In July 2012, Fox Chase became part of the Temple University Health System—a move that opened new possibilities and strengthened the future for both organizations as they became part of a powerful new whole.

The pages that follow detail the exciting work being done by clinicians and scientists at Fox Chase and TUHS—work that broadens our understanding of cancer and other life-threatening diseases and offers new hope for prevailing over these threats. The dynamism created by these entities’ collaboration is propelling these efforts forward at an unprecedented rate.

Together, Fox Chase and TUHS are creating science and medicine that make a difference for patients—in the Philadelphia region and around the world.

“The rest of the story: To read the full annual report—including additional 2012 highlights and a list of top donors—visit 2012annualreport.foxchase.org.”

“SYNERGY IS THE CREATION OF A WHOLE THAT IS GREATER THAN THE SUM OF ITS PARTS.”

Tailoring Treatment

From genetic testing to cancer-killing sound waves, the best patient care means providing personalized treatment, pioneering new technologies, and caring for the whole person, one patient at a time.
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Unlocking Knowledge

Fox Chase clinicians and researchers know that leading-edge cancer treatment starts in the laboratory. Innovative Fox Chase science is leading to a new understanding of disease and providing access to the development of new and better treatments.
Low-dose Radiation: an Ounce of Prevention?

Even a little radiation is bad for you. That belief, originally based on decades of research in Japanese atomic bomb survivors, has been augmented by more recent publications warning of the dangers of low-dose radiation from computerized tomography, or CT, scans.

But Mohan Doss, a medical physicist in the Fox Chase radiology department, says that conclusion is mistaken. He points to research showing that small amounts of radiation are beneficial, providing protection against cancer and other diseases of aging such as Alzheimer’s.

Although some researchers warn that even the amount of radiation from a CT scan or mammogram could increase one’s risk of cancer, Doss says animal and human studies suggest that radiation levels several times higher than those generated by such tests may in fact be therapeutic and help to prevent cancer.

An Unexpected Connection

Meteorologists call it the butterfly effect: the metaphoric notion that an action as subtle as the flutter of one delicate wing can have a profound effect in another part of the world through a series of unexpected interactions.

The body has its own flapping butterflies, intersections of cause and effect that seem unrelated, yet carry profound consequences. Nestor Esnola, a surgeon who specializes in colorectal cancer at Temple University Health System, wanted to see if there was a butterfly effect in colon cancer. Was the malady known as metabolic syndrome somehow related to the uncontrolled cell growth of the cancer?

On the surface, metabolic syndrome and colon cancer hardly seem to be related. Metabolic syndrome, which is associated with an increased risk of cardiovascular disease, is diagnosed if someone has at least three of a cluster of ailments including elevated blood sugar, hypertension, elevated cholesterol, increased abdominal fat, and high triglyceride levels. Colon cancer, on the other hand, occurs when cells in the colon’s lining begin to replicate uncontrollably.

Although some research has suggested that metabolic syndrome might lead to worse outcomes in colon cancer patients, Esnola says those studies are contradictory and controversial.

To cut through the confusion, he examined the medical records of 36,000 colon cancer patients—including 7,000 with metabolic syndrome—from medical data collected in a national Medicare surveillance database. He found butterflies—connections between the seemingly unrelated maladies.

While metabolic syndrome did not correlate with recurrence or survival rates, his research showed that the syndrome’s components had important associations.

Both high blood pressure and high blood sugar levels associated with a greater likelihood of metastatic disease and with reduced survival. High cholesterol levels, on the other hand, predicted a better outcome for colon cancer patients. But when a patient had all three symptoms, as in metabolic syndrome, the effect vanished.

Of Mice and Men

Eight hundred fifty. That’s the number of existing drugs that medical oncologist Igor Astsaturov and his team will test on pancreatic tumor cells while looking for a cancer-killing compound.

Five. That is the number of dose levels tried per drug.

Two. That’s how many times each drug is tested on each tumor.

Forty. That is the number of promising drugs the investigators have found so far against a cancer that, to date, has had only limited treatment options.

Behind this effort, and critical to its success, is an army of mice and a leading-edge technique called xenotransplantation. From the Greek xenos, meaning “foreign,” the term refers to the transplantation of living cells or tissues from one species to another.

For years, researchers have tested drugs on cell lines that have lived for generations in plastic dishes. As the cells adapted to their plastic nests, they shed the characteristics that made them a menace to humans. “Most cancer cell lines very poorly represent what actually happens in the patient,” Astsaturov says.

Astsaturov needed menacing cells. To create them, he used human pancreatic tumor tissue provided to him by Fox Chase surgeons. He began growing the tumors in immune-deficient mice, then shipping them to his collaborators at Lombardi Cancer Center in Washington, DC. There, the tumor cells are transferred to special tissue cultures that allow for the cells’ rapid expansion without introducing additional genetic changes. Finally, the scientists freeze the cells, creating a library of unique pancreatic cancer models ready for drug testing—that cells that respond the way they would inside the human body.

“We are very excited because we’ve seen a number of compounds that have never been tested in pancreatic cancer before that have proved effective against this new library of pancreatic tumor cells,” Astsaturov says.

“If we can bring even one medication to clinic, we’ll be making tremendous progress.”

Beyond the Gene

It is not always the content of our genes that matters; sometimes, it’s how they’re labeled.

Jean-Pierre Issa of Temple University School of Medicine is among a growing number of researchers who study how cells can stumble into cancer, not through genetic mutation but through chemical “tags,” called methyl groups, that attach to the coils of our DNA.

These tags and their influence form the field of epigenetics, the Greek prefix epi indicating that the action is on the genes, not of them. In normal development, the tags block some genes and turn on others as embryo becomes fetus becomes baby becomes adult. But sometimes a misplaced or missing tag gives rise to the unregulated cell growth of cancer.

Now Issa, who directs Temple’s Fels Institute for Cancer Research and Molecular Biology, is working with a team of Fox Chase investigators engaged in epigenetics research to create a joint program between the newly merged institutions.

“The principle of the program is to try to get synergy between different investigators with the idea that the sum of working together will be better than working individually,” Issa says.

Study Yields Clues to Origins of Blood Cancers, Other Cancers

Researchers have discovered how certain mutations can lead to blood and other cancers. “These findings help explain how mutations in one class of proteins can trigger the development of cancer,” says Shuyun Rao, a Fox Chase postdoctoral fellow working in the lab of immunologist David L. Wiest. “If we find a way to block the pathway activated by these mutations, this may cause the tumors to regress.”

The researchers found that of 30 leukemia patients, 9 percent were missing or had mutated forms of a protein called L22, suggesting that problems with the protein may have played a role in the development of their cancer.

Gene Tied to Recurrence of Head and Neck Cancer

Fox Chase researchers have identified a gene that predicts disease recurrence in individuals with squamous cell carcinoma of the head and neck. The sixth most common type of cancer worldwide, the disease has a relatively low five-year survival rate and a high degree of recurrence. In the study, the researchers focused on a gene that encodes the cytochrome P450, or CYP1B1 protein, which is abundant in tumor tissue and produces carcinogens by metabolizing tobacco smoke and alcohol—substances that increase the risk of squamous cell carcinoma of the head and neck.

Treatment Choices Influenced by Income, Research Reveals

Findings from Fox Chase suggest that patients’ income influences the treatments they choose, even causing them to select less effective therapies out of cost concerns. Health plans with higher deductibles and co-pays may exacerbate those differences, as patients of lower socioeconomic status may be more likely to avoid costly treatment. The study results could help to explain ongoing disparities in cancer outcomes, in which some ethnic and racial minorities fare worse after diagnosis, likely due in part to differences in socioeconomic status.

2012

Scientific Highlights

Read more at 2012annualreport.foxchase.org.
Helping Hands

At Fox Chase, cancer care is a collaborative effort. From donors who want to make a difference to dedicated staff and faculty members, Fox Chase efforts are reaching patients from Philadelphia to half a world away.
**Help that Honors**

Betty Bishop says she cried when she heard what her husband Reggie Bishop had done. She had known he was going to make a donation to Fox Chase in honor of their late niece, Kimberly Miller Eline. She just didn’t know it was going to be a gift significant enough to keep Kimberly’s name alive at Fox Chase in perpetuity.

“Reg said he just felt like we needed to do something so everyone would know how wonderful she was,” Betty says. Today, there’s a conference room on the fourth floor of the Robert C. Young, M.D., Pavilion—a new Fox Chase research, treatment, and prevention hub—named in Kimberly’s honor. The oldest daughter of Betty’s brother, Robert Miller, Kimberly was the first grandchild in their family and served as flower girl in Reggie and Betty’s wedding. At the time of her death from breast cancer in 2011, Kimberly was the mother of three children, ages 17, 19, and 22.

Reggie Bishop still shakes up when he talks about his niece. “The thing that really helped was that she was at Fox Chase,” he says. “They helped her live an almost normal life.”

Reggie and Betty have been longtime contributors to the Bucks County Chapter of the Fox Chase Board of Associates, a fundraising group. Now they’ve increased their support with generous annual gifts to Fox Chase research.

» Continued at 2012annualreport.foxchase.org.

**Putting Scientists on the Court**

Zebrafish are small windows on biology, their early development from fertilization of an egg to first heartbeat being a 24-hour-long live broadcast that is visible through the transparent embryo.

Jennifer Rhodes, a developmental biologist who heads the Fox Chase zebrafish facility, is tuned into their channel, looking for the signals that guide the development of the minnows’ blood cells. Now she’s homing in on a single factor that appears to be critical in guiding some of the cells in the earliest embryos to become blood cells. That factor is a potential clue to the miscues that lead to blood cancers in humans.

The junior investigator is still earning her stripes in science. Three years ago, she was a new Fox Chase scientist with an idea about how blood cells form—and how they turn cancerous—and not much money to pursue it. That’s when she was awarded $200,000 from the V Foundation, an organization established by renowned college basketball coach and ESPN sports analyst Jim Valvano. Valvano died of bone cancer just weeks after he and ESPN launched the foundation to support cancer research. He was 47.

For Rhodes, the grant provided the shot she needed. “It really helped establish my lab and my career as a scientific investigator,” she says.

» Continued at 2012annualreport.foxchase.org.

**Temple’s Larry Kaiser Named ‘CEO of Year’**

Larry Kaiser, president and CEO of Temple University Health System, was named a “CEO of the Year” at the 2012 Healthcare Innovation Awards, sponsored by The Philadelphia Business Journal. He was among three area healthcare leaders who accepted their awards at a ceremony in November. Kaiser said the award was “a testament to the unwavering commitment and collective efforts of the physicians and staff of Temple University Health System who continue to work together to transform our enterprise into one of the region’s premier academic medical centers.”

Kaiser is an internationally renowned academic executive, thoracic surgeon, researcher and educator. He joined Temple in April 2011.

**Geneticist Recognized for ‘Lifetime Achievement’**

During a more than 50-year career at Fox Chase, geneticist Beatrice Mintz has helped to unravel the origins of cancer, in part through the development of mouse models that enable scientists to identify links between development and cancer and explore the biology of cancer over an animal’s lifetime. In April, those achievements earned her the American Association for Cancer Research’s annual Award for Lifetime Achievement in Cancer Research.

2012 Notables

» Read more at 2012annualreport.foxchase.org.

For a list of top 2012 donors, visit 2012annualreport.foxchase.org.
Looking Forward

In a time of unprecedented transition, important research and clinical priorities take shape for Fox Chase.

The recent merger with Temple University Health System puts Fox Chase in a position to help more patients than ever before. According to Richard I. Fisher, Fox Chase’s interim cancer center director and physician-in-chief, the merger provides an exciting opportunity to create something altogether new—a powerful whole much greater than the sum of its parts. “This has never been done before,” he says. “We are the first freestanding NCI-designated cancer center to merge with a major health care system, and we’ll be developing new paradigms.”

Although Fox Chase is known to have one of the most complete translational efforts in the country—exciting developments are under way in both ovarian and head and neck cancer, for example—significant work remains to be done. “Translational programs are something that every institution struggles to get right,” says molecular biologist Erica Golemis, a Fox Chase deputy chief scientific officer. “Each scientist in the laboratory needs a good clinical partner to work with—you need balance on both sides of the equation, and effective communication between the two is important.” Fox Chase will work to strengthen its translational science in part through the recruitment of strategically selected faculty members.

Working in the Center’s favor is the fact that critical scientific assets are already in place, Golemis says, such as an excellent laboratory animal facility and a protocol management office that runs clinical trials smoothly and effectively. “Most organizations don’t have the strong combination of facilities that we do,” she says. Plus, the collegial atmosphere at Fox Chase is conducive to progress. “In some places, basic science doesn’t even speak to clinical research. Here, we have a very nurturing environment where people actually become friends.”

What will complete the circle is recruiting strong personnel in a few key areas. “Dr. Fisher is already working to bring in more people who are both physicians and scientists,” Golemis says.

• Create a new hematologic malignancy program. Fisher himself is a leader in the field of malignant lymphoma research, having published a number of studies in The New England Journal of Medicine establishing a standard of care for patients. He is also the principal investigator on an NCI SPORE grant for lymphomas, one of only five such grants in the country funding that research area.

The next logical step is to establish a dedicated program at Fox Chase in hematologic malignancy, which will be a first for the Center. “My experience will make it somewhat easier to develop a program from the ground up,” Fisher says. “This represents a major opportunity to serve the community of Philadelphia in a world-class fashion.”

The ultimate goal of these efforts is deeper expertise and greater collaboration in the interest of serving more patients. By any measure, achieving that goal will make the Fox Chase-Temple affiliation a resounding success.
Financial Overview

Operating Revenues in millions

- Patient-care revenue $278.3 79%
- Research grants and commercial support $53.6 15%
- Fundraising support $10.8 3%
- Investments and other support $6.9 2%
- Governmental appropriation $2.5 1%

Total Operating Revenues $352.1

Operating Expenses in millions

- Patient care $202.3 57%
- Administration and general $55.1 15%
- Research $50.8 14%
- Capital-related costs $29.3 8%
- Maintenance and plant operations $20.2 6%

Total Operating Expenses $357.7

Patient Care

- Outpatient Visits: 94,302
- Total Patients: 29,710

Types of Cancer Treated

- 17% Breast
- 12% Prostate
- 11% Lung
- 10% Gynecologic
- 8% Colorectal
- 5% Bladder
- 5% Head and Neck
- 4% Skin
- 4% Lymphoma
- 3% Pancreatic

14% Other

Total Patients: 29,710

By the Numbers