A NEW ERA
Cancer is as varied and complex as human beings. Its path in each patient is completely distinct. How we go about preventing, treating, and coping with cancer can differ based on factors that range from our genes to our cultural heritage. Because of this perpetual variation, scientists and clinicians make the most progress in understanding cancer when they combine their knowledge and collaborate across processes and biological systems.

Fox Chase has had a collaborative culture since our earliest days. Today, that culture, expanded through our affiliation with Temple University Health System, positions us especially well to accelerate the discoveries researchers are making every day here and worldwide. In this review of 2014, you will see that it is the fresh meeting of minds that has marked our most exciting advances and that holds the promise of a new era in cancer care.
Q&A WITH THE CEO

Fox Chase President and CEO Richard I. Fisher, MD, (third from left) prepares for a day in the clinic with his hematologic oncology team.
Since Richard I. Fisher, MD, took the helm as president and CEO of Fox Chase in July 2013, he has helped Fox Chase build on its strengths by recruiting talented new scientists and clinicians to join our ranks. He has also pursued new avenues of growth, working closely with Temple colleagues to maximize the gains from our affiliation with the Health System.

Why does collaboration hold the keys to progress in cancer care today?

Throughout the world, science is moving so fast and is so complicated that no single lab or individual has all the technical capacity and knowledge needed to move us forward. Individual researchers make their most meaningful contributions in the context of team science. The teams that care for patients must also reflect multiple different disciplines in order to deliver treatment that is right for each individual.

What makes Fox Chase especially well positioned to lead in this era?

Fox Chase’s early leaders always emphasized collaboration, across labs and across generations. That spirit has become fundamental to the culture here. Senior scientists take the time to mentor younger faculty members as well as fellows and students. Even our physical structure supports collaboration, with our labs and treatment facilities all in one place. Just moving around the halls and eating together in the cafeteria, our scientists and clinicians become intellectually engaged in each other’s work.

What is different about the current emphasis at Fox Chase?

What is new is the degree to which we are bringing the clinical piece together with bench science. We are very excited that Wafik El-Deiry, a physician and scientist, has joined us as deputy director for translational research, precisely to accelerate this movement. El-Deiry is a well-established research leader who has taken science from his own lab to clinical settings. He has also formed two companies to speed the application of scientific advances to patient care. It’s an exciting time at Fox Chase. It’s a time when our tradition of collaborative learning and respect for various disciplines is coming into its own, to the benefit of science as a whole and, most important, our patients.
Grace Ma, PhD, (left) and Carolyn Fang, PhD, (third from left) meet with their outreach staff at the Center for Asian Health.
Carolyn Fang, PhD, Fox Chase associate professor, and Grace Ma, PhD, professor and director of the Center for Asian Health at Temple’s College of Health Professions and Social Work, collaborate with each other—and with the community—to study and reverse the factors driving up rates of cancer among Asian Americans.

Although the Korean-American woman was well into her 50s, she had never had a Pap test. “Why should I go see a doctor when I feel fine?” she asked the community health educator who had recommended cervical screening.

She is the exact type of person Grace Ma and Carolyn Fang want to reach through Temple’s Center for Asian Health, which aims to unravel why cancer is prevalent in certain Asian-American populations—and to stop its spread. Even though cancer is the leading cause of death among Asian Americans, they remain the nation’s least studied population in the areas of cancer prevention and control.

When it came time for the woman’s Pap test, it turns out she was not fine. After receiving abnormal results, navigators from the Center for Asian Health connected her to the appropriate follow-up care. “I wouldn’t have known what to do or where to go,” she says.

A health partnership

As the Center helps more Asian Americans in Philadelphia get the health care they need, these same men and women are contributing to Fang and Ma’s research on the psychosocial, behavioral, and biological factors that may influence cancer risk. They are adding to what is known about Asian-American populations with striking health disparities, including Vietnamese-, Korean-, and Chinese-American women at high risk for cervical cancer and Vietnamese-American men with the hepatitis B virus (HBV), which contributes to nearly 80 percent of liver cancer cases.

Fang and Ma’s teams have learned, for example, that while American-born children are typically vaccinated against HBV, Vietnamese immigrants—particularly uninsured, low-income males—often arrive in this country already infected and thus at high risk for liver cancer.

“I am confident that through increased awareness, appropriate screening, vaccinations, and follow-up care, we can reduce rates of cervical and HBV-related cancers,” says Fang.

For the good of the community

“The key is building trusting relationships between community leaders and research partners,” Fang adds. “We do our work where the people are—in churches, at festivals, and at the kitchen table. People have to trust that what’s being done is for the good of the community, and that kind of trust requires transparency, education, and a lot of discussion.”

SEEKING HEALTH EQUITY

Through service

• Each year, more than 12,000 people attend free, bilingual cancer education events presented by Fox Chase’s community speakers bureau.
• Fox Chase’s mobile screening unit, the only such unit in the region, reaches underserved women with breast screening.

Through research

• Fox Chase researchers are probing the cultural, environmental, and biological reasons behind cancer disparities.
• Studies look at disease patterns such as cervical cancer in Asian-American women and head and neck cancer in American blacks of Caribbean origin.

“It is our hope that this comprehensive approach will yield health equity for the region.”

- Evelyn Gonzalez, senior director, Fox Chase’s Office of Health Communications and Health Disparities
MORE IS BETTER IN CLINICAL TRIALS

Left: Jean-Pierre Issa, MD, (left) and Patricia Kropf, MD, (right) review clinical trial results.

Right: Henry C. Fung, MD, came to Fox Chase in January 2014 to lead the Center’s hematologic oncology program.
The Fox Chase-Temple affiliation means more clinical trials, and that’s better for patients.

Does the promising new result in the lab really confer more benefit than standard, accepted treatments? Clinical trials must answer this question before a new treatment can come into broad use. That is why Fox Chase has long fielded a strong array of clinical trials.

Now, through its affiliation with Temple University Health System, Fox Chase can offer even more trials to patients, many in the area of hematologic oncology, a program that saw dramatic expansion and recruitment in 2014. More trials mean more options for patients with blood cancers such as lymphomas, leukemias, myeloma, and myelodysplastic syndrome (MDS).

“Our affiliation with Temple has resulted in an expanded clinical trials program, providing novel therapies and unique drug combinations for patients with hematologic malignancies,” says Patricia Kropf, MD, director of the Fox Chase-Temple MDS program. “That helps us succeed.”

**Switching on the protection**

The standard of care for most patients with MDS and Acute Myeloid Leukemia (AML) includes intense chemotherapy and/or a bone marrow transplant, but older patients and those with additional medical problems often cannot tolerate such a regimen. To find a way to treat them, Kropf is collaborating with Jean-Pierre Issa, MD, a pioneer of epigenetic research and chair of Temple’s Fels Institute for Cancer Research and Molecular Biology. Their approach uses epigenetic therapy to reprogram cancer cells by reversing methylation, the chemical process that switches off specific genes that normally protect cells from becoming cancerous.

In earlier research, Issa discovered that carboplatin and arsenic trioxide, two FDA-approved drugs long used to treat various malignancies, have hypomethylating properties. With these data as background, Kropf and Issa are now exploring the safety and efficacy of these two drugs in combination with decitabine, another hypomethylating agent, for patients with MDS and AML.

Collaboration between Fox Chase and Temple is nothing new for Kropf and Issa, who have worked together for more than three years. Where the affiliation makes a difference is in the scale of their work and collaboration. They have recently been awarded the prestigious Stand Up to Cancer grant to further study and treat patients with hematologic malignancies.

**IT’S IN OUR BLOOD**

**Leadership**
- President and CEO Richard I. Fisher, MD, a leader in the lymphoma field, has directed the expansion of the hematologic oncology program.
- Henry C. Fung, MD, a nationally recognized figure in blood cancers and bone marrow transplant, arrived in January 2014 to head the program.

**Team effort**
- A team of recruits specializing in hematologic malignancies came on board in 2014.
- Fox Chase’s program works with the Fox Chase-Temple Bone Marrow Transplant Program, which has performed more than 1,500 transplants.

“Fox Chase’s amazing clinical and basic science research infrastructure has enabled us to build our program into what I think will be one of the best in the country.”

—Henry C. Fung, MD, director, hematologic oncology treatment team and Fox Chase-Temple Bone Marrow Transplant Program
RESEARCH COLLABORATION MEANS A WIN FOR PATIENTS

Elizabeth Plimack, MD, MS, (center and right) leads a multidisciplinary team studying treatment for muscle-invasive bladder cancer.
Genetic profiles predict which bladder cancer patients will see significant benefits from early chemotherapy.

"We rarely see biomarker data this good."

To uncover a genetic pattern that would predict responses to AMVAC, Plimack and her colleagues collaborated with Massachusetts-based Foundation Medicine to sequence a panel of cancer-related genes in tissue samples taken from 34 of these patients before they underwent chemotherapy. The analysis clearly landed on three genes associated with repairing damaged DNA. All but one of the patients who benefited from the early chemotherapy carried mutations in at least one of three specific genes; none of these mutations were present in any of the people who still harbored traces of cancer after AMVAC.

"Patients may have developed cancer in the first place because a damaged cell couldn’t repair itself. Once they have cancer, however, our hypothesis is that the defective DNA repair machinery makes the tumor more likely to respond to chemotherapy because the cancer cells can’t repair the additional damage caused by cisplatin," says Plimack.

Everyone contributes

Her team was astonished to see such a clear distinction between the genetic profiles of responding and non-responding tumors. Plimack hastens to credit her colleagues for lending their diverse expertise to the research: bioinformatics specialist Yan Zhou, PhD; biostatistician Eric Ross, PhD; molecular modeling specialists Roland Dunbrack, PhD, and Mark Andrake, PhD; and molecular therapeutics researchers Erica Golemis, PhD, and Ilya Serebriskii, PhD.

“This collaboration is what translational medicine is all about,” affirms Plimack.

“Translation is crucial because it moves fundamental discoveries in science into clinical trials that we hope will positively impact patients. It takes concerted effort to see the potential clinical value of basic science developments, and it takes active collaboration between scientists and clinicians to act on that potential.”

– Wafik S. El-Deiry, MD, PhD, FACP, deputy cancer center director for translational research
Left: Patient Beth Brunswick (left) meets with her doctor Stephen Rubin, MD, (center) and nurse navigator Carol Cherry, MSN, RN (right).

Right: Brunswick’s sister Julie Steinberg accompanies her to an appointment.
One sunny Thursday afternoon, Beth Brunswick, a 60-year-old New Yorker in Florida with her husband, learned she had ovarian cancer. She was stunned. “I’d never had major surgery,” says Brunswick, “and here I was, a cancer victim out of the clear blue sky.”

Her gynecologist would recommend only one physician—Stephen C. Rubin, MD, who at that very moment was preparing to take the helm as chief of gynecologic oncology at Fox Chase. Brunswick flew to Philadelphia that weekend. On Tuesday, with her husband, Ed Brunswick, her sister, Julie Steinberg, and her 88-year-old father, Ben Alexander, she met with Rubin. By then, she had already spoken with Carol Cherry, MSN, RN, a gynecologic oncology nurse navigator, who explained how things would work, prepared the paperwork, and gave Brunswick her direct phone number. Rubin confirmed the diagnosis and recommended immediate surgery.

“Let’s do it,” said Brunswick. “I want this cancer out of me.”

Rubin’s first week at Fox Chase was filled with orientation meetings, but Cherry helped him rearrange his schedule. Brunswick had her surgery that Friday at 6 a.m.

Seven months later, Brunswick feels fabulous—and grateful. “The people at Fox Chase couldn’t be more wonderful. Carol Cherry made everything happen smoothly—she is so kind and capable—and Dr. Rubin, well, he’s the best. Every time I see him, I give him a hug.”

Rubin and Cherry share Brunswick’s enthusiasm for the collaborative, patient-friendly culture of Fox Chase. The only hospital in the region committed to scheduling appointments for new patients within one business day of a call, Fox Chase is easily accessible, intimate, and approachable. “Our institutional commitment to compassionate patient care is supported from the very top,” says Rubin.

The most amazing journey

With surgery completed, Cherry continued to help Brunswick minimize the disruptions that are inevitable with cancer treatment as much as she could. “Nurse navigators help patients connect the dots between everything that’s happening inside Fox Chase and the rest of their lives,” says Cherry. “We help them move forward.”

“I’m not finished with treatment, but I’m more than halfway through,” says Brunswick. “Sure, there have been a few bumps in the road, but my team at Fox Chase has made this the most amazing journey of my life.”

A SPECIAL RESOURCE

Fox Chase has been a leader in nurse navigation since its program launched four years ago.

- Today, the Center has 14 nurse navigators specializing in breast, gynecologic, thoracic, genitourinary, gastrointestinal, hematologic, and head and neck cancers, as well as melanoma and sarcoma.

- Every nurse navigator is a certified oncology nurse, ensuring that patients can have urgent clinical questions answered quickly and accurately.

“Navigators provide education, reduce barriers, and make connections for our patients so they arrive at their first appointment knowing what to expect and have less anxiety as they begin their cancer journey.”

– Bonnie Miller, RN, BSN, OCN, FAAMA, administrator, clinical nurse navigation
NEW PARTNERSHIP PROMISES BENEFITS FOR PATIENTS

Left: Jonathan Chernoff, MD, PhD, (left) and James Duncan, PhD, (right) work together on the new Cancer Kinome Initiative. Right: The kinome research is made possible by a gift from Don Morel, PhD, and his wife Lauren.
A recognized leader in kinase research, Fox Chase chief scientific officer Jonathan Chernoff, MD, PhD, knew that launching a Cancer Kinome Initiative could mean substantial payoff for patients. Now he needed supporters to jump start the Initiative until its work could mature to earn more external funding. In Don and Lauren Morel, he found the perfect philanthropic partners.

Collectively known as the kinome, the 518 human kinases are a group of enzymes that are often co-opted by cancer cells to cause uncontrolled growth and invasion into surrounding tissues. While drugs that interrupt kinase signals often induce remarkable shrinkage of tumors, over time these tumors usually develop resistance to such agents and resume growth. What is needed is an effective method to determine how cancer cells are “reprogrammed” to evade kinase inhibitors.

Kinases have long been a focus for Chernoff and his colleague Jeff Peterson, PhD. In 2013, James Duncan, PhD, joined their team, a young scientist who is working to establish a novel approach to measuring the activity of the entire kinome at a much greater and more precise level. This detailed information will show how tumors are responding to treatment so clinicians can adjust a patient’s drug regimen over time.

Hoping to organize this endeavor into a formalized Initiative, Chernoff sought a philanthropic partner. Don Morel, CEO of the highly successful West Pharmaceutical Services, was a natural match. A PhD in materials science who has led West in developing novel pharmaceutical technology, Morel was quick to recognize the value in galvanizing the Center’s kinome research effort. He and his wife Lauren pledged their support.

“Lauren and I were convinced by the underlying science but also by Jon Chernoff’s enthusiasm for the translational potential,” says Morel, chair of the Fox Chase Foundation Board of Directors. “We are excited by the possibility that this powerful scientific idea can work its way up from the lab to benefit patients.”

Continuing support

The Morels’ support for the Initiative is the latest in a long line of generous gifts to Fox Chase. They have funded two endowed chairs to support prominent Fox Chase researchers, and each fall, dozens of West employees raise roughly $150,000 for Fox Chase at the Philadelphia International Dragon Boat Festival.

“No,” Chernoff says, “they are making possible a new and promising approach to tumor profiling that is not available elsewhere. Thanks to the Morels, Fox Chase is at the forefront of this work.”
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Fox Chase Cancer Center is very grateful to our supporters for their commitment to our mission and the resources that give us an extra edge toward excellence. Thank you.
## Philanthropy Snapshot

- **20%** increase in total philanthropic support
- **$16.9 million** total philanthropic support
- **$260,000** raised at the inaugural In Vino Vita wine auction event

## Volunteer Snapshot

- **540** volunteers
- **118,047** total volunteer hours; equivalent to 60.53 full-time employees
- **$204,754** volunteer department budget
- **$2,661,950** value of hours, measured by Independent Sector Rate ($22.55)
- **$2,457,206** net value added to Fox Chase

## Research Snapshot

### Active Funded Projects

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Number of Projects</th>
<th>Direct Costs</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEER-REVIEWED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCI</td>
<td>102</td>
<td>$13,326,571</td>
<td>$21,730,136</td>
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<tr>
<td>Other NIH</td>
<td>53</td>
<td>8,772,135</td>
<td>14,516,269</td>
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<tr>
<td>Other</td>
<td>30</td>
<td>3,011,219</td>
<td>4,043,714</td>
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<tr>
<td><strong>Subtotal of peer-reviewed</strong></td>
<td><strong>185</strong></td>
<td><strong>$25,109,925</strong></td>
<td><strong>$40,290,119</strong></td>
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<tr>
<td>NON-PEER-REVIEWED</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Industry</td>
<td>43</td>
<td>$3,893,689</td>
<td>$5,022,859</td>
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<tr>
<td>Other non-peer-reviewed</td>
<td>35</td>
<td>2,547,829</td>
<td>2,958,033</td>
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<tr>
<td><strong>Subtotal of non-peer-reviewed</strong></td>
<td><strong>78</strong></td>
<td><strong>$6,441,518</strong></td>
<td><strong>$7,980,892</strong></td>
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<tr>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>263</strong></td>
<td><strong>$31,551,443</strong></td>
<td><strong>$48,271,011</strong></td>
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</tbody>
</table>

### Total Number of Projects

- **394** Total Number of Active Clinical Trials
- **328** Total Number of Active Treatment Trials

Numbers represent Fiscal Year 2014.
### Clinical Snapshot (in thousands)

<table>
<thead>
<tr>
<th></th>
<th>FY14</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVENUES - CLINICAL ACTIVITY</strong></td>
<td></td>
</tr>
<tr>
<td>Patient Care Revenue - Hospital</td>
<td>$244,966</td>
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<tr>
<td>Patient Care Revenue - Physicians</td>
<td>31,420</td>
</tr>
<tr>
<td>Philanthropy, Outreach &amp; Other</td>
<td>12,274</td>
</tr>
<tr>
<td><strong>Clinical Revenue</strong></td>
<td>$288,660</td>
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<tr>
<td><strong>OPERATING EXPENSES - CLINICAL ACTIVITY</strong></td>
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<tr>
<td>Direct Patient Care</td>
<td>$214,669</td>
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<td>Administrative and General</td>
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<td>Capital Related Costs</td>
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<tr>
<td>Maintenance and Plant Operations</td>
<td>12,498</td>
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<tr>
<td><strong>Clinical Expenses</strong></td>
<td>$280,791</td>
</tr>
</tbody>
</table>

### FY14 Payer Mix

- Commercial: 50%
- Medicare: 33%
- Medicaid: 4%
- Medicare Managed Care: 9%
- Other: 4%

### Types of Cancer Treated

- Head and Neck: 3%
- Pancreatic: 4%
- Lymphoma: 4%
- Skin: 5%
- Bladder: 5%
- Kidney: 7%
- Colorectal: 8%
- Gynecologic: 10%
- Prostate: 11%
- Lung: 11%
- Breast: 15%
- Other: 17%

### Key Patient Care Statistics

<table>
<thead>
<tr>
<th>Type</th>
<th>FY14</th>
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<tbody>
<tr>
<td>New Patients</td>
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<tr>
<td>Hospital Admissions</td>
<td>4,756</td>
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<tr>
<td>Outpatient Registrations</td>
<td>43,361</td>
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<tr>
<td>Chemotherapy Infusions and Related Procedures</td>
<td>45,563</td>
</tr>
<tr>
<td>Radiation Therapy Treatments</td>
<td>22,204</td>
</tr>
</tbody>
</table>
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