

Fall/Winter 2008

# PATHS OF PROGRESS

Research and Care at Dana-Farber Cancer Institute

## A LEADING EXAMPLE

HOW PATIENTS TAKE  
CENTER STAGE WITH THEIR  
POWERFUL MESSAGE

DEFINING "CURE" • BATTLING LUNG CANCER • PATHOLOGY'S CRITICAL ROLE

## From the President

More than half a century of scientific and clinical advances have changed the way cancer is perceived by the general public and the medical community. Prior to World War II, physicians widely believed that cancers could not be thwarted by chemical-based medicines, a bias shattered in the late 1940s when Dana-Farber founder Dr. Sidney Farber demonstrated that drugs could produce remissions in childhood leukemia. In the intervening years, treatments and survival rates have improved to the point where a number of cancers are viewed as conditions that can be controlled, contained, and treated as chronic illnesses – often for many years, with a high quality of life. Too many others, unfortunately, still defy our best efforts to improve survival. However, the overall outlook is brightening every day.

As an article in this issue of *Paths of Progress* asks, what will a cure for cancer look like? Based on all the trends we can discern in the laboratory and the clinic, it's clear that a cure won't take the form of a single agent that can quell all of the roughly 400 related conditions that go by the name 'cancer.' Cancer is too complicated a disorder at both the molecular and larger biological level for any "magic bullet" approach. More likely, as our understanding of the genetic directives underlying cancer grows, a variety of individualized treatments will be needed to strike the multiple weak

points in tumors' molecular makeup. Still, it is a sign of how far we have come, and how confident we have reason to be, that we can speak of conquering a condition that once instilled such universal fear that its name was rarely spoken.

As a group, the stories in this issue can be thought of as offering a mid-course look at how the journey toward cures is faring. The pieces on lung cancer research and cancer pathology illustrate the state of the art in these two areas. The articles on the Patient and Family Advisory Councils and the physical and emotional ups and downs of living with cancer focus on the personal side of disease, exploring how patients call on their coping skills and sometimes direct their energy toward improving the care they and others receive.

Although it is impossible to know how cancer treatment will evolve and be refined in the years ahead, we do know that patients – as advocates, participants in clinical trials, and teachers about the human spirit – will be the true heroes in the process. I hope you enjoy reading about our progress.



Edward J. Benz Jr., MD  
President, Dana-Farber Cancer Institute

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### PATHS OF PROGRESS Fall/Winter 2008

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Fall/Winter 2008

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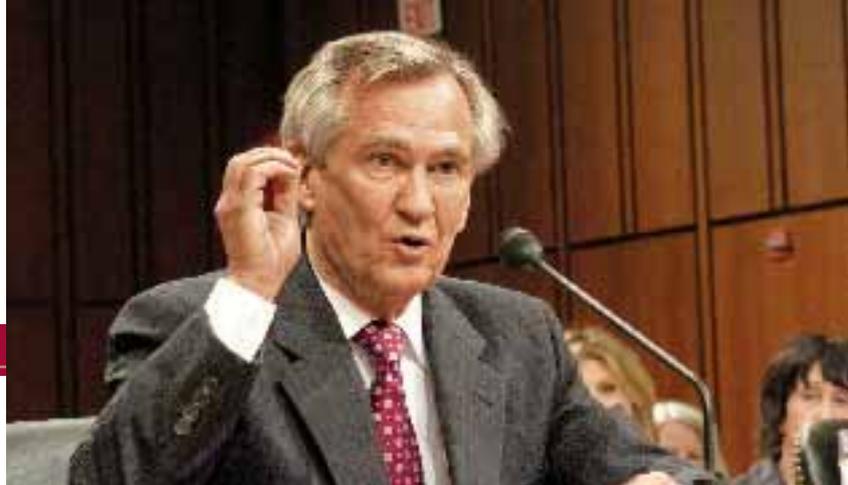
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# Dateline

news around the Institute



Dana-Farber President Edward J. Benz Jr., MD, testifies at a U.S. Senate Committee hearing this spring.

## Crafting cancer legislation

Dana-Farber President **Edward J. Benz Jr., MD**, is helping shape legislation that aims to reenergize and reengineer the nation's war on cancer.

A developing bill, co-sponsored by Sens. Edward Kennedy (D-Mass.) and Kay Bailey Hutchison (R-Texas), seeks to overhaul the 1971 National Cancer Act by improving the coordination of cancer research, prevention, and treatment, and by expanding funding to the National Cancer Institute. The senators solicited the advice of Benz, who calls for a more holistic approach to the fight against cancer, one that promotes collaboration among research centers and hospitals, insurers, foundations and advocacy groups, private industry, and government.

"We need to make research part of each and every initiative and intervention associated with cancer, whether it's basic biological research, public health, nursing, or clinical research," says Benz, who was invited by Kennedy to speak at a U.S. Senate Committee hearing in May titled "Cancer: Challenges

and Opportunities in the 21st Century."

Benz also notes the importance of increasing access to cancer care, especially among traditionally underserved groups, and raising participation in clinical trials by encouraging private and government insurers to pay the basic medical costs of trial participants.

Dana-Farber's involvement with a national bill speaks to Benz's position as a leader in the oncology field; he serves as president of the Dana-Farber/Harvard Cancer Center and the Association of American Cancer Institutes, which represents 92 comprehensive cancer centers. Benz also co-chairs the Research Working Group, a panel of scientists, physicians, and policy advocates that recently surveyed the body of cancer research currently being conducted in the U.S.

The Senate committee is considering new cancer legislation at a time when federal funding for independent investigators is leveling off, potentially hampering the pace of cancer research. Legislators plan to send the bill to the full Senate and House of Representatives in 2009.

## New academic department supports growing fields

The growing depth and breadth of services in psychosocial oncology and palliative care at Dana-Farber has led to the creation of a joint academic department for these areas.

The new Psychosocial Oncology and Palliative Care department, which is chaired by **Susan Block, MD**, a recognized leader in these fields, brings together several separate adult and pediatric programs, many of which share common clinical, practice, and research concerns.

Psychosocial oncology caregivers provide support for handling anxiety and sadness, depression, changes in thinking and behavior, and personal and spiritual issues through all phases of the cancer experience. Palliative

care specialists focus on managing pain and other physical symptoms, along with emotional concerns and decision-making challenges that patients and their families face as they cope with a life-threatening illness. Though the two areas' services are unique, they have the same objective: helping patients and families maintain the best quality of life.

"Our goal, through collaboration among our services, is to support our clinicians, amplify our impact on patients, and create a national model for care," says Block.

A compelling reason to form the new department, according to Dana-Farber President **Edward J. Benz Jr., MD**, was that the size and scope of activities and

personnel have grown rapidly in these patient-care areas. The Institute also conducts a wide array of education programs and research on cancer-related mental health issues.

“What were small programs only a few years ago have become internationally respected and leaders in the field,” says Benz.

Dana-Farber faculty who work in psychosocial oncology and palliative care will be part of an inter-

disciplinary group with a common mission. The department will also provide a single point of connection between the mental health and palliative care faculties and their academic homes in Adult or Child Psychiatry, Medicine, and Pediatrics, create opportunities for collaborations, and assure that the perspectives and interests of psychosocial oncology and palliative care faculty members are appropriately represented in the Institute’s academic councils.

## Dana-Farber cited as role model in partnering with patients

Dana-Farber’s efforts to involve patients and their families in clinical caregiving were recognized in April with the Blue Cross Blue Shield of Massachusetts (BCBSMA) Health Care Excellence Award.

In bestowing the honor, which carries a \$100,000 award, a panel of national and local leaders in health care delivery cited Dana-Farber as a pioneer in engaging and empowering patients in every aspect of care, from the bedside to the boardroom.

“One of the ways to improve our health care system is to recognize and support organizations that can guide us to exceptional achievement in creating and implementing innovative programs and partnerships,” says Cleve Killingsworth, BCBSMA’s chairman and CEO. “Dana-Farber has transformed the delivery of care through its entire organization by encouraging collaboration, communication, and engagement with patients – activities that are critical to ensuring that the quality of health care in Massachusetts remains of the highest standard.”

More than 30 organizations submitted nominations for the award, which was established in 2007 to recognize organizations that excel in improving the safety and effectiveness of health care in the Commonwealth.

Using the occasion of this recognition to recommit the Institute to safe, patient- and family-centered care, DFCI President **Edward J. Benz Jr., MD**, launched a set of initiatives “to ensure that both our culture of

safety and our safety practices will remain the best that can possibly be achieved.” Highlights include:

- Opening adult clinics earlier, so patient check-in starts at 7 a.m. to accommodate more people.

*Continued on next page*



**Clinical staff like Latoya Toney-Morris are spreading patient appointments more evenly throughout the day.**

# Dateline

## news around the Institute

- Creating new scheduling guidelines and systems to help spread out the peak of patient volume.
- Adding more infusion chairs, exam rooms, and staff.
- Increasing the number of DFCI patients seen at the Faulkner Hospital satellite clinic and the cancer center at Milford Regional Medical Center. Preparations are also under way for new sites in Weymouth, Mass., and Londonderry, N.H.
- Appointing **Sharon Lane, RN, MSN**, as the new associate director of the Center for Patient Safety and creating a new medication safety officer position in the Pharmacy.
- Establishing a new training program to build more effective and collaborative clinical teams.
- Surveying front-line staff about their perceptions and recommendations about patient safety, and developing a new online education program.
- Deploying two Information Services initiatives to reduce the risk of human error in computerized clinical systems.

## Pediatric researchers top list of recent faculty honors

Dana-Farber pediatric oncologist **David Pellman, MD**, was named one of 56 new Investigators by the Howard Hughes Medical Institute (HHMI), one of the nation's largest philanthropies and supporters of biomedical research, in May. HHMI holds nationwide competitions to select scientists who are at a relatively

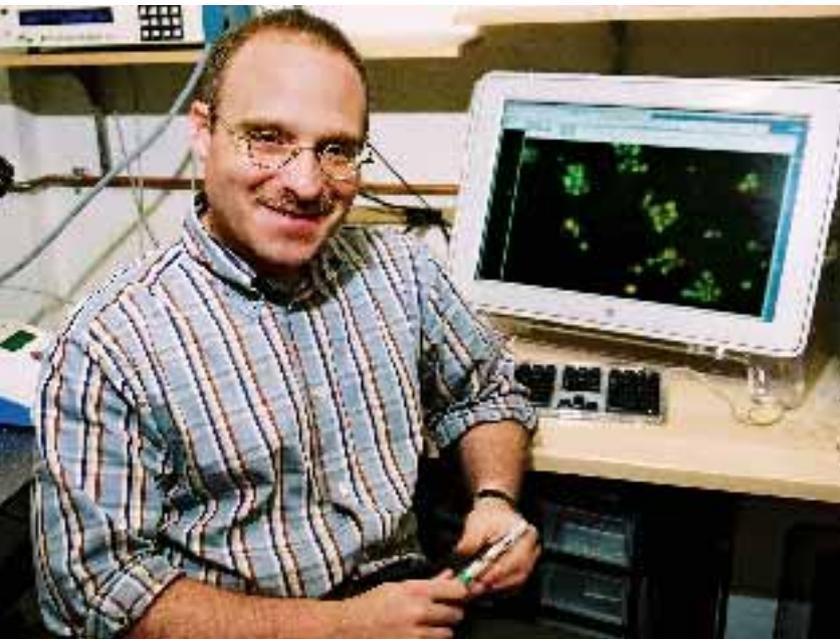
early stage in their careers, highly productive, and pursuing groundbreaking research.

Pellman studies aneuploidy, the abnormal chromosome numbers often observed in cancer cells. Working with yeast and mouse models, Pellman and colleagues discovered an important route to aneuploidy and cancer: doubling the entire set of chromosomes (also known as polyploidy).

"The idea that the doubling of the genome would contribute to tumor development is one of those ideas that's been out there, would get revisited every 10 years or so, but would then be forgotten," says Pellman, who hopes to develop new treatment approaches that exploit the biological differences between normal and aneuploid cells.

In another honor, the Society for Pediatric Research recently awarded an E. Mead Johnson Award to **Todd Golub, MD**, for his pioneering work in cancer genomics. Golub, a Dana-Farber and Children's Hospital Boston pediatric oncologist, also directs the cancer program at the Broad Institute of Harvard and MIT. He is best known for developing new technology for using mRNA and microRNA expression profiles, which indicate activity levels of different genes, to classify cancers and predict their behavior.

Most recently, Golub established an entirely new way to use gene expression data to identify drugs that mimic



Pediatric oncologist David Pellman received national recognition for his groundbreaking research on aneuploidy.



## Additional awards and honors

Several Dana-Farber faculty members were honored at the American Society of Clinical Oncology's (ASCO) annual meeting in the spring. **Bruce Johnson, MD**, director of the Lowe Center for Thoracic Oncology, took home a new ASCO honor, the Translational Research Professorship. It is designed to support oncologists dedicated to bringing advances in basic sciences into clinical practice and to mentoring other translational researchers. He was also named to the ASCO Board of Directors. **Jay Harris, MD**, chair of

the Radiation Oncology Department, was named winner of the annual Gianni Bonadonna Breast Cancer Award for his outstanding achievements in breast cancer research and treatment.

**Elizabeth Cooley, RN, BSN; Lisa Doherty, RN, NP; Bette Jeanne Kelly, RN, MS; Jeannine Sudol, RN, BSN; and Annette Werger, NP, MS**, were selected from a field of hundreds across the state to be recognized for their special work in *The Boston Globe's* sixth annual Salute to Nurses. The DFCI caregivers

were nominated by patients or families for the honor.

**Marsha Fonteyn, RN, PhD**, is this year's recipient of *Nursing Spectrum* magazine's Excellence Award for mentoring in New England. **Susan DeCristofaro, RN, MS**, director of Patient and Family Education, and **Linda Pellerin, RN, MSN**, clinical nurse specialist, were finalists in the community service and teaching categories, respectively. The awards support and celebrate nurses who shine in clinical care, community service, management, mentoring, and teaching.

or oppose genetic changes induced by disease. The technique analyzes changes in gene expression of diseased versus normal cells, and compares them with similar changes induced by a battery of FDA-approved drugs.

Golub's translational research accomplishments were further recognized with his recent election to the American Society for Clinical Investigation. The society acknowledges the achievement of scientists who have leveraged laboratory findings into advances in medical care.



**Multiple societies honored cancer genomic pioneer Todd Golub.**

## Green efforts earn statewide recognition

Dana-Farber was named the 2008 Green Binny Institutional/Non-Profit of the Year in October. The statewide honor, by the Massachusetts Recycling Coalition, is given annually to an organization that shows leadership in recycling and waste reduction.

"The Institute is committed to protecting natural resources, reducing waste, and promoting a healthy environment for patients, employees, and visitors. This award is evidence that our efforts are working," says DFCI's Director of Environmental Health and Safety

Melissa McCullough, MS, CHMM, CIH.

The Green Binny is one of several environmental awards that Dana-Farber has earned in recent years. The Institute has won two merit awards and a WasteWise Partners of the Year award from the U.S. Environmental Protection Agency. It's also been recognized by Hospitals for a Healthy Environment (H2E) for its success in reducing the use of products with mercury and the release of mercury waste, and by the City of Boston for being a bike-friendly business. ■

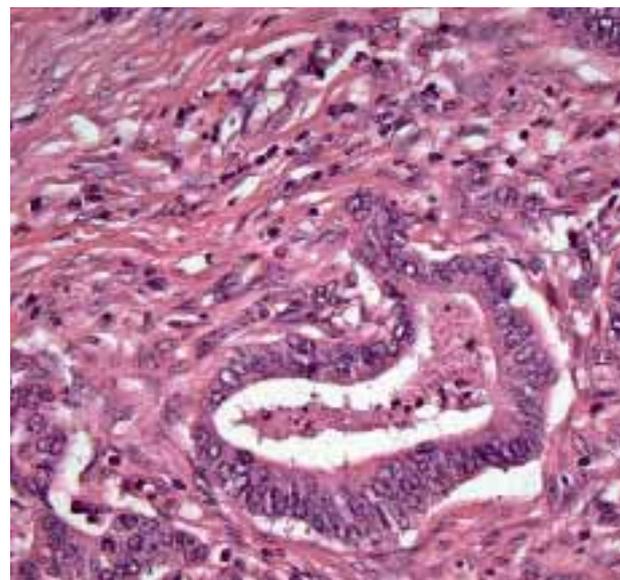
## Research sharpens picture of colon cancer risk

Two recent studies by Dana-Farber scientists provide additional details about who is at increased risk for colorectal cancer and who may have the best chance of surviving it.

One study found that having a family history of colon or rectal cancer doubles one's risk of developing the disease but also improves the odds of survival if the cancer does occur. Researchers, led by **Jennifer Chan, MD, MPH**, **Charles Fuchs, MD, MPH**, and **Jeffrey Meyerhardt, MD, MPH**, found that patients treated for advanced, stage 3 colorectal cancer fared significantly better if they had

a first-degree relative (parent, sibling, or child) with the disease than if they had no such family history. The investigators don't fully understand why this is the case but hope further research will reveal the answer.

The second study reported that people diagnosed with colon cancer who had abundant vitamin D in their blood were less likely to die during a follow-up period than those who were deficient in the vitamin. The findings are intriguing, but study leaders **Kimmie Ng, MD, MPH**, and **Fuchs** say further studies are needed to examine whether supplements can benefit colorectal cancer patients.



Colon cancer cells

## Success of drug in melanoma patient burnishes promise of targeted therapies

The future of personalized cancer therapy came into sharper focus this spring when Dana-Farber researchers achieved a medical



Stephen Hodi

first – using a “targeted” drug to drive a patient’s metastatic melanoma into remission.

The case involved a 79-year-old woman who had several melanoma tumors in her abdomen. When lab tests showed the tumor cells carried an abnormality in a gene called *KIT*, the patient enrolled in a clinical trial involving Gleevec®, a drug known to target that gene. Four weeks after she began therapy, imaging exams showed a dramatic reduction in tumor size and activity. Four months later, the tumors were still in check.

“This is the first proof of princi-

ple that we can find an Achilles’ heel” – a gene critical to tumor cell growth and proliferation – “in melanoma and, by targeting that gene with a drug, cause the cells to die,” says Dana-Farber’s **Stephen Hodi, MD**, who led the study. “It is especially significant because there haven’t been any effective treatments for melanoma patients with metastatic disease.”

Because *KIT* mutations are found in only a small percent of melanomas, Gleevec does not represent a universal treatment for the disease. But the case suggests that drugs that target other gene abnormalities in melanoma cells may be equally successful.

## Mathematical tool searches for cancer genes

The advent of technology for scanning thousands of genes at a time to see which are mutated in cancer cells has presented researchers with a downpour of data – and a quandary. How to sort through the dozens or even hundreds of genes that often turn up abnormal on such scans to determine which are truly involved in cancer, and which are merely decoys?

Investigators at Dana-Farber and Memorial Sloan-Kettering Cancer Center have developed a set of mathematical formulas, or

an algorithm, to do just that. The algorithm, now freely available to scientists online, ranks genes by their likelihood of being involved in cancer. In a study published this spring, the researchers showed that a gene identified by the algorithm as a likely tumor restrainer indeed plays that role in a common type of brain cancer, and is not a mere “bystander” to another restrainer gene.

The algorithm promises to be especially valuable to The Cancer Genome Atlas (TCGA) pilot project, a federally led effort

to explore genomic changes linked to human cancer, according to Dana-Farber’s **Lynda Chin, MD**, senior author of the study and a leading participant in TCGA.

“As the project begins to map the genetic alterations in different kinds of cancer, we need to be able to discriminate between alterations that truly are relevant to the disease and those that are not,” she says. “The new algorithm, which was developed in collaboration with Dr. Cameron Brennan of Memorial Sloan-Kettering, will help us do that.”

## Patients’ worries and wishes gain attention

New research is shedding light on patients’ concerns and preferences when diagnosed with cancer and when completing trials of new treatments.

In one study, Dana-Farber investigators found that elevated levels of anxiety may cause women with ductal carcinoma *in situ* (DCIS), the most common form of non-invasive breast cancer, to overestimate their risk of recurrence or of dying from breast cancer.

“Although DCIS typically is a very treatable disease, many women diagnosed with it develop inaccurate risk perceptions,” says **Ann Partridge, MD, MPH**, who led the study with Dana-Farber colleague **Eric Winer, MD**. “This exaggerated sense of risk needs to

be addressed, as it may cause women to make poor treatment choices and adversely affect their emotional well-being and subsequent health behaviors.”

In a second study headed up by Partridge and Winer, an overwhelming majority of patients participating in clinical trials to test new therapies said they’d like to receive reports of the trial outcomes. These results countered the conventional view that such information would cause patients anxiety and confusion.

“We can share results safely,” says Partridge. “Patients appreciate learning them, and it doesn’t interfere with the clinical trial process in any negative way, as far as we could detect.” ■



Eric Winer and Ann Partridge



# What is a Cure?

As our knowledge of cancer grows, our vocabulary for dealing with the disease grows with it.

By Richard Saltus

**N**ot so long ago, cancer was so feared that many dared not say its name: “The Big C,” they called it. These days, people speak much more openly and the disease has lost some of its stigma and death-sentence aura. Treatments are better, mortality rates are falling, and incidence rates for some forms of cancer are declining.

Now another “C” word bubbles up often in the cancer community – “the cure.” It’s hardly a new word, of course: A “cure for cancer” has long been near the top of humankind’s wish list. The earliest docu-

mented case of cancer, recorded on papyrus in about 1,500 BC in Egypt, was treated by burning with a hot iron. The ancient physicians opined that the disease was not curable. But with the explosion of knowledge about cancer beginning in the mid-20th century, optimism surged. In the 1970s, for example, the American Cancer Society (ACS) used a slogan, “We want to wipe out cancer in your lifetime.”

Today, “For the Cure” is a frequent rallying cry in the names of organizations and fundraising events. At Dana-Farber and other cancer centers, health care providers

“People tend to forget where we were and where we are now – our progress is incremental, but our progress is real.” — Len Lichtenfeld, MD

will tell you that being part of this mission is what brings them to work every day.

After all, the reasoning goes, science and technology have defeated polio and smallpox, sent people to the moon, unlocked the code of the human genome. Why should biomedicine not eradicate the scourge of cancer?

But with increasing knowledge of cancer’s many faces and its ability to outwit medical attacks, the definition of the term “cure” grows more ambiguous. As researchers delve ever deeper into the genetic jungle of the cancer cell, their vision of an outright cure – especially a single, cancer-eliminating solution – is giving way to other “c” words, such as conquer, control, and making cancer a chronic disease: a successful long-term campaign rather than a knockout blow.

“Cure is a word that I don’t use a great deal; it is promising something that may or may not be possible,” says Robert J. Mayer, MD, a senior cancer researcher at Dana-Farber and physician at Dana-Farber/Brigham and Women’s Cancer Center. “Instead I say to patients, ‘You will be alive and well, and in 20 years we’ll look back at this and have a chuckle.’”

Certainly, some cancers can be cured today, and others will be in the future. Cancer is an umbrella term for several hundred different diseases all caused by damaged DNA that spurs cells to grow uncontrollably, invade tissues and organs, and spread menacingly to distant parts of the body. Further complicating matters, cancer cells

aren’t derailed by a lone defect, but often have an array of abnormalities that enable them to survive the body’s cellular self-destruct mechanisms. They are also quite adept at evading even the most powerful and toxic cancer drugs. Few scientists today envision one all-powerful key that would solve the puzzle.

“Will we have the magic bullet that will cure all cancer? The answer is no, but we *will* increasingly be able to keep this disease under control – people will live a long time with it,” says Len Lichtenfeld, MD, deputy chief medical officer for the ACS. “People tend to forget where we were and where we are now – our progress is incremental, but our progress is real.”

### Realistic goals

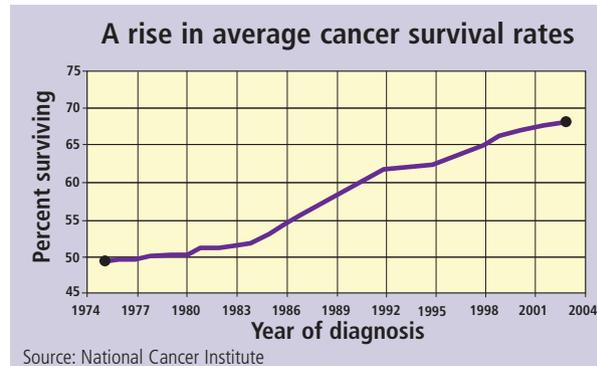
Except for surgical removal and occasionally successful radiation therapy, no reliably effective cancer treatments existed until the late 1940s, when DFCI founder Sidney Farber, MD, achieved the first (though initially very temporary) remissions in childhood leukemia with the forerunners of today’s chemotherapy drugs. The opening of the chemotherapy era inspired a surge of optimism and successful lobbying for government funding. In 1957, an official of the National Cancer Institute declared: “The next step – the complete cure – is almost sure to follow.”

Farber himself was bullish, believing that a cure was on the horizon, “lacking only the will and the kind of money and comprehensive planning that went into putting a man on

the moon,” as he was quoted in a *New York Times* full-page ad calling on then-President Nixon to wage an all-out “War on Cancer.” Intense lobbying by Farber and other physicians and by citizen activists led to Nixon’s 1971 National Cancer Act, which provided record-high funding for cancer research but at the same time raised unrealistic expectations.

Nearly 30 years later, in 1998, the ACS issued a more modest challenge to the cancer community: Between 1992 and 2015, it hoped to see “a 50 percent reduction in age-adjusted cancer mortality rates; a 25 percent reduction in age-adjusted cancer incidence rates; and a measurable improvement in quality of life (physical, psychological, social, and spiritual) from the time of diagnosis and for the balance of life of all cancer survivors.”

In 2007, the ACS reported that despite progress, it was unlikely those goals would be achieved without “substantial breakthroughs” in early detection or treatment. As of 2004, cancer incidence rates had dropped 10.2 percent since 1992 – less than half of what would be



**Thirty years ago, half of cancer patients survived five years or more; today, the rate is more than two-thirds.**

necessary to meet the 25 percent incidence reduction goal by 2015.

Cancer death rates also declined between 1992 and 2004, but at a pace that is estimated to reduce deaths by about 38 percent by 2015, rather than the hoped-for

reduction of 50 percent.

Dana-Farber has set a goal “of conquering at least one major form of cancer within a decade.” The goal, explains President Edward J. Benz Jr., MD, is not necessarily a complete cure.

“Many people think that cancer is like polio, that there will be a picture of a vial of something in the newspaper and [the disease] is gone,” he says. “That’s what we’d like cancer to be – something our grandchildren won’t even remember.”

## Three Survivors

Even though they are not “cured,” many people today are living quite well for extended periods with even the most deadly forms of cancer. Here are reflections from three patients of Robert J. Mayer, MD, on the subject.

“When I was first diagnosed, the doctors said my disease was treatable, but we just don’t have a cure now. It was hard to hear,” says **Michelle Grant-Epstein**, a 52-year-old mother of three from Framingham, Mass. The advanced colon cancer diagnosed in 2005 had spread to one of her ovaries, requiring extensive surgery and chemotherapy, which is continuing in the wake of a recurrence.

As Grant-Epstein thinks of it, she is “cohabitating” with her cancer, “and as long as I’ve got the upper hand, that’s OK.” The disease doesn’t prevent her from being a “fully functional adult,” she says – exercising at home, spending time with her family and friends, and working part-time at a local library.

“Do I wish for a cure? Absolutely!” she adds. “But I know that it’s complicated and each cancer is different. For now, I’m grateful for the drugs that are controlling my cancer, and I hope they’re still working.”

**Edward Bromfield, MD**, a neurologist at Brigham and Women’s Hospital, was diagnosed in 2006 with pancreatic cancer, an aggressive disease rarely detected early enough for potentially curative surgery. A series of chemotherapy regimens has kept him feeling relatively well and active enough to continue playing basketball regularly with his group of longtime friends.

“I think the term ‘cure’ still has meaning,” says



**Mieko Komogata hasn’t slowed down in the wake of serious stomach cancer, for which she was treated in 2002.**

the 57-year old Bromfield. “It’s not for me, in my situation, but I know a number of people who could be considered cured – they have no recurrence of cancer after some substantial number of years.”

For himself and many others, Bromfield uses the words “successful treatment.” This means, he says, “successful in the sense that you can live your life as normally as possible and you don’t have the sense that things are getting worse.”

When **Mieko Komogata’s** mother was diagnosed with stomach cancer 25 years ago in Japan, doctors told her family but purposely hid the diagnosis from the patient. She had successful surgery and to this day thinks it was for an ulcer.

Mieko herself, a software developer who lives in Stow, Mass., developed a stealthy form of stomach cancer that took years to diagnose, and in 2002 surgeons removed her entire stomach. She was then treated with chemotherapy and radiation.

She has been free of cancer since then, and the 48-year-old Komogata says she’s been told that her chances of having a recurrence are becoming smaller as she continues to have normal tests.

“Still, the chances of recurrence are not zero – there is no single cure,” she says. “But I feel healthy and happy. Doctors are making progress, and I am very hopeful that risks of cancer can be reduced. I want people to know that cancer is not a death sentence.”



The dramatic rise in childhood cancer cure rates, from virtually zero in 1950 to around 80 percent today, is one of the major success stories in cancer treatment.

However, says Benz, “The reality is that most cancers will be managed rather than eliminated, and people will be able to live with them and deal with them. Except for some infectious diseases that we cure with antibiotics, there are almost no diseases where we take them away and they never come back again.”

### Redefining progress

Even if a cure has been elusive, new chemotherapy combinations, along with improved surgery and radiation, have brought better outcomes. Cancer has become much better understood – especially in the past decade, as its genetic roots have been uncovered. Advances in diagnosis, detection, population screening, and the advent of targeted treatments like the drug Gleevec in the past decade are all making a

difference. In the early 1970s, half of patients with cancer lived five years or more; today it is more than two-thirds.

“I’ve had patients whom I’ve treated for 20 years – including two women with metastatic breast cancer – and it’s extremely gratifying,” Mayer observes. “Many of them are not cured, but they are living their lives in a full and robust manner. We now have more effective treatments that last a longer period of time.”

To be sure, some types of cancer can be treated today with a very high probability that the patient will be alive five years later and probably far beyond. Childhood leukemias, thanks to the pioneering work of Farber and others, have gone from being universally lethal a few decades ago to curable in 80 percent to 90 percent of cases.

Testicular cancer and Hodgkin lymphoma have high cure rates, too. In fact, Mayer points out, a patient with almost any cancer that is caught and treated early, including potentially deadly types like melanoma, pancreatic, ovarian, lung, breast, and colon cancer, has very good odds of long survival. A major challenge, however, is that some of the most lethal cancers, such as ovarian and pancreatic, are extremely difficult to detect when they can be effectively treated.

At this point in the history of cancer and its treatment, no single yardstick of success, like the term “cure,” accurately reflects what medicine can do or hopes to do in the foreseeable future.

To measure progress only in terms of eradicating cancer misses the point, adds Mayer. “It’s like saying the only way you can score

How the word “cure” is used depends on the specific audience, says Vish Viswanath, a health communication specialist.

a run in baseball is by hitting a home run.”

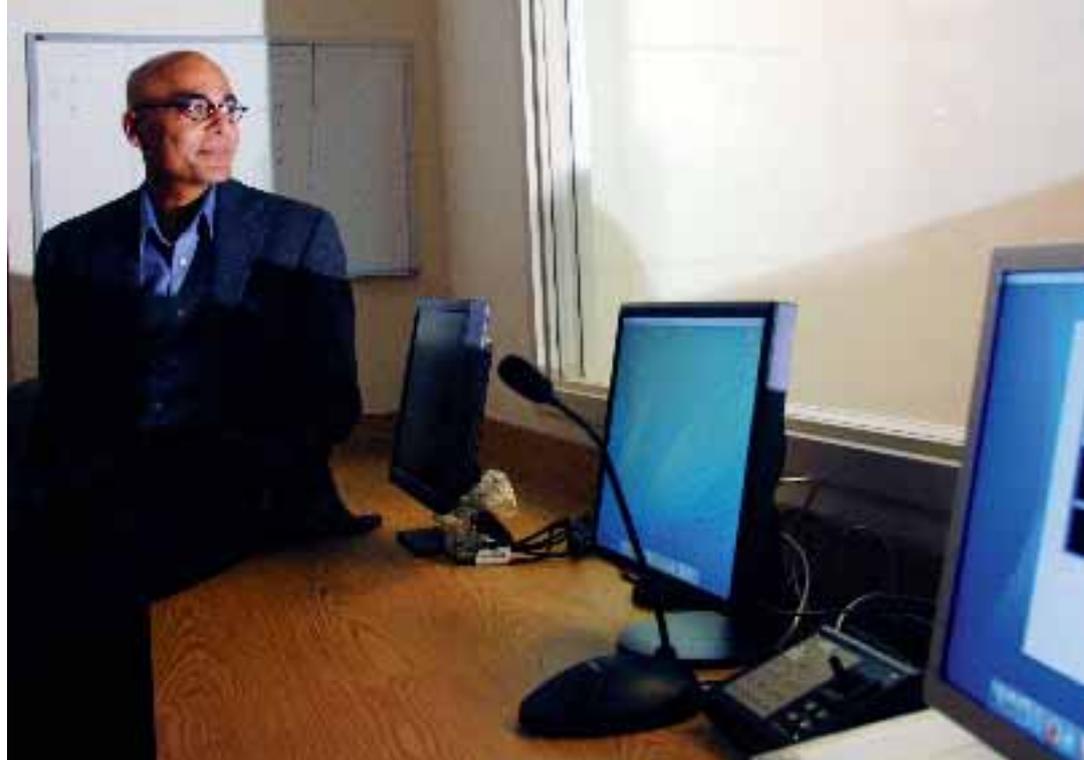
### The language of the cure

Even if the word “cure” is over-used, there are times and places when it serves an important purpose, says K. Vish Viswanath, PhD, a specialist in health communication at Dana-Farber and the Harvard School of Public Health.

“My argument is that we cannot use just one message for the public as a whole,” says Viswanath. He says there are a number of different “publics,” each with different needs. Among them: scientists and health providers, who speak in cautious and precise terms; people who are “engaged” with cancer – current patients and families, and longer-term survivors; and the “general public,” which doesn’t spend a lot of time thinking about cancer.

“And then there is the advocacy community,” Viswanath adds. “We know that the way you mobilize people around a common cause is to frame it in a way that stimulates outrage.” Viewed in this light, he says, calling an event a “race for the cure” is really a metaphor – a motivational strategy rather than a concrete goal.

Similarly, says Viswanath, there is a reason for the common military metaphors such as a “war on cancer” fought with “smart bombs” and vaccines that rally “armies” of immune cells to attack tumors. “Pithy phrases like these,” he admits, “are more likely to resonate



than saying, ‘Our goal is to understand the molecular basis of cancer and target those gene modifications to stop cell proliferation.’”

No amount of debate or skepticism about a cure, however, will slow the pace of research aimed at blocking the fundamental processes of cancer. Equally important, cancer specialists and organizations emphasize that much more can be done with the knowledge

Looking ahead, oncologist Mayer points to inroads being made with newer targeted treatments like Gleevec®, Tarceva®, and Herceptin® that are tailored to the genetic traits of specific patients’ tumors. “It’s been a remarkable decade – among other things, we’ve learned that one size *doesn’t* fit all in cancer treatment,” he says. “We’re seeing survival improvements of 5 percent here, 10 percent there ... this is not

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“It’s like saying the only way you can score a run in baseball is by hitting a home run.” — Robert J. Mayer, MD

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already gained. For example, it’s estimated that about half the cancer deaths in the United States are related to tobacco use, physical inactivity, obesity/being overweight, and nutrition. It is obvious that cancer prevented is even better than cancer cured.

Five years ago, a federal study projected that 60,000 deaths and 100,000 new cases of cancer could be prevented annually by 2015, using current early detection and prevention measures.

a day-and-night difference, but this is progress.”

Cancer may not be totally eliminated any time soon – or ever. Advances are generally incremental, and victories will likely come one cancer type – or subtype – at a time. But there is no denying that more lives are being saved today, and the quality of those lives is better than in the past. If this is not “a cure” in the strict sense of the word, it is surely the next best thing. ■

By Saul Wisnia

Looking back, Julie Silver, MD, realized that one of the defining moments of her breast cancer treatment was when her 4-year-old daughter complained about her mommy “just sitting around.” As a rehabilitation physician who prided herself on being active with her three young kids, Silver tried to keep up her strength during treatment, but sometimes it just wasn’t possible. She had constant pain in her hands and feet that made the easiest tasks arduous and old joys like running around the backyard next-to-impossible.

One friend noticed a pattern. She wouldn’t hear from Silver until eight days after her biweekly chemotherapy infusions at Dana-Farber, when her e-mails or calls would suddenly come in a torrent. A few days later, when another chemo dose loomed, she’d grow silent again.

“People feel that healing is a fairly smooth process – you go from having cancer to feeling better and better, and then you’re done – but it’s not that simple,” explains Silver, who was 38 when first diagnosed in 2003 and is now in remission. (Silver leads patient workshops on survivorship at Dana-Farber; see story on page 14.) “Setbacks and plateaus are part of the process. Usually you go to a doctor who gives you treatments that make you feel better, but with cancer you may feel *worse* before you can get better.

“And it’s not always during the treatment itself that you feel your worst,” she adds. Patients who are getting chemotherapy every second or third week, for instance, say they often feel sicker during their “off” weeks as their bodies try to recover from the physical onslaught of drugs. Since they are usually home during these periods, they don’t have the constant reassurance of clinicians and support staff, sometimes resulting in stress for them and their families. And while some side effects associated with cancer therapy such as hair loss, nausea, and lymphedema (arm or hand swelling) are well known, there are many other emotional and physical “ups and downs” experienced by both adults and children during and after treatments.

Whether it’s depression, dramatic mood swings, or fatigue that can make even simple conversations seem daunting, patients and families often must deal with these less publicized challenges along with the rest.

“I went to the mall the other day with some friends and had a great time, but while we were driving home I just started crying,” says Von Marie Rosario, a 19-year-old being treated

# Ups & downs

Taking the steps to recovery



Julie Silver is focused on “healing optimally” after treatment.

# Getting through each day

Julie Silver, MD, has developed a holistic approach to healing that she shares with others through workshops at Dana-Farber and her book, *After Cancer Treatment: Heal Faster, Better, Stronger*. Among her recommendations:

- **Employ “super healing energy”:** Work at optimizing your sleep, being as active as you can physically, and eating a healthy diet.
- **Make “fatigue” an agenda item with your oncologist:** How you’re sleeping at night and whether you’re depressed or have sleep apnea are important factors in your recovery. Anemia, hormonal fluctuations, and/or other treatable conditions may be contributing to your fatigue.
- **Avoid “emotional ambushes”:** If you hear something, like news about a public figure whose cancer treatment isn’t going well, recognize that it’s not about you; your diagnosis has not changed.
- **Share details as you see fit:** Individuals don’t owe it to anybody to talk about their diagnosis. Do what’s comfortable for you.

for Hodgkin lymphoma in Dana-Farber’s Jimmy Fund Clinic. She attributes her frequent mood swings to the steroids she takes every other day in conjunction with her weekly chemotherapy. “I get easily angry and easily sad, and it’s hard for my friends to understand it.”

Family members who do understand can also find this emotional roller coaster taxing. “It affects everybody in the house,” says Karen Bernard, whose 16-year-old daughter, Kelley, is being treated in the Jimmy Fund Clinic for acute lymphocytic leukemia (ALL). “She’s a friendly, warm-hearted person, so when she starts lashing out during her big steroid week, it really stands out.”

Fatigue can be another problem. Rosario took a leave from her job at a clothing store when she started treatment in April, and even going back to a few shifts a week has been difficult. Vinnie Corsaro can relate; a 56-year-old carpenter and teacher, he was forced to stop work last year

during treatment at DFCI for tonsil and lymph node cancer, and still has ringing in his ears and numbness in his feet months after finishing chemotherapy.

For Corsaro, however, the toughest challenge has been the impact on his taste buds – another side effect he hopes will disappear in a year or two. “Most things don’t taste very good, and I don’t enjoy cooking anymore,” he says. “Sometimes the cure feels worse than the disease.”

## Seeking control

Dana-Farber is taking steps to address such feelings. Each new patient and his or her family has access to a clinical social worker, either through the Care Coordination Department of the Dana-Farber/Brigham and Women’s Cancer Center (DF/BWCC) for adult patients or the Jimmy Fund Clinic’s Pediatric Psychosocial Unit, run in conjunction with Children’s Hospital Boston. Beyond psychosocial assessments and interventions, social

workers tackle both emotional and logistical concerns.

In addition to meeting individually with patients, DF/BWCC psychologist Karen Fasciano, PsyD, and social worker Mary Ann Holcombe, LICSW, lead group sessions in which they teach emotional coping skills such as stress management strategies to alter negative thoughts, and behaviors to change one’s mood. For example, they encourage patients to “schedule” worry time so they don’t let fears overwhelm them, and to organize time or activities with loved ones that are free from discussions about cancer.

Another teaching device they use is cognitive restructuring. “We listen to peoples’ thoughts and work with them to develop more adaptive ways of thinking about the same situation,” Fasciano explains. “Instead of saying, ‘Cancer has taken over my life,’ we encourage them to replace it with something like, ‘Cancer has taken over *part* of my life, but I’m not going to let it control *all* of my life.’”

Even when patients are too young to understand the implications of a diagnosis, the same fears are often



Holcombe Grier (left) and Lewis Silverman help children enjoy life around treatments.

there. In more than 25 years as a pediatric oncologist at Dana-Farber, Holcombe Grier, MD, has learned the importance of respecting young patients' intellects and easing their anxiety by always including them in conversations and decision-making about their care. And in the case of teenage patients, asking parents to leave the room so he can discuss more private matters like drug use and sex can both calm patients and win their trust and respect.

"At almost any age, except for the youngest babies, there is a desire to exert some control over your environment," Grier says. "When [medical] residents are doing rounds with me and ask a child, 'Do you mind if I listen to your chest?' I correct them. You're not giving the kid a choice; you're going to listen to it no matter what. You need to be thoughtful and say, 'I have to listen to your chest. Do you want me to do it here, or do you want to stand over by Mommy?'"

### Sharing insights

Grier's colleague Lewis Silverman, MD, director of the Jimmy Fund Clinic, says that clinic personnel are always working to better understand the side effects young patients face from chemotherapy and steroid treatment, and alter dosages when possible. Dana-Farber is partnering with seven other hospitals to conduct a series of clinical trials involving ALL, the most common childhood cancer, with 5,200 new cases annually (most of them children). In the current trial, hundreds of pediatric patients ages 2 to 18 and their parents are being surveyed on the impact of the chemotherapy drug asparaginase on their quality of life.

"There is something we've identi-



**Kelley Bernard looks forward to when she can join her mother (rear) on the dance floor again.**

fied as the 'asparaginase blues,' where the many patients who take this drug for the typical 30-week period lose their energy and appetite," explains Silverman. "We want to understand how these symptoms change over time, and whether or not different types of asparaginase may have different results."

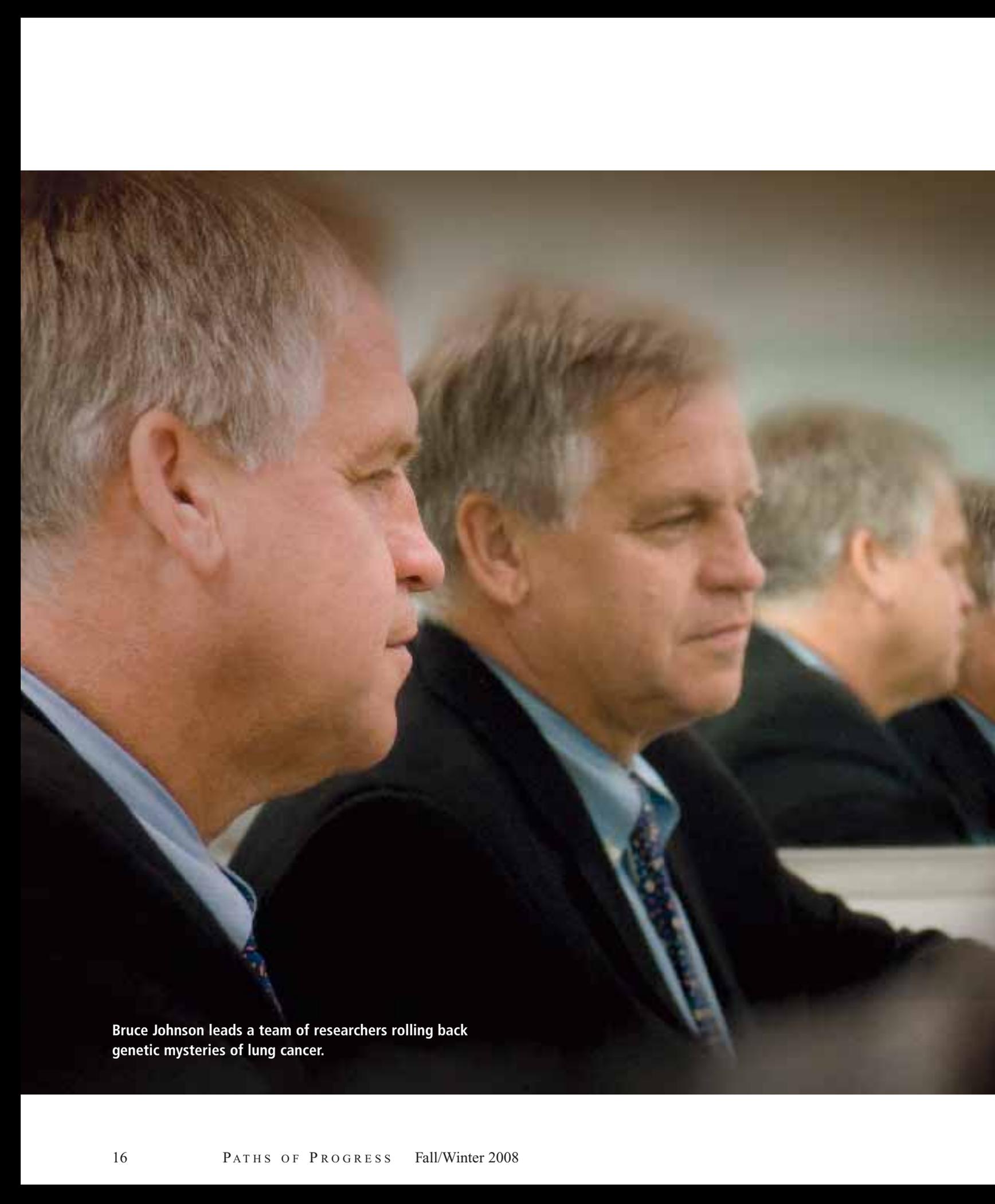
In another effort beginning this fall, Dana-Farber will allow adult patients to log on to the secure "Patient Gateway" Web site and report symptoms and side effects they are experiencing while on different drugs. "Our concern is that patients who come into the hospital every three weeks may not remember how they felt each week in between," says Saul N. Weingart, MD, the Institute's vice president for patient safety. "If they can track symptoms at home and report them each week when prompted, we hope it will give them a sense of power and control over their disease and allow us to better help them. We still want patients to contact us directly with any serious symptoms, but we envision building a 'self-help' section and creating opportunities for patients to interact electronically with a doctor or nurse practitioner."

In the meantime, patients and clinicians do what they can to work

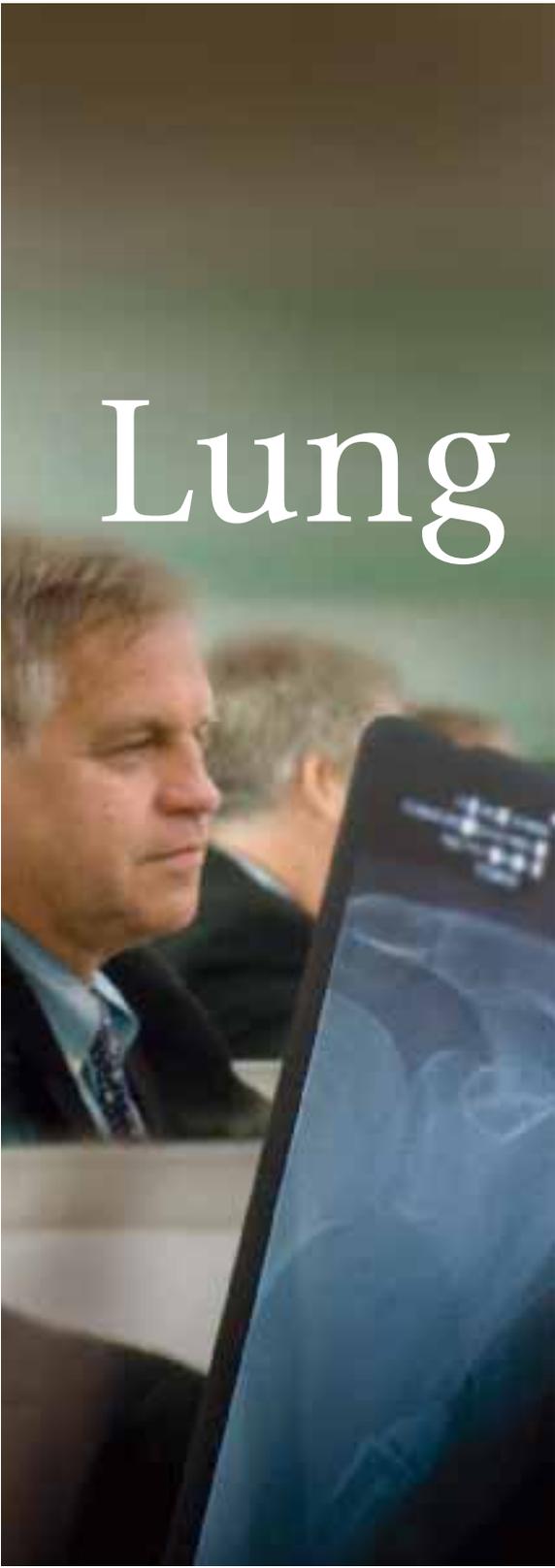
around the challenges. When it's clinically safe, physicians will occasionally put off starting a new series of chemotherapy drugs or steroids by a few days so a patient can enjoy a birthday party or other major event. One woman remembers her late husband working with his doctor to rearrange a chemo treatment around an upcoming Bruce Springsteen concert.

"When I'm on my five-day dose of steroids, I'm claustrophobic, can't stand messes, and am generally not a pleasant person to be around," says Kelley Bernard, who had to give up dancing and most of her sophomore year of high school during her ALL treatment. "I've just learned to make the most of my 'good' weeks and hang out with my friends or go to the gym as much as I can then. If I give people my look, they know I need my space."

While the cancer treatment itself has been grueling for Bernard and her family, she and others agree that the emotional, physical, and logistical challenges during and between it have often been just as taxing. Now they're eager for a return to their old routines – whether that's dancing, enjoying the taste of their gourmet dinners, or simply chasing their kids around the backyard. ■

A photograph showing a group of men in business attire, likely researchers, seated in a row. The man in the foreground is Bruce Johnson, looking towards the right. The background is slightly blurred, showing other participants in the meeting.

Bruce Johnson leads a team of researchers rolling back genetic mysteries of lung cancer.



# Lung

# Distance

## Extending the reach of lung cancer treatment

By Robert Levy

in a small minority of cases where the results were spectacular. Doctors couldn't predict which patients would be among the lucky few. Some experts argued the drug shouldn't even be approved for lung cancer, since it worked so sporadically, but the successes were too compelling to ignore.

Researchers at Dana-Farber and their colleagues began to piece together evidence earlier this decade that Iressa's rare but dramatic effects were tied to the genetic makeup of NSCLC tumors.

One hint came from the experience of treating patients: Doctors had noticed that Iressa (chemical name: gefitinib) has a higher success rate in Japanese patients than Americans. When Dana-Farber's Matthew Meyerson, MD, PhD, and William Sellers, MD, scanned a col-

**F**or a drug that became the first of a new generation of lung cancer treatments, Iressa® started out as one of the most puzzling medicines in history.

When given to patients with non-small cell lung cancer – or NSCLC, by far the most common form of the disease – the drug generally didn't provide much benefit, except

lection of NSCLC tumors for malfunctioning, or mutated, genes, they found that the gene *EGFR* (which stands for “epidermal growth factor receptor”) was faulty in 15 Japanese patients, but in only one from the United States. Research had shown that Iressa acts directly against the protein made from *EGFR*.

(Meyerson also holds an appoint-

ment at the Broad Institute of MIT and Harvard; Sellers is now based at Novartis, a pharmaceutical company.)

A second hint came from work by Dana-Farber's Bruce Johnson, MD,

and Pasi Jänne, MD, PhD. They found that tumor tissue from a woman with cancer that had spread to the lining around her lungs – a condition called adenocarcinoma – was very responsive to Iressa when tested in a laboratory dish. When the adenocarcinoma's DNA was analyzed, it was found to have the same *EGFR* mutation that Meyerson and Sellers' group had found.

“We knew that *EGFR* mutations are more frequent in women, in Japanese, and in people with adenocarcinoma,” says Johnson, director of Dana-Farber's Lowe Center for Thoracic Oncology. “These are the same groups that are most likely to experience tumor shrinkage when treated with Iressa.”

To test whether Iressa indeed works best for patients with *EGFR*

## Lung cancer remains the leading cause of cancer death in men and women in the United States. This year, the disease will claim the lives of 161,840 Americans.

mutations, the researchers analyzed tumor samples from five patients whose tumors had responded to the drug and four whose tumors hadn't. All of the responders had *EGFR* mutations; the other four did not.

The publication of this work by the Dana-Farber team in 2004 – and the simultaneous publication of a related study by other investigators – propelled lung cancer treatment into the genomic age. “It was the first demonstration that a ‘targeted

therapy’ [aimed at a particular misbehaving gene or set of genes] could be effective against a form of lung cancer,” says Johnson. And it became the model by which other gene-focused treatments for NSCLC could be identified, tested, and approved for patient use.

This summer, Lowe Center researchers and physicians opened a genotyping service where NSCLC patients at Dana-Farber/Brigham and Women’s Cancer Center can

have their tumors scanned for eight gene abnormalities associated with the disease. The information will help investigators gauge the prevalence of such mutations and the effectiveness of various targeted therapies. The service, established with financial support from the Friends of Dana-Farber Cancer Institute, provides a foundation for the kind of personalized medicine that Bruce Johnson and others envision: a place where lung cancer

## Promise in the air for mesothelioma treatments

Efforts to remove asbestos from thousands of buildings across the United States in the past 30 years may have given people the impression that mesothelioma – an often fatal form of lung cancer linked to asbestos exposure – is increasingly rare. In fact, because symptoms of the disease usually don’t appear for 30 to 50 years after exposure, experts predict the annual number of new diagnoses will continue to climb until 2015.

Research at the molecular level and the adoption of new treatment approaches are raising hopes of improvements in doctors’ ability to treat the disease.

Scientists at both Dana-Farber and Brigham and Women’s Hospital (BWH) are conducting mesothelioma research along a range of fronts: from the development of new surgical approaches to the use of tiny particles that piggyback medication directly to tumors. These efforts benefit from BWH’s bank of mesothelioma tumor tissue for study, the largest such bank in the world.

“Mesothelioma provides a prime example of the kind of progress that can be made when two institutions share a commitment to improving treatments for a disease and their staffs work as a team,” says David Sugarbaker, MD, director of the International Mesothelioma Program and chief of the Division of Thoracic Surgery at Brigham and Women’s Hospital, as well as a staff surgeon at Dana-Farber/Brigham and Women’s Cancer Center.

Among the most promising areas of research are these:

- Working with software engineers, Dana-Farber and BWH investigators have demonstrated that advanced DNA sequencing systems can identify the unique set of abnormalities in mesothelioma tumors. The finding suggests a practical way of reading tumors’ genetic signatures and using that information to guide therapy.
- Clinical trials are examining a surgical technique that involves applying chemotherapy agents directly to tissue where mesothelioma tumors are embedded. Such “intracavitary chemotherapy” will, it is hoped, reduce chances that tumors will recur after removal. Early results indicate that patients enrolled in the trials live longer than those receiving standard chemotherapy.
- Investigators are exploring whether drugs known as M-tor inhibitors, which block a key protein, can increase the potency of conventional chemotherapy agents.
- Scientists are investigating whether lab-made nanoparticles a fraction the size of human cells can be used as chemotherapy delivery vehicles. The nanoparticles would be hitched to chemotherapy agents and equipped with antibodies that draw them to the surface of cancer cells. Spread in a salve or gel on tissues at the surgical site, the chemo-carrying particles could help eliminate any remaining tumor cells.

patients can have their tumors “typed” – much as bacterial infections are categorized by the kind of bacteria involved – and treated accordingly.

### Formidable foe

The 2004 breakthrough could not have come against a more implacable opponent. Despite declines in cigarette smoking and other forms of tobacco use, lung cancer remains the leading cause of cancer death in men and women in the United States. This year, the disease will claim the lives of 161,840 Americans, according to the American Cancer Society – more than breast, colorectal, and prostate cancers combined. Not only are cure rates for lung cancer lower than for most other major forms of cancer, they have barely budged in recent decades. Lung cancer patients have only a 15 percent chance, on average, of being alive five years after their initial diagnosis.

Against this backdrop, it’s important to appreciate the significance, and the limitations, of the advance involving Iressa. (Iressa itself is not currently approved for new patients with lung cancer in the United States; doctors generally prescribe the alternative drug Tarceva®.) Lung cancer is classified as either small-cell or non-small cell, accounting for 13 percent and 87 percent of all cases, respectively. Of the non-small cell group, only about 12 percent have an *EGFR* mutation that makes them candidates for treatment with Tarceva. (Among Japanese and other Asian peoples, the prevalence of *EGFR* mutations in patients with NSCLC is consid-



**Kwok-kin Wong (left) and Pasi Jänne work to apply lessons from the lab to clinical settings.**

erably higher – as much as 40 or 50 percent.) Twelve percent may sound relatively small, but with 187,000 people diagnosed annually in the U.S. with NSCLC, a 12 percent portion works out to 22,440 patients who potentially can benefit from Iressa or Tarceva each year.

Also to be considered are the gains in length and quality of life associated with Iressa or Tarceva.

For most patients with NSCLC, conventional chemotherapy provides an additional four to six months of survival over what they would have without treatment. Patients who respond to Iressa or Tarceva, by contrast, can expect another year or more. (Like most cancer drugs, Iressa and Tarceva lose their power over time as tumor cells become resistant to them.) And, because

## At the Lowe Center, a philosophy of empathy

**T**o put oneself in the place of a lung cancer patient and his or her family is more than a matter of empathy. At the Lowe Center for Thoracic Oncology at Dana-Farber/Brigham and Women's Cancer Center (DF/BWCC), it forms the philosophy of care.

The center's clinicians work on the principle that lung cancer leaves virtually no aspect of people's lives untouched, so patient services need to be both broad-based and broad-spirited. The care team includes physicians, nurses and nurse practitioners, pain specialists, nutritionists, social workers, and mental health professionals.

"We try to be attuned to the whole family dynamic," says nurse practitioner Pamela Calarese, RN, MS, CS. "If the patient has children, for example, we want to be sure his or her emotional needs are addressed. We get to know the 'significant other' – a husband, wife, or friend – who accompanies a patient to appointments to see how we can help that person as well. Our social worker, Bryan Harter [LCSW], gets involved as soon as treatment begins, to coordinate services for the family."

Particular attention is paid to patients' psychological issues. "Many times, we're able to anticipate what they're going to go through emotionally," Calarese remarks. "With smokers, for example, there's often a sense of guilt about having brought the disease on themselves, and feelings of depression about their future. People who never smoked, on the other hand, feel baffled: 'How did this happen to me?' We don't hesitate to refer people experiencing these kind of difficulties to a staff psychologist, psychiatrist, or social worker."

Underlying this approach is a determination that patients not feel alone in dealing with their disease. It's



**Catherine Hooper can often save patients a trip to the clinic by answering their questions by phone.**

reflected in the appointment of a triage nurse, Catherine Hooper, RN, OCN, whom patients can call with questions or concerns that otherwise might require a trip to the clinic.

"Lung cancer is a tough disease," Calarese comments. "If I had a family member who had it, I'd want to be sure they'd have someone to talk to. That's what we try to provide."

Services cover a spectrum of areas, from medical treatments to quality of life issues. Pain and symptom management is a prime focus, with specialists from DF/BWCC's Pain and Palliative Care team available when needed. Nutritionists offer guidance in eating as well as possible, even when the rigors of treatment make food unappetizing. Religious clergy attend to spiritual concerns, and a support group is available to help patients and family members cope with the demands on their lives.

As new treatments help patients live longer, the need for such services is increasing. "There's a level of commitment here that we truly feel present for our patients," Calarese says. "We talk about their work, what they enjoy, and we do it with humor and a lot of love."

they concentrate their effects on cancer cells, rather than a broad range of cells, Iressa and Tarceva generally produce fewer side effects than standard treatments do.

To an outsider, such gains might seem modest, but, as Johnson points out, it represents a doubling of sur-

vival time – no mean feat in a field where progress was frustratingly slow for many years.

### Out of hibernation

In some respects, lung cancer is a relative latecomer to targeted therapy. Breast cancer treatment is

increasingly personalized, with treatment regimens geared to specific gene mutations in patients' tumors. Lung cancer research, by contrast, has long suffered from the difficulty of obtaining tissue for study and from a reputation as an area with few good scientific leads.

“We want to make it routine to test patients’ tumors for known mutations, so their treatment can be tailored to their specific abnormalities.” — Bruce Johnson, MD

The discovery of NSCLC’s molecular vulnerability has given the field fresh energy, by essentially mapping a route toward the development of new gene-oriented therapies. At Dana-Farber, Johnson has assembled a team of scientists to carry the process from start to finish. Meyerson is leading the effort to scan tumor tissue for potential cancer genes; Kwok-kin Wong, MD, PhD, is conducting tests in laboratory cell cultures and mice to determine if abnormalities in those genes are indeed linked to cancer; and Pasi Jänne is studying the effectiveness of therapies for such target genes in patients.

The goal, as Johnson puts it, is to “chip away at the problem of non-small cell lung cancer” by finding and defeating additional genes linked to the disease. Chances are, each of these genes will be responsible for only a small percentage of NSCLC cases – perhaps just 2 percent or 3 percent – but cumulatively they may affect a quarter of all patients with the disease.

“We want to make it routine to test patients’ tumors for known mutations, so their treatment can be tailored to their specific abnormalities,” Johnson says. Some of those therapies may already be “on the shelf” – used for other diseases and therefore readily available.

Dana-Farber researchers are currently on the trail of several NSCLC-linked genetic abnormalities – instances of misspellings of a gene’s chemical code, or cases where a gene is overcopied or stuck in the wrong portion of a chromosome. In some instances, these same abnormalities are found in

other cancers for which drugs are available, raising the possibility that they’ll work in certain non-small cell lung tumors as well.

Meyerson is co-leader of a group that has sequenced more than 600 genes in almost 200 lung cancers known as adenocarcinomas, and has discovered more than 15 significant new mutated genes. “In this one survey, we have more than doubled the number of known genes whose mutation can lead to lung cancer,” Meyerson says.

Dana-Farber scientists also have been the first to show how NSCLC cells gain the ability to shrug off Iressa or Tarceva and resume their rampant growth. In one study, Jänne and colleagues found that after a year of Iressa or Tarceva use, 50 percent of patients acquire an

additional mutation, and 20 percent have an overcopying, or “amplification,” of genes, which loosens the drugs’ grip on their runaway growth. “We’re at work on a second generation of EGFR inhibitors that circumvent the problem of resistance,” Jänne says.

“Today, we can identify the genes driving tumor growth in a substantial portion of non-small cell lung cancer patients,” observes Wong. “The first challenge is to devise successful treatments keyed to those genes. The other is to find additional genetic culprits.” Wong admits that these mutations already linked to the disease may be the easiest to find – “low hanging fruit,” as they’re called – and that additional ones may be more elusive. But, he adds, “There is a lot of low-hanging fruit.” ■



**Matthew Meyerson leads efforts to probe lung tumors for abnormal genes linked to cancer.**



# Leading the way

Council members spread the message of patient-centered care

By Christine Cleary

Two-time cancer survivor Kari Dudley (right) is organizing a speakers' bureau to manage speaking requests for survivors such as Martha Hayward.

When breast cancer survivor Martha Hayward gives talks at other organizations about Dana-Farber's patient-centered approach to care, her audience is often surprised when she steps up to the microphone. "They are not used to hearing from an actual patient," explains Hayward. "It's not until I go elsewhere that I realize how unusual our style is here."

Hayward is a member of the Adult Patient and Family Advisory Council (PFAC) at Dana-Farber/Brigham and Women's Cancer Center (DF/BWCC), which, along with the pediatric PFAC, is at the heart of the Institute's patient-centered philosophy. For the last 10 years, the adult council has addressed the care provided through DF/BWCC, while its pediatric counterpart, founded in 1999,

focuses on patients of Dana-Farber/Children's Hospital Cancer Care.

Together, the councils give patients and families the opportunity to be leaders and educators, spreading the message of patient- and family-centered care locally and internationally, and teaching staff members at all three partner hospitals what it means to be a patient. Advice from these groups is sought on nearly every important matter concerning patients and families, from shortening the time spent waiting to be seen by a clinician to helping plan clinics beyond the Longwood medical area.

## Patients as teachers

In a traditional picture of health care, clinicians are on one team and patients on the other. The patients are physically and emotionally vulnerable, and doctors,

nurses, and other providers have the knowledge and skills to make them better. Dana-Farber works from a different paradigm, in which both sides have wisdom to impart. Patients are considered experts in being patients, and their perspectives make the organization better. "When I describe our Patient and Family Advisory Councils to colleagues outside Dana-Farber," says Janet Porter, PhD, DFCI's chief operating officer, "They ask, 'What do you call the patients and families who do this work?' And I say, 'I call them teachers.' They teach me what it means to be a cancer patient. As leaders, we have to be humble. Who am I to say what a cancer patient needs?"

Currently, advisory council members serve on more than 80 committees and project planning groups, making "Let's ask the



Andrew MacKinlay and his mom, Cyndi, give talks about what it's like to be a childhood cancer survivor.



Caroline and Mike Rider find time to serve on the pediatric council despite their busy family life.

council” a common refrain among staffers planning clinical programs.

“To call them ‘advisors’ is not strong enough,” points out Carolyn Hayes, PhD, RN, director of the Institute’s Shapiro Center for Patients and Families. “They are

recipient of a Health Care Excellence Award by Blue Cross Blue Shield of Massachusetts, cited as a leader in engaging and empowering patients in every aspect of care. (See story on page 3.)

“Visitors are astonished that we

design of our new Yawkey Center for Cancer Care,” she recalls, “someone asked, ‘Isn’t it exhausting to ask patients and families every time you do something?’ I said, ‘No, it’s easier, because then you are more likely to get it right.’”

“They teach me what it means to be a cancer patient.” — Janet Porter, PhD

not on the sidelines offering their opinions. They often work so hard we have to remind ourselves that they are volunteers, not employees.

“I consider myself to be patient-centered,” adds Hayes, “yet the council members always teach me something I didn’t know.”

Increasingly, health care leaders beyond Dana-Farber are recognizing the importance of this patient-centered approach. Dana-Farber was recently named the second annual

include patients and families in meetings where we talk about sensitive subjects such as medical errors, and seek their help in enhancing our patient safety programs,” Porter says. She often cites her surprise and delight that the search committee for her position as chief operating officer included a patient, who fired tough questions during the interview process.

“After a recent speech I gave about patient involvement in the

### Ambassadors for care

Council members are frequently invited to speak at health care organizations and conferences in New England and beyond about such topics as teen and young adult cancer survivorship, patient safety, and how to create a patient-centered model of care. They teach staff, other patients, and other organizations, and their engagements are so frequent that council member Kari Dudley is formalizing



**Leukemia patient and PFAC member Anne Hristov reviews Yawkey Center for Cancer Care plans.**

a speakers' bureau to respond to requests, seek new opportunities, and offer training to speakers.

"We invited two council members to speak to our board of directors, and we were impressed by the fact that patients and families really do work in partnership with hospital leaders in every aspect of care," says Julie Rosen, executive director of the Kenneth B. Schwartz Center, an organization that strengthens the relationship between patients and caregivers, and helps caregivers provide compassionate health care.

Recently, Martha Hayward traveled to Irkutsk, Russia, with Yelena Wetherill, PhD, a Dana-Farber breast cancer researcher, to help teach women the value of early detection. Pediatric council co-chair Eric Rodriguez is a popular speaker within and outside Dana-Farber, notably at the bi-annual Lance Armstrong Foundation summit. Rodriguez had a brain tumor behind his eye at age 15 and a subsequent cancer on his tongue at 26; despite a slight speech impairment, he's an eloquent and tireless advocate for teen and young adult patients and survivors.

Leukemia survivor Andrew MacKinlay, 15, whose mother Cyndi serves on the pediatric council, is also unafraid of the stage, speaking at various survivorship and fundraising events. "I try and let people know that if I can get through cancer, they can too, and my mom talks about the things a parent can do to help," says Andrew.

Many council members find the transformation from private cancer patient to public speaker to be very powerful. "Who knew that I would become an advocate for cancer patients worldwide?" said the late Scott Viera when his term as co-chair ended in Jan. 2007. "I have had a chance to address a variety of audiences, from health care leaders to college students."

PFAC members are also leading the way on the legislative front. Thanks to an idea from adult council member Anne Hristov, patients and families can use a Web site to help influence cancer research and funding legislation (see page 25).

In addition, the council draws site visits from hospital representatives around the world, recently as far-flung as Iceland, who are looking to study how the perspectives of patients and families are included in patient care planning.

### **Personal growth, sense of community**

Giving back. Making a difference. Easing the next family's cancer journey. These reasons are often cited by "PFACers" for joining up. Once on board, they frequently discover another benefit – personal growth.

Many of the active or emeritus adult council members (30 in total)

are cancer survivors, several years past treatment, and feel that taking part helps them heal while they help others. Those who are retired or have a flexible work schedule can attend meetings or work as patient "rounders" in the clinics, gathering feedback from patients about their experience. Some even manage to serve during treatment; Dudley learned she had breast cancer after joining the council as a nine-year survivor of Hodgkin lymphoma, and Viera was receiving care for colon cancer while he was co-chair. "Scott would go straight from his infusion chair to a meeting," recalls Hayes.

The councils also give members a ready community of support. In a place that emphasizes cure and survival, both groups welcome the participation of families that have experienced bereavement. Former adult council co-chair Jim Stam lost his wife to cancer, and current pediatric co-chair Christine Reilly lost her 5-year-old son. "We see our lives not only in terms of what we lost, but what we were given," reflects Reilly, who published a brochure to guide friends of families whose children are facing the end of life.

Pediatric council members (eight active and four emeritus) often have to balance raising children, working, and tending to the needs of their young cancer patient or survivor. Some, such as Rodriguez, faced cancer themselves as kids, although most are parents who bring a special kind of fervor to their work.

"I notice as co-chair of the pediatric council that parents advocating for their children can be more passionate than patients

## Helping patients support legislation that helps patients

**P**FAC members became “advocates for advocacy” when they proposed a new way for patients and families to support legislation related to cancer. Launched this fall, Dana-Farber’s Legislative Action Network (LAN) helps patients, families, and staff members learn about bills and laws that affect them, and identifies ways they can voice their support or opposition.

Although the LAN will organize workshops and other learning opportunities, its chief instrument is an interactive Web site that highlights potential legislation or funding proposals that affect cancer patients. The site features current bills before the state and federal legislatures, such as a proposal for Medicare to cover the treatment summaries and follow-up care plans needed by cancer survivors. Visitors can express their opinions online, make a phone call, send an e-mail, join a rally, or even show up at their state capitol building to give testimony.

The LAN’s goal is to provide visitors with the basics of advocating for public policy initiatives that help people with cancer, and offer resources to help them get involved in whatever capacity they feel most comfortable. “It’s important for people to understand that they don’t need special training or a degree in political science,” says Anne Hristov, an attorney and member of

the Adult Patient and Family Advisory Council (PFAC) of Dana-Farber/Brigham and Women’s Cancer Center. “All you need to get involved is your story, your personal experience, and your commitment to fighting for improvements in cancer care and funding.”

The formation of the network is a striking example of the powerful impact that the PFACs can have. “I was familiar with the importance of legislative advocacy through some other organizations such as the Leukemia and Lymphoma Society, and felt that Dana-Farber should have a mechanism for involving patients and families,” says Hristov. “It’s a way for them to make a difference if they are not in a position to give money or volunteer.”

Hristov met with Anne Levine, Dana-Farber’s vice president for External Affairs, who was open to the idea; she then wrote a proposal, teamed up with Eric Rodriguez from the pediatric PFAC, and the project began to take shape as a joint effort from both councils.

“When it comes to ensuring that programs, policies, and funding are aimed at cancer prevention, treatment, research, and survivorship, the message is more powerful when legislators and other policymakers hear from those who are directly affected,” says Levine.

For more information on the LAN, visit [www.dana-farber.org/legislative-action-network](http://www.dana-farber.org/legislative-action-network).

advocating for themselves,” explains Rodriguez. “Many parents want to make specific improvements to benefit their own child or other families.”

For many, that is an integral part of why they serve on the council. Mike and Caroline Rider, whose 5-year-old son, Charlie, is a leukemia patient, have two tangible goals. Mike wants to help create a chart for families to track their children’s medications, and Caroline is leading the effort to install lockers in the Jimmy Fund Clinic for families to store their possessions. “When you spend the day in the clinic with your sick child and his or her healthy siblings, you have a lot of stuff –

coats, snacks, games, homework – especially in winter,” Caroline explains. “Right now, we have to drag everything around.”

Even with Charlie in treatment and two older sons at home, the Riders make time for council meetings and related volunteer projects. “We don’t have deep pockets, so we are willing to give our time to repay the place that saved our child’s life,” says Caroline.

Both councils are occasionally rocked by the deaths that inevitably occur among a community of cancer patients and survivors. Last year, Jessie Doktor, a 12-year-old leukemia patient and daughter of a pediatric council alumna, passed away, and the adult group lost Viera,

44, who brought his stamina as a former wrestler to his many roles: husband, father of two young daughters, college coach, full-time retail manager, and cancer patient.

Despite their achievements, the rotating members of the councils continually find new things to work on. “There can always be improvement,” says Hristov. “Just when you think things are good enough, you should question yourself.” As the Patient and Family Advisory Councils celebrate their 10th anniversary, they will continue to spread the message of patient-centered care so that others can have the same success.

To learn more, visit [www.dana-farber.org/pat/pfac](http://www.dana-farber.org/pat/pfac). ■

# Journey By Prashant Nair to the Center of Diagnosis

Different-colored chemical stains applied to thin slices of tissue show whether cells are normal or cancerous.

In August 2007, Betsy Grant, a 33-year-old marketing employee from Holliston, Mass., began to experience worrisome symptoms. She described some of them – nausea, moodiness, and menstrual disruptions – to her gynecologist, who suspected that Grant’s hormone levels were awry, possibly due to a non-invasive and easily managed growth on her pituitary gland. A magnetic resonance imaging (MRI) scan revealed something far more serious – a brain tumor.

Neurosurgeons at Dana-Farber/Brigham and Women’s Cancer Center (DF/BWCC) removed a lozenge-sized tumor from the right frontal lobe of Grant’s brain, diag-

nosed the next week as a grade II oligoastrocytoma – a brain tumor with a tendency to recur. In the days that followed, scientists at Dana-Farber and Brigham and Women’s Hospital (BWH) ran a series of molecular tests, some of which were developed by DF/BWCC neuropathologist Keith Ligon, MD, PhD, which showed that some of Grant’s cells were positive for OLIG2 and CD68 – both proteins used for molecular cancer diagnosis.

Based on the clinical characteristics of Grant’s tumor, DF/BWCC oncologist Andrew Norden, MD, suggested trying an experimental drug called vorinostat, in addition to

a standard drug and radiation. Norden hopes that vorinostat, which has shown promise in treating some brain tumors, will “silence” the action of certain enzymes that prod Grant’s tumor cells to grow unchecked. Grant says, “I’m happy to know that, if this medication gets approved, it would not only benefit me but other people, too.”

## A vital partnership

With such precisely targeted drugs, Dana-Farber and BWH researchers are inching closer to the promise of personalized medicine – tailoring cancer therapies to the genetic makeup of individual patients and their cancers. To be successful, personalized medicine requires

Samples from tumors removed by surgeons embark on a journey through diagnostic and research labs.



Slices of brain tumor are “snap-frozen” by pathologist’s assistant Kristin Gill immediately after surgical removal at BWH.



**“The pathologist’s report lends credence to the oncologist’s treatment decision. It’s a vital partnership, right from the get-go.” — Massimo Loda, MD**

collaboration between scientists and clinical investigators located in labs at Dana-Farber and BWH.

To aid in that collaboration, Edward J. Benz Jr., MD, president of DFCI, and Michael Gimbrone Jr., MD, chairman of the pathology department at BWH, organized a task force on molecular pathology to explore personalized medicine for patients of DF/BWCC.

“Most people are not aware of the central role of pathology in categorizing tumors for treatment and in monitoring response to drugs – processes that cut to the heart of personalized cancer therapy,” says DF/BWCC pathologist Massimo “Max” Loda, MD, who chairs the pathology task force with Janina Longtine, MD, co-director of the BWH Center for Advanced Molecular Diagnostics.

“The pathologist’s report lends credence to the oncologist’s treatment decision,” Loda adds. “It’s a vital partnership, right from the get-go.”

Pathology is a branch of medicine dedicated to the diagnosis of disease through the visual examination of cells, tissues, organs, and organ systems. Pathology services for DF/BWCC patients are provided through a lab at BWH. For research, Dana-Farber has opened a new Dana-Farber/Brigham and Women’s Center for Molecular Oncology Pathology (CMOP),

directed by Loda; though located at Dana-Farber, it is a joint venture.

At CMOP, researchers Loda, Ligon, Ronny Drapkin, MD, PhD, and Shuj Ogino, MD, PhD, are trying to shift the terrain in cancer diagnosis from traditional visual methods to sophisticated molecular analyses. “The effort has far-reaching implications for virtually every realm of cancer treatment,” says neuropathologist Ligon.

### **A tumor’s journey**

Patients at DF/BWCC begin a journey that may include surgery, chemotherapy, and radiation. But few know that a little piece of their cancer goes on its very own journey.

*Spring 2008.* It’s late on a Friday afternoon when a team of neurosurgeons removes a small section of tan-pink tumor from the right frontal lobe of a patient’s brain. Although the surgery is meticulously calculated, the surgeons depend on the expertise of the attending neuropathologist to ensure that the tissue they removed came from the tumor. They await the pathologist’s diagnosis as the tissue is brought from the operating room into a small sideroom.

This “frozen section room” is abuzz with activity, like a command center of residents hunched over microscopes. Within minutes, a patholo-

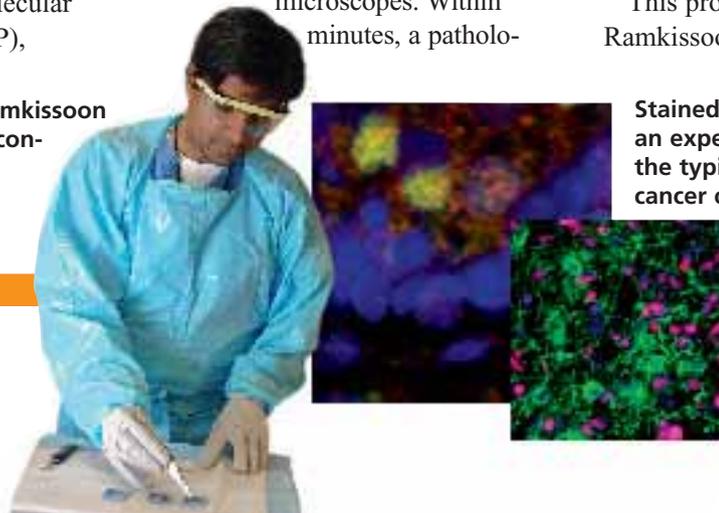
gist’s assistant snap-freezes the tumor, cuts a thin slice, and mounts it on a slide. The slide is then dipped in a series of glass beakers with dyes, an arrangement not unlike an artist’s palette. The dyes, hematoxylin and eosin, stain different components of the tumor cells to make them more visible for neuropathologist Rebecca Folkerth, MD.

Folkerth enters the room, glasses perched like a pince-nez, with her pathology resident in tow. She peers into the microscope, looking for signs of malignancy. Dense, blue-tinged blotches of tiny cell nuclei reveal telltale signs of runaway cell division. Blood vessels crisscross the tumor’s crinkled landscape, indicating its greed for nutrients. Folkerth diagnoses the tumor as a likely high-grade astrocytoma – an aggressive, recurrent brain tumor. The pronouncement is preliminary, but it serves the surgeons’ purpose; they remove the rest of the tumor, and the 58-year-old patient is later informed of the tentative diagnosis.

Before the tumor can continue its journey – to the histology room, to the CMOP at Dana-Farber, and to the molecular diagnostics lab at Brigham and Women’s – Folkerth sets aside most or all of the tissue for overnight preparation in order to make an official diagnosis.

This process begins with Shakti Ramkissoon, MD, PhD, a pathology

**Pathology resident Shakti Ramkissoon of BWH places samples into containers to be preserved.**



**Stained samples reveal to an experienced pathologist the typical abnormalities of cancer cells.**



**Betsy Grant (right), who is taking an experimental drug to combat a brain tumor, enjoys the view with her mother, Barbie.**

resident, who “fixes” the tumor by bathing it in formalin to ensure that its features remain intact. He then places bits in small plastic receptacles and loads them into a processing machine that dehydrates the tissue overnight.

The next morning, technicians in the histology room slice and stain thin sections before Folkerth and a small group of residents and fellows gather to determine the type and severity of the tumor. Folkerth scans the sections, detecting abnormalities an untrained eye might miss. She notices a spike in cell density, a sign of frenetic cell division, clumps of calcium typical of certain brain tumors, flecks of red spotting that indicate thickened blood vessel walls, and branching thickets of blood vessels where there should be only a few, if any. Folkerth also detects signs of infiltration – tumor cells have diffused through the brain to wreak even more havoc.

A pathologist’s work, Folkerth explains, is to describe in detail the characteristics of every

sample, combine that description with knowledge, and decide what additional tests are needed to clinch the diagnosis. From this final pathology report, the oncologist discusses the findings and treatment options with the patient. Herein ends one leg of the tumor’s journey through the pathologists’ workshop.

A second part of the journey began earlier, back in the frozen section room. If enough tissue is available, a tiny portion will be saved for researchers at Dana-Farber, where the scientists examine the tissue for clues that might guide treatment.

### **The research side**

The Center for Molecular Oncologic Pathology is a veritable jungle of high-tech instruments, extending the length of the second floor of Dana-Farber’s Jimmy Fund Building. “Our goal is to marry clinical pathology, currently used to

**BWH pathologist Rebecca Folkerth (center, in lab coat) interprets a stained brain slice.**

diagnose patients, with research pathology performed at CMOP. That marriage is likely to shape the future diagnosis and treatment of cancer,” says Ligon, who pioneered the use of OLIG2 as a diagnostic indicator of brain tumors. Today, the test is a component of clinical diagnosis for many DF/BWCC patients.

Microscopes, array scanners, laser devices, and cutting instruments compete for space in bays occupied by technicians, postdoctoral fellows, and graduate students. Matthew Theisen, a technician in Ligon’s lab, cuts the tiny, buff-colored sample from the operating room into fine bits, some of which he grows in a nutrient-rich slurry. This mixture prods the tumor stem cells – a small group of perpetually dividing cells purported to fuel the cancer – to grow into tiny spheres that can be studied in the lab two weeks later.

At that time, Theisen looks for molecular markers that define the tumor. These markers include EGFR, a growth-signaling protein implicated in many cancers; OLIG2, a marker for cancer stem cells; and KI67, a protein that reveals accelerated cell division. Seen through the microscope, these proteins look like magnified leopard skin, and reveal the



**Pathology researchers (l-r) Keith Ligon, Max Loda, and Matthew Theisen**

tumor's aggressiveness. Theisen detects signs of rampant cell division and cues suggesting how that growth might be slowed or stopped.

Other clues come from more involved CMOP techniques, such as array CGH (comparative genomic hybridization), which singles out hyperactive and underperforming genes. Tissue microarrays can be used to simultaneously probe multiple samples for cancer-indicating proteins. Laser capture microdissection uses a focused laser beam to isolate suspicious

thought to keep brain tumor stem cells from maturing into adult brain cells. Blocking these factors, Idbaih surmises, will slam the brakes on tumor growth in patients.

Extending the effort to use the data generated at the CMOP, Claire Sauvageot, PhD, a scientist in the laboratory of neurobiologist Charles Stiles, PhD, tests drugs from pharmaceutical companies on cells grown in labs and in mice.

"With glioblastoma, we know some of the molecular defects that cause the tumor cells to become

At the lab, a technique called MGMT methylation analysis aims to determine which patients might benefit from the cancer drug Temodar®. Jesse Ladner, a wiry, soft-spoken technologist, analyzes the sample using a technique that distinguishes methylated DNA – which is attached to a chemical molecule known as a methyl group – from unmethylated DNA. Methylation of *MGMT*, a specific gene on the DNA, "silences" that gene, which might allow Temodar to kill tumor cells effectively.

**"The pathologist is right at the center of personalized medicine, and the task force is aimed at making sure we're at the absolute cutting edge of expertise."**

**— DFCI President Edward J. Benz Jr., MD**

parts of the tumor and air-lift them onto a receptacle for further tests.

### Beyond diagnosis

CMOP scientists go beyond molecular diagnosis to help inform treatment options. For example, they are developing techniques that sabotage cancer genes to keep tumor growth in check. Ahmed Idbaih, MD, PhD, a postdoc in Ligon's lab, uses molecules, called small interfering RNAs (chemical cousins of DNA), to switch off the production of proteins, called transcription factors, which are

malignant, so we test small-molecule inhibitors against them," Sauvageot says. Using the genetic clues gleaned from the analyses done by Ligon's group, Sauvageot determines whether the inhibitors might kill brain tumor cells of a certain genetic stripe. "That's the idea of targeted therapeutics. If we see something promising, we move it rapidly to clinical trials for gliomas," she says.

Besides going to CMOP, the sample also goes to the Molecular Diagnostics lab at BWH. Tests there pinpoint genetic defects in tumors, which might aid diagnosis and treatment decisions.

Having provided a wealth of molecular information to guide treatment, the tumor's journey ends here. But the mission of the task force on molecular pathology has just begun.

"The pathologist is right at the center of personalized medicine, and the task force is aimed at making sure we're at the absolute cutting edge of expertise," says DFCI President Benz. As it seeks to develop custom-designed treatments for cancer, the task force is already on its way to harnessing pathology's potential. ■



**Making use of leads from CMOP studies of brain tumors, Claire Sauvageot in Charles Stiles' lab is testing drugs targeted to molecular defects in glioblastoma.**

## First Person: Cori Liptak, PhD

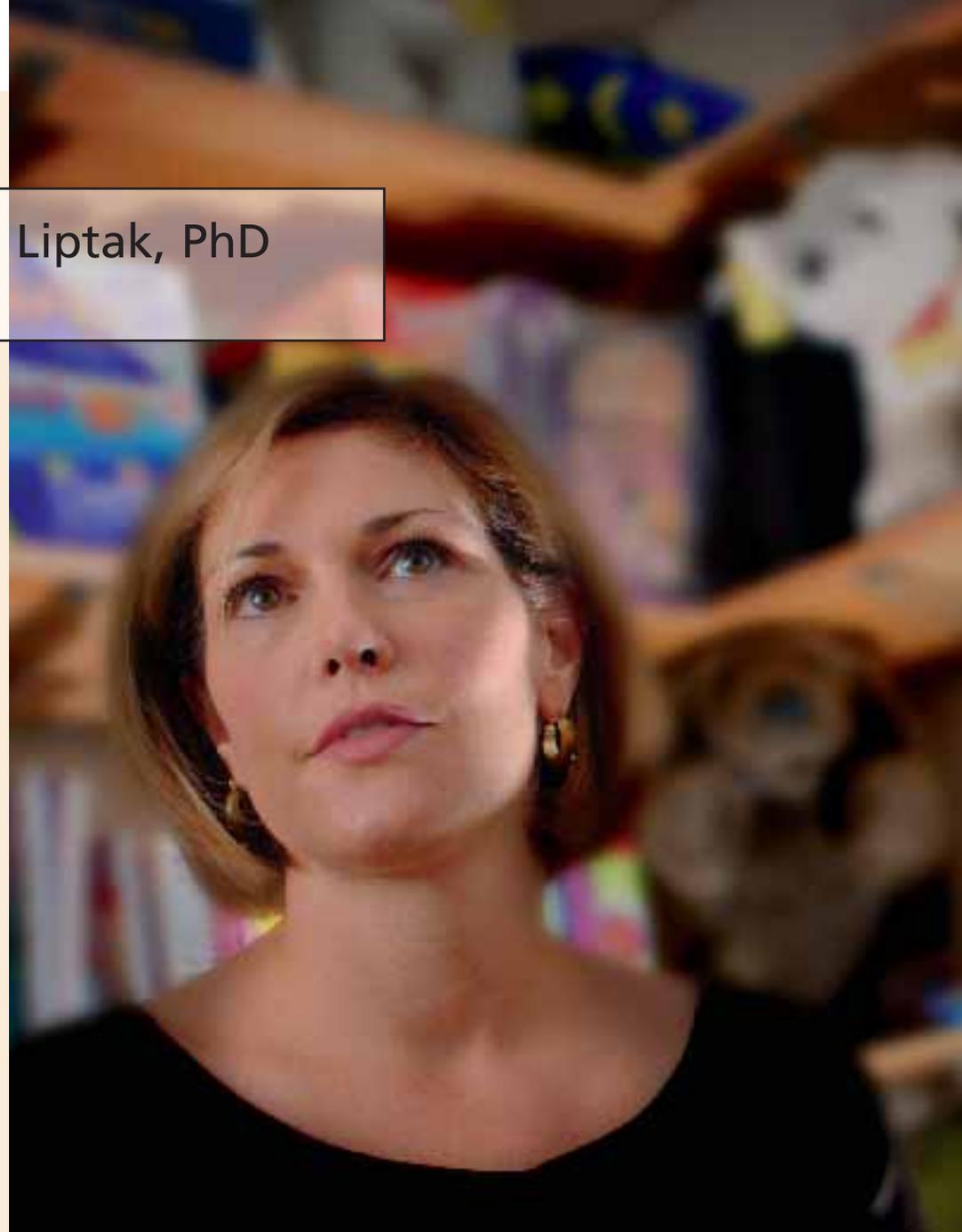
Pediatric Psychosocial Services

Edited by Dawn Stapleton

*Cori Liptak, PhD, discovered her interest in pediatric psychology following a summer internship at Columbus Children's Hospital in Ohio. Her path eventually led to Dana-Farber, where in 2002 she began a two-year fellowship in pediatric neuro-oncology. Liptak loved working with the patients and families and became a full-time staff member. Now one of the senior psychologists in the Division of Pediatric Psychosocial Services, she sees patients with many diseases, though she specializes in pediatric neuro-oncology and survivorship issues. Her role is diverse and the days sometimes unpredictable – just the way she likes them. Liptak views her work with families as a privilege, establishing relationships with patients and allowing them direct involvement with the medical team.*

*The multidisciplinary division, made up of psychologists, social workers, resource specialists, and school liaison personnel, provides a wide range of services and support to pediatric cancer patients and their families. This includes play therapy, behavioral therapy, such as techniques to manage pain and anxiety, parent guidance, school consultations, and communication with the medical teams at Dana-Farber and Children's Hospital Boston. The 27-person team is integral to the care people receive.*

*The emotional support offered through the division is available to all immediate family members. It*



**Cori Liptak, PhD, discusses her multifaceted role as a child psychologist and some of the “tools of the trade” that help her deliver care and support for her patients.**

*often includes parent guidance, helping parents maintain a routine at home, assessing how siblings are adjusting to the illness within the family, and helping parents manage the transitions between various hospital and clinic settings. Support extends beyond the immediate family and includes the patient's school team and classmates. Here, Liptak talks about the process a family goes through when a child is diag-*

*nosed with cancer and the role of the psychosocial clinician.*

“**T**he minute a family hears the diagnosis ‘Your child has cancer. Your child has a brain tumor,’ their lives are irrevocably changed. An enormous emotional roller coaster begins that takes on different meaning depending on where people are in the process: diagnosis, treatment, or post-treatment.

When a child is diagnosed, the family goes through different phases. They wonder, ‘How am I ever going to get through this?’ They do, however, learn to manage. In pediatrics, all families are assigned to a psychosocial clinician right from the start to help them adjust to the new routine. Here, we recognize that the psychosocial care is critical to support a family in addition to the medical care.

Some people don’t understand what we do because we do so many different things. We might be playing the card game Uno with a patient or helping him or her with a doll and medical kit. Play therapy is a proven research-based technique. There’s therapeutic value in it, and it provides opportunities to learn about the patient, his or her behavior, and approach to social situations. Playing also gives children a little bit of control and encourages them to just be kids. It’s reassuring because they think, ‘If I can play, I’m okay.’

For example, I work with a 10-year-old girl who comes for weekly chemotherapy treatments. The possibility for mood and anxiety struggles is always present because of the demands of the treatment, and the weekly play therapy sessions can be very helpful during the course of a lengthy treatment day. She loves art and decided that we needed to make a portfolio of all the projects that we work on. This has provided a means to document her treatment journey and a vehicle to express her feelings about illness. For instance, we wrote a story about a sick centipede, and it was a beautiful way for her to express her struggles, needs, and worries. When

she is done with her treatment and walks out of Dana-Farber with her portfolio, she has something that will serve as a reminder of the work that she has done, the relationships formed, and how she can cope when things get difficult.

ability to cope, and that transfers over into his real-life experience.

There are other behavioral interventions that go beyond what happens in the clinic. For example, a child who had been sleeping in his own bed before he got sick may



**Christopher Bartorelli, 11, beats Liptak 3 to 1 at a game that employs cognitive memory and function.**

Behavioral interventions also play a role in helping children master their situation medically. Sometimes they aren’t sedated for difficult procedures, and they need to sit still, and we help them to get through it. We can do work ahead of time to help them prepare so they understand what their job is throughout the course of the procedure. They might say, ‘Cori, I’m going to sit like a statue right now.’ Anytime you get to witness a child using something you taught and be successful as a result, that’s rewarding. For instance, when I use medical play with a child and see him stop giving the puppet lots of shots, and instead hear him say, ‘We’re now going to put on your magic cream. It’s numbing and you’re not going to feel a thing. Don’t be scared!’ I’m watching him evolve in his

all of a sudden want to sleep in his parents’ bed. We help him work through that while encouraging families to continue to set limits. Upholding family rules and expectations is important; it encourages the child and family to have a regular routine – because that’s what’s going to be most helpful for him and the family.

We also address the complicated emotions that come with going through cancer treatment and handling side effects. And we give people an opportunity to talk about them and permission to not be okay all the time. That can be difficult, especially for adolescents. Their attitude can be, ‘I’ve got it together. I don’t need any help,’ but when given the permission to “not be so fine,” their walls come down, and you’re able to learn what they really

## Survivorship and treatment completion poses its own set of challenges.

need that they haven't been able to ask for.

One of the biggest challenges is working with families around end-of-life issues. It is important that patients and families have someone to talk to about difficult treatment decisions, as well as their hopes, fears, and wishes. This can be comforting for families as they focus on whatever time remains.

I worked with one young woman who had things she wanted to do

before she died, and we made a list: 'I want to go someplace with my friends, finish my scrapbook, get my room organized.' It's very simple, but it opened up a conversation about what was important to her. The list exercise also served as a concrete reminder that she had a choice about what her time was going to look like and provided her with a focus of how to get what she needed. It's special for family and friends to know that they helped

her accomplish items on that list. That carries meaning for them now that she's gone.

Conversely, survivorship and treatment completion poses its own set of challenges. Brain tumor survivors struggle with multiple medical, cognitive, and physical challenges. These impact school, work, and friendships; many struggle socially. To help meet some of these challenges, I've started a program called STEPS (Success Through Education, Psychosocial Support, and Socialization) that holds a dinner once a month for brain tumor survivors and their caregivers. Patients know that they're going to see people who are like them and understand what they're going through, which is what has made people come every month. As part of the program, we took a group of brain tumor survivors to Project Adventure, where they worked as a team to overcome challenging tasks like climbing a tree and walking across a wire. One girl who is legally blind wanted to try the task, and the group worked together to help her get up the ladder and to the tree. They did this solely with communication and absolute trust, and it was successful because they all really care for each other. These are people who have established friendships outside of Dana-Farber. Once you've seen a patient connect with another patient and be able to say, 'I have a friend who understands,' the power of that type of success goes beyond anything I can really describe." ■



Liptak engages Shayla Oliveira, 4, in medical play before her chemotherapy treatment.

## **DANA-FARBER CANCER INSTITUTE ...**

“Dedicated to discovery ... committed to care” is the mission of Dana-Farber Cancer Institute (DFCI), described as one of the world’s premier cancer centers by the National Cancer Institute. Founded in 1947 by Sidney Farber, MD, Dana-Farber is renowned for its unique blend of basic and clinical research and for using its discoveries to improve the treatment of adults and children with cancer and related diseases. It is a founding member of the Dana-Farber/Harvard Cancer Center – one of 41 nationally designated Comprehensive Cancer Centers. A teaching affiliate of Harvard Medical School, Dana-Farber is also one of 20 federal Centers for AIDS Research in the United States, and is consistently ranked one of the top cancer centers in the country by *U.S. News & World Report*. In addition, it has also earned “Magnet” status for excellence in nursing.

Dana-Farber partners with Brigham and Women’s Hospital to deliver care for adults with cancer through Dana-Farber/Brigham and Women’s Cancer Center. It also has a longstanding alliance with Children’s Hospital Boston to care for pediatric cancer patients through Dana-Farber/Children’s Hospital Cancer Care. By bringing together the strengths of three world-class institutions, these partnerships provide an exceptional level of care for cancer patients and their families.

## **... AND THE JIMMY FUND**

The Jimmy Fund supports the fight against cancer at Dana-Farber, helping to raise both funds and the chances of survival for children and adults around the world. Named to protect the anonymity of one of Dr. Sidney Farber’s young patients, the Jimmy Fund was established in 1948 by the Variety Children’s Charity of New England in conjunction with the Boston Braves baseball team. Later adopted as the official cause of the Boston Red Sox, the Massachusetts Chiefs of Police Association, and the annual Pan-Massachusetts Challenge bike-a-thon, the Jimmy Fund is widely regarded as “New England’s favorite charity.” Individual and corporate gifts, many of them collected through numerous annual Jimmy Fund events, have helped the organization generate hundreds of millions of dollars for cancer research and care at Dana-Farber over the decades.



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*Dedicated to Discovery...Committed to Care*



In an impromptu news conference, 9-year-old Ryan Reardon, a Dana-Farber patient and Big Papi fan, talks about “the jersey” and his favorite team. The David Ortiz Red Sox jersey, which was recovered from underneath the new Yankee stadium, raised more than \$175,000 for the Jimmy Fund.



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