take the Poll on the Top Five**
- **Cancer.Net: Top Five Patient**

As a participant in the American Board of Internal Medicine Foundation's Choosing Wisely® campaign, ASCO has issued **a "Top Five" list** of common, costly procedures in oncology that are not supported by evidence and that should be questioned. In addition to the Top Five list, a full manuscript further detailing the background, methods, and results of ASCO's efforts is **published in the *Journal of Clinical Oncology*.**

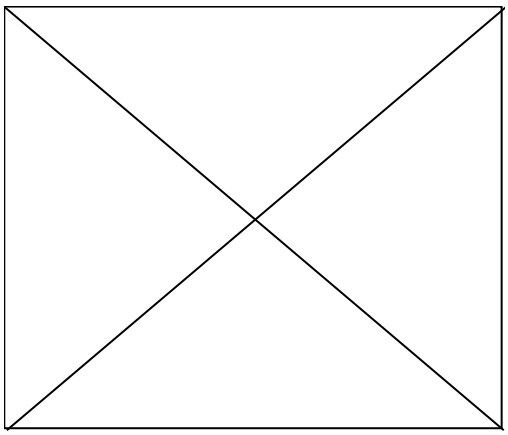
The development of the list for oncology was led by ASCO's Cost of Cancer Care Task Force, a multidisciplinary group of oncologists committed to addressing the underlying issues contributing to the rising cost of cancer care. Selections were based on a comprehensive review of published studies and current guidelines from ASCO and other organizations. The final list also reflects input from more than 200 oncologists, including the society's Clinical Practice Committee, the leadership of the state/regional oncology societies, as well as other leading oncologists and patient advocates.

The resulting list for the field of oncology affirms that evidence-based medicine is the key to providing high-quality, high-value care to our patients.

Summaries

- **Survey: Tell ASCO Your Top Five**
- **Cost of Cancer Care Task Force Roster**

ASCO Past President Michael P. Link, MD Discusses Choosing Wisely®



The concept for the Top Five list was first proposed in 2010 by Howard Brody, MD, PhD in a ***New England Journal of Medicine* commentary**. Dr. Brody challenged medical specialties to take a critical look at their fields, and to each identify five costly practices that are commonly performed despite lack evidence.

"The fact is that today's growing healthcare costs are unsustainable. As oncologists, we have a responsibility to provide our patients with high value cancer care. That means providing the highest quality care to our patients while avoiding costly tests and procedures that have little or no proven benefit," said Michael P. Link, MD, president of ASCO.

"By working together to reduce the overuse of these procedures, the oncology field can help improve the care of our patients, while achieving substantial cost savings" said Lowell E. Schnipper, MD, chair of ASCO's Cost of Cancer Care Task Force. "This list will help oncologists and their patients make more informed decisions about their care."

In addition to the physician and patient resources released in conjunction with the launch of the Choosing Wisely campaign, over the coming months, ASCO will provide additional resources to help educate our members regarding the Top Five recommendations and encourage honest conversations with patients.

For questions, please contact **topfive@asco.org**.

Cost of Cancer Care

ASCO has identified the rising cost of cancer care as a barrier to high-quality care for many cancer patients. To address this issue, ASCO established the Cost of Cancer Care Task Force to define challenges related to the cost of cancer care and to develop strategies to address these challenges.

Background

Advances in medical technology are increasing the cost of care for most fields of medicine, and oncology is no exception. Cancer care costs are growing rapidly, at a rate of 15% per year, and the newest drugs cost several thousand dollars per month of treatment. 33% of families are experiencing difficulty paying for their cancer care.[1]

The high prices of individual drugs can create a difficult situation for patients and oncologists. Many cancer patients are unfamiliar with having to make trade-offs between very high out-of-pocket costs and very expensive treatment with measurable but sometimes modest health benefits.

Additionally, oncologists are conflicted about how the cost of care should affect their behavior. For example, a recent survey of 167 medical oncologists found that, when asked whether they discuss the costs with their patients, 37% said "always," 32% said "sometimes," and 31% said "never." More than half of respondents said that when they know the cost will cause a financial strain, the oncologists omit discussion of expensive therapy altogether.[2]

What is ASCO Doing?

In response to the growing challenges surrounding the cost of cancer care, ASCO is developing practical educational tools and resources to assist oncologists in discussing the cost of care with patients, as a component of high quality care. Tools are also being developed specifically for patients to help them raise cost of cancer care questions with their oncologists. Additionally, ASCO is committed to addressing the fundamental policy issues related to the rising cost of cancer care. To learn more about ASCO's cost of care initiatives, please visit the links below.

Cost of Care Patient Resources: Review ASCO cost of care resources for patients.

Cost of Care Physician Resources: Review current ASCO physician resources related to the cost of cancer care.

HIGHLIGHTS

- ASCO Guidance Statement: The Cost of Cancer Care

- Patient Guide to Managing the Cost of Cancer Care
- ASCO Cost of Cancer Care Task Force