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Costs of Cancer Care Estimated for Elderly Patients

The 5-year cost of caring for elderly people with cancer in the United States is projected to be $21.1 billion, according to a report today in the *Journal of the National Cancer Institute (JNCI)*.

The estimate is part of a detailed analysis of the per-person and aggregate 5-year costs of caring for Medicare patients (age 65 and older) with cancer. The findings show that costs vary by type of cancer, stage at diagnosis, phase of treatment, and survival.

"The estimates provide a basis for future projections of health care costs that can be used to plan health care programs," said lead investigator Dr. Robin Yabroff of NCI's Division of Cancer Control and Population Sciences. The estimates could also be used to evaluate the cost-effectiveness of anticancer interventions aimed at prevention, screening, or treatment.

The study focused on the 18 most prevalent cancers. Costs were determined for three phases of care: the initial year after diagnosis, the continuing care phase, and the last year of life. Costs tended to be higher during the initial phase and last year of life than in the intervening period.

The average 5-year net costs varied widely, from less than $20,000 for patients with breast cancer or melanoma to more than $40,000 for patients with brain, esophageal, gastric, or ovarian cancers or lymphoma.

For men, cancers of the brain and nervous system were the most costly per patient in each phase of care and over 5 years. For women, these cancers were also the most expensive during the initial and final phases, but ovarian was the most expensive over 5 years.

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Cancer Research Highlights

Cisplatin No Better than Standard Therapy for Anal Canal Cancer

Replacing mitomycin with cisplatin in chemoradiotherapy for cancer of the anal canal failed to improve either disease-free or overall survival and resulted in more patients needing colostomies, according to a study in the April 23 issue of the *Journal of the American Medical Association*.

Current standard therapy for anal canal cancer consists of fluorouracil plus mitomycin and radiotherapy. Previous studies have established that chemoradiation is more effective for smaller tumors. Researchers wondered whether initial chemotherapy with fluorouracil and cisplatin could improve outcomes by shrinking

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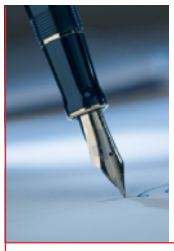

Guest

Director's Update

Accelerating Translational Research at NCI: The Next Steps

Dr. Lynn Matrisian serves as a special assistant to NCI Director John Niederhuber while maintaining her position as professor in the Department of Cancer Biology at Vanderbilt University. A former co-chair of the Translational Research Working Group, her charge is to work with the Coordinating Center for Clinical Trials to begin implementing the working group's recommendations.

On November 7–9, 2008, NCI will hold a first-of-its-kind, institute-wide translational science meeting in Washington, DC. The meeting marks a significant step toward implementing recommendations made by the Translational Research Working Group (TRWG) in its June 2007 report.

In this report, the TRWG laid out a plan to enhance the effectiveness of NCI's translational research enterprise. The recommendations focus on "early translation"—where many promising basic research discoveries can stall or derail because of a lack of tools or infrastructure.

The TRWG further defined the early translation process with six developmental pathways—engineering diagrams that depict steps that are required to move discoveries from the laboratory, clinic, or population to the point where they can be tested in early-stage clinical trials. Basic research lies upstream from these pathways and provides a continual source of fundamental and innovative discoveries. In its June 2005 report, the Clinical Trials Working Group addressed advanced-phase trials that are downstream in the translational continuum. The TRWG's recommendations use a managed approach intended to accelerate translational progress along these six pathways.

The November meeting is the first step toward initiating a new approach to identifying and supporting promising translational research projects. Using the six pathways as a framework, the meeting's aim will be to identify projects in NCI's intramural and extramural translational portfolio that are "ripe" for translation. That is, those discoveries with sufficient promise to meet an important clinical need and those that can and should, with the appropriate links to other researchers and support tools, be efficiently moved into early-phase trials.

The meeting will provide an opportunity to assemble the components of a pathway that are focused on a single goal. There may be, for example, promising serum biomarkers or imaging approaches for early detection of a particularly devastating type of cancer that would benefit from links to an appropriate animal model, cohorts of high-risk individuals, or clinical teams poised for action. Participation from industry, foundations, and advocacy groups will be critical for traversing the translational path.

Translational teams that are pursuing projects deemed high priority could be supported through the creation of a new funding mechanism, called Special Translational Research Acceleration Project (STRAP) awards. STRAP funding will join various components required to complete the translational process and to facilitate handoff from one group to another along the six developmental pathways. As part of a requirement for receiving STRAP funding, the project would need to have a management plan for reaching early-stage human studies, specific development milestones with a timeline for achieving them, and a development/commercialization strategy; in essence, a business plan for translation.

We are in the earliest stages of implementing the TRWG's recommendations, including the prioritization process and development of the STRAP awards, and the November meeting is our testing ground. My hope is that this forum will enable NCI to identify promising projects and teams of researchers with the expertise and skills to propel research discoveries along the route to becoming effective new tools for cancer assessment and intervention. ◆

Also in the News

Research organizations from 10 countries, including the National Institutes of Health, announced today the launch of the International Cancer Genome Consortium, a collaboration to generate high-quality genomic data on up to 50 types of cancer. ◆

Cancer Research Highlights

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tumors before they were treated with the same agents and radiotherapy.

In this randomized phase III clinical trial, 644 patients with anal canal cancer received standard treatment with fluorouracil plus mitomycin and concurrent radiotherapy or induction chemotherapy with fluorouracil plus cisplatin, followed by concurrent treatment with fluorouracil, cisplatin, and radiation.

After a median follow-up of 2.5 years, the estimated 5-year disease-free survival rate was 60 percent for patients in the mitomycin group, compared with 54 percent in the cisplatin group. Estimated rates of overall survival, local recurrence, and distant metastasis were all worse for patients in the cisplatin group. In addition, at 5 years an estimated 19 percent of patients who received cisplatin needed colostomies, compared with 10 percent of patients who received mitomycin.

"These findings do not support the use of cisplatin in place of mitomycin in combination with fluorouracil and radiotherapy in the treatment of anal canal carcinoma," conclude principal investigator Dr. Jaffer A. Ajani of the University of Texas M.D. Anderson Cancer Center and his colleagues.

Ovarian Epithelial Tumors Traced to Fallopian Tubes

Researchers at Dana-Farber Cancer Institute have found that the source of disease in many cases of the most aggressive form of ovarian cancer, serous carcinoma, may not be the ovary at all, but rather the fimbria of the fallopian tube. Dr. Keren Levanon reported these findings at the American Association for Cancer Research annual meeting on April 14.

"Until now, there was no understanding of the basic pathogenesis or carcinogenesis of [ovarian] serous carcinoma," said Dr. Levanon at the meeting. Noting that the majority of ovarian cancers are diagnosed at an advanced stage, she continued: "We didn't really know what the early cancer lesion or precursor lesion looks like, so we couldn't analyze what went wrong."

Her team, which included collaborators at Brigham and Women's Hospital, searched for these early lesions by identifying cells with a "p53 signature"—mutations in the *p53* gene and buildup of p53 protein in cells—in the tissues of women who, due to a high risk for developing ovarian and other cancers, volunteered to have their ovaries and fallopian tubes removed.

The team found a p53 signature most often in the secretory cells lining the finger-like appendages, called fimbria, at the ends of fallopian tubes. Dr. Levanon's team then developed an *ex vivo* model that they are using to continue studying these cells and the molecular events that lead to cancer. They hope this research will lead to targeted therapies and biomarkers for early detection.

Though they were surprised by their findings, explained Dr. Levanon, they were not surprised that ovarian cancer could begin in the fallopian tubes. "When we look at patients who are diagnosed with later-stage ovarian cancer," she said, "we find that they have these lesions in their fallopian tubes in close to 100 percent of cases." She also noted that patients who have prophylactic surgery to remove their ovaries sometimes develop tumors in other parts of their abdomen, which could result from shed cancer cells when the fallopian tubes are left intact.

Prognostic Test for Breast Cancer Profiles the Tumor Environment

Researchers have developed an experimental prognostic test for breast cancer based on the activity of 26 genes in the stroma of breast tumors—the connective tissue surrounding the tumors. The test provides information that is independent of other prognostic indicators, such as clinical tests and tumor gene signatures, Dr. Morag Park of McGill University and her colleagues reported online April 27 in *Nature Medicine*.

The role of the local tumor environment in promoting cancer is of great interest, but few studies have addressed how changes occurring in tumor stroma affect disease outcome.

The researchers developed and tested the 26-gene signature using tissue samples and clinical data from three large breast cancer databases. The results suggest that changes in breast tumor stroma play a crucial role in the progression and outcome of the disease.

In one analysis, the researchers detected an increase in the activity of certain immune-related genes in stroma samples from patients who were classified as having "good outcomes." These individuals may benefit from treatments that target tumors via the immune response, such as vaccine

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therapies in the adjuvant setting, the researchers say.

Combining the 26-gene stroma signature with other gene signatures improved the prediction of clinical outcomes beyond that achieved by using individual molecular signatures. These findings highlight the need to integrate all aspects of the tumor microenvironment into prognostic prediction, the authors conclude.

Pesticide Linked to Testicular Cancer Risk

Males exposed to a byproduct of the pesticide DDT may have an increased risk of testicular cancer, according to research published online in the *Journal of the National Cancer Institute* April 29. Blood levels of DDE, the main persistent metabolic product of DDT, were higher in a sample of American men with testicular germ cell tumors (TGCT) than in other men. This relatively rare cancer is often treatable, especially when detected early.

The U.S. banned DDT in 1973, but the pesticide continues to be used elsewhere. The chemical and its metabolites are stored in fat tissue and can accumulate, for instance, in humans and in fish. "While levels have declined in the population since the 1970s, DDE remains detectable in the majority of Americans," said lead investigator Dr. Katherine A. McGlynn of NCI's Division of Cancer Epidemiology and Genetics. "This study suggests that chemicals that persist in the environment may have effects years after their usage ceases."

A link between pesticides and testicular cancer was proposed decades ago, but testing the hypothesis has been a challenge because the disease is rare. The researchers studied 739 U.S. servicemen with TGCT and 915 healthy men who had provided blood samples to the Department of Defense, on average, 14 years before the current analysis.

The men in the group with the highest blood levels of DDE were 1.7 times more likely to develop TGCT than men with the lowest concentrations. If the risk estimates are correct, then DDT exposure could account for 15 percent of TGCT cases in the study.

DDT belongs to a family of organochlorine pesticides that may disrupt the body's endocrine system. "Because evidence suggests that TGCT is initiated in very early life, it is possible that exposure to these [pesticides] during fetal life or via breast feeding may increase the risk of TGCT in young men," the researchers write. ◆

(Cost of Care continued from page 1)

Few of the study's findings were startling, notes an editorial in *JNCI*, but, taken together, "they provide the scientifically strongest picture yet" of the incidence costs of cancer in aggregate and by tumor type for this population.

The results show that substantial amounts of money are spent on hospitalizations in the last year of life for people with rapidly fatal cancers. Hospital costs alone are the bulk of the 5-year expenses for these patients.

"The vast majority of the money spent on advanced cancers such as gastric and pancreatic goes toward acute care hospitalizations, despite the fact that such care is unlikely to meaningfully improve the prognoses for these patients," said coauthor of the editorial Dr. Elizabeth Lamont of Massachusetts General Hospital and Harvard Medical School.

As an oncologist, Dr. Lamont points to studies showing that most people, if confronted with a terminal illness, would prefer to spend their remaining time not in the hospital but rather with family and if possible at home.

"This study puts a price tag on the extra hospital care, and it is not trivial," she said. "Some of this money might be better spent developing systems to help patients avoid unwanted hospitalizations at the end of life."

Dr. David Cutler, a professor of Applied Economics at Harvard University who was not involved in the research, was struck by the magnitude of the costs at the end of life.

"The central question raised by the results is whether all this care is really valuable," he said. "This is a very nice study, and the findings stress the importance of that question."

The study used information from NCI's Surveillance, Epidemiology, and End Results (SEER) program and data on health care costs from the SEER-Medicare database.

The work, led by NCI's Health Services and Economics Branch and Statistical Research and Applications Branch, follows a study last year that estimated the time cancer patients spent on their care.

A challenge for the field will be to standardize the methods of estimating costs for different aspects of the cancer burden as well as other diseases, according to the authors. ◆

By Edward R. Winstead

Spotlight

Alcohol and Breast Cancer Risk: New Findings

While the potential health benefits of moderate alcohol consumption have garnered a lot of public attention, alcohol's impact on cancer risk has received much less. Epidemiological studies have consistently found that heavy drinking can increase the risk of liver, head and neck, and esophageal cancers, and even moderate drinking has been shown to increase the risk of breast cancer.

At the recent American Association for Cancer Research (AACR) annual meeting in San Diego, two new studies were presented that shed additional light on the alcohol-breast cancer connection, including one study that linked alcohol consumption with a significantly increased risk of the most common type of breast cancer.

Even though these studies grabbed headlines, researchers stress that important questions remain unanswered, such as which women who drink are at greatest risk, and what biological mechanism(s) alcohol might trigger to cause breast cancer. In short, researchers are still accumulating evidence that can form the basis for personalized clinical recommendations.

Nevertheless, some recommendations have already been made. As part of a far larger report on cancer prevention released last year, a consensus panel formed by the American Institute for Cancer Research (AICR) concluded: "The evidence on cancer justifies a recommendation not to drink alcoholic drinks."

The AICR report also acknowledged, however, the consistent findings that moderate alcohol consumption can protect against heart disease, and offered that, if individuals choose to drink, women should limit their consumption to one alcoholic beverage per day and men to two.

But even a highly consistent association between alcohol intake and breast cancer risk "is not the same as saying causality has been proven," says Dr. Arthur Schatzkin, chief of the Nutritional Epidemiology Branch in NCI's Division of Cancer Epidemiology and Genetics. The same, he adds, holds true for the protection against heart disease.

"The breast cancer risks involved with alcohol are indeed modest; nothing like the magnitude of the risks between smoking and lung cancer or HPV and cervical cancer," Dr. Schatzkin continues. "So it's difficult to be absolutely certain from the available studies that it's not some other biologic or behavioral factors associated with moderate drinking that are the real etiologic agents in breast cancer."

The important point, he stresses, is that "Drinking alcohol is an entirely avoidable risk factor," especially for women with established risks like a family history of breast cancer.

Studies dating back to the 1920s show that alcohol consumption and mortality risk are represented by a J-shaped curve: Risk of death is somewhat elevated in teetotalers, dips for moderate drinkers, and then climbs steadily as consumption increases.

According to long-term studies performed by Dr. Arthur Klatsky and colleagues at Kaiser Permanente in Oakland, CA, the vast bulk of the benefit of light-to-moderate alcohol consumption is due to an apparent protective effect against cardiovascular disease, primarily in middle-aged people.

Incidence data presented by NCI researchers at the AACR meeting were somewhat consistent with a J-curve, at least in terms of excessive alcohol consumption. Based on an analysis of more than 180,000 women in the NIH-AARP Diet and Health Study, they found that women who consumed three or more alcoholic drinks a day had more than a 50-percent increased risk of ER+/PR+ breast cancer, while women who drank smaller amounts also had an elevated risk, regardless of alcohol type.

The results, Dr. Klatsky notes, are mostly consistent with data from his studies and support the hypothesis that alcohol may increase breast cancer risk via an effect on estrogen. However, the results are not entirely consistent and highlight the difficulty in establishing a risk "threshold," Dr. Klatsky explains.

"Our data show that women who report having just several drinks a week don't have an increased [breast cancer] risk, and the risk begins somewhere between that and two drinks per day," he says.

In addition to the interplay between alcohol and estrogen, research has

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focused on several genes that code for the enzyme alcohol dehydrogenase (ADH), which is involved in alcohol metabolism. ADH initiates the breakdown of alcohol into acetaldehyde, ethanol's first metabolite, which is carcinogenic in animal models.

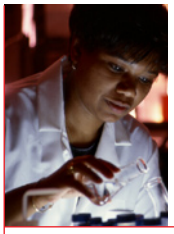
At the AACR meeting, researchers from Georgetown University's Lombardi Comprehensive Cancer Center and the State University of New York at Buffalo, using data from the Western New York Exposure and Breast Cancer Study, reported finding an increased breast cancer risk among postmenopausal women who drank and had variations in a gene that codes for ADH. The more the women reported drinking, the greater their risk.

"This is what we're really trying to get at now," says Lombardi's Deputy Director, Dr. Peter Shields, who co-led the study. "We're assuming that there are certain genetic susceptibilities. There's some evidence for it, but not enough studies to say that, for women who drink, certain genes put you at increased risk of breast cancer."

But other molecular players may be at work. Dr. Shields' lab has received funding from the Department of Defense to take a more systematic look at four potential causal mechanisms suggested by previous studies. These include the alcohol-estrogen link and the role of acetaldehyde, as well as alcohol-induced oxidative damage and disruption of folic acid pathways.

"We want to take this type of beverage that many women are going to drink," Dr. Shields says, "and figure out when they are really putting themselves at risk." ◆

By Carmen Phillips



Featured Clinical Trial

Cediranib for Androgen-Independent Prostate Cancer

Name of the Trial
Phase II Study of AZD2171 in Patients with Metastatic Androgen-Independent Prostate Cancer (NCI-07-C-0059). See the protocol summary at http://cancer.gov/clinicaltrials/NCI-07-C-0059.

Principal Investigators
Dr. William Dahut and Dr. William Figg (Protocol Chair), NCI Center for Cancer Research

Why This Trial Is Important
Advanced prostate cancer is often dependent upon male hormones (androgens) for continued growth and may initially respond to anti-androgen therapy. Unfortunately, prostate cancer growth ultimately becomes androgen-independent. Treatment with the chemotherapy drug docetaxel may help men with androgen-independent prostate cancer survive longer, but, if the cancer becomes resistant to docetaxel, there currently are no other proven effective treatment options.

One strategy being tested for treating metastatic, androgen-independent prostate cancer is to block the blood supply that feeds the tumors. A large body of research indicates that solid tumors need to develop new blood vessels (a process called tumor angiogenesis) in order to keep growing and that attacking the tumor blood supply may inhibit further growth and spread. Some studies suggest that metastatic prostate cancer may be especially dependent on tumor angiogenesis.

A drug called cediranib blocks the action of vascular endothelial growth factor (VEGF), a protein that plays a crucial role in tumor angiogenesis, by attaching to VEGF receptors on cancer cells. Cediranib treatment, therefore, may be able to block prostate tumor angiogenesis and inhibit prostate tumor growth.

In this trial, men with metastatic, androgen-independent prostate cancer whose cancer has continued to progress on docetaxel will take oral cediranib daily. Treatment will continue for those patients whose tumors do not progress and who do not suffer unacceptable side effects. Doctors want to see if cediranib can help delay the progression of cancer in these patients.

"There are a number of drugs that block the action of VEGF being tested in metastatic, androgen-independent prostate cancer, but each drug works differently," said Dr. Dahut. "Cediranib looks to be a promising agent because it blocks more VEGF receptors than other drugs in the class, potentially making it a more effective inhibitor of tumor angiogenesis."

For More Information
See the list of eligibility criteria and contact information at http://cancer.gov/clinicaltrials/NCI-07-C-0059 or call the NCI Clinical Trials Referral Office at 1-888-NCI-1937. The call is toll free and confidential. ◆

An archive of "Featured Clinical Trial" columns is available at http://cancer.gov/clinicaltrials/ft-all-featured-trials.

Notes

Casadei Named CTEP Branch Chief

Dr. Jan Casadei has been appointed chief of the Regulatory Affairs Branch in the NCI Division of Cancer Treatment and Diagnosis' Cancer Therapy Evaluation Program (CTEP). Dr. Casadei received her Ph.D. in Biochemistry from the University of Pennsylvania. Before joining CTEP in 1991, Dr. Casadei was a research scientist at IGEN, Inc., where she developed bioluminescent antibody fusion proteins as tools for immunoassays. While at CTEP, Dr. Casadei has demonstrated her expertise in all aspects of new agent development, working with the U.S. Food and Drug Administration in meeting investigational new drug requirements.

NCI's Barker Receives AACR Award

Dr. Anna D. Barker, deputy director for Strategic Scientific Initiatives, received an award April 13 to honor her 10 years of leadership of the AACR Scientist–Survivor Program.

The program builds partnerships among leaders of the scientific and cancer survivor and patient advocacy communities worldwide. The program helps survivor and patient advocates develop stronger backgrounds in cancer research and allows scientists to gain a more personal understanding of cancer's impact on patients and their loved ones.

Free Telephone Workshop for Cancer Survivors

Cancer*Care*, in collaboration with NCI, the Lance Armstrong Foundation, Intercultural Cancer Council, Living Beyond Breast Cancer, and National Coalition for Cancer Survivorship, will present a teleconference titled "Rediscovering Intimacy in Your Relationships Following Treatment" on May 13.

This is the second of a three-part telephone education workshop series called "The Sixth Annual Cancer Survivorship Series: Living With, Through, and Beyond Cancer."

Part I, "The Importance of Communicating with Your Doctor about Follow-Up Care," took place on April 22 and is archived on the Cancer*Care* Web site.

Part III, "Survivors Too: Family, Friends and Loved Ones," is scheduled for June 24. All of the workshops take place from 1:30 to 2:30 p.m. ET.

No phone charges apply. However, pre-registration is required. To access the archive or to register, go to http://www.cancercare.org/TEW.

NCI Sponsors Webinar on Cancer Control Planning Tools for Prostate Cancer

NCI's Office of Advocacy Relations will host a webinar on a set of simulation models from NCI's Cancer Intervention and Surveillance Modeling Network (CISNET). The models can be used to support the establishment of policies, guidelines, and evidence-based cancer control interventions (e.g., screening and treatment) for prostate cancer to optimally balance benefit and cost.

The webinar is scheduled for May 14 from 12:00-1:00 p.m. ET. No advance registration is required. More information and instructions on how to participate are available at http://www84.imsweb.com/webinars/prostate_05142008.html.

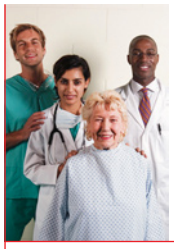
caBIG Annual Meeting Slated for June

The 2008 cancer Biomedical Informatics Grid (caBIG) annual meeting will take place June 23–25 at the Omni Shoreham Hotel in Washington, DC. The meeting provides a forum for the exchange of the latest knowledge in the ongoing creation of a "World Wide Web of cancer research." This year's meeting will feature case studies about centers that are adopting caBIG and technical demonstrations of caBIG tools and infrastructure.

The annual meeting is free and open to the public. To register, visit https://cabig.nci.nih.gov/2008AnnualMeeting/. ◆

Funding Opportunities

For a complete listing of current NCI funding opportunities, please go to the HTML version of today's *NCI Cancer Bulletin* at http://www.cancer.gov/ncicancerbulletin/NCI_Cancer_Bulletin_042908/page8. ◆



Cancer Center Profile

Barbara Ann Karmanos Cancer Institute

President and CEO: Dr. John C. Ruckdeschel • 4100 John R, Detroit, MI 48201
Phone: 1-800-KARMANOS (527-6266) • Web site: http://www.karmanos.org

Background

The Karmanos Cancer Institute began as the Detroit Institute for Cancer Research in 1943. It later became the Michigan Cancer Foundation, and—following a gift in 1995 from Peter Karmanos, Jr., chairman and chief executive officer of Compuware Corporation—it was re-named in honor of his wife, Barbara Ann Karmanos, who lost her 8-year battle with breast cancer in 1989. In providing the gift, Mr. Karmanos wanted to honor her courage and ensure that the best cancer care is available to all families.

As Michigan's only independent cancer hospital, Karmanos focuses on treating cancers of all types and is committed to a future free of the disease. It has been an NCI-designated Comprehensive Cancer Center since 1978 and is affiliated with Wayne State University.

Research Activities

A recognized leader in the fight against cancer, Karmanos Cancer Institute is at the forefront of cancer research. Lives are being saved today through more than 700 cancer-specific investigation programs and clinical trials conducted at Karmanos. As a leader in the field, Karmanos' Phase I Clinical Trials Program is one of only 16 in the nation funded by NCI. Karmanos has been involved in phase I trials for seven of the latest FDA-approved cancer drugs.

Patient Care Specialties

More than 6,000 newly diagnosed cancer patients come to Karmanos annually from throughout Michigan, across the nation, and around the world. Karmanos cares for its patients through 13 multidisciplinary teams of experts in all areas of treatment—surgery, medical oncology, and radiation oncology—as well as supportive services including pathology, radiology, nursing, and social work.

All forms of minimally invasive surgical techniques are used by Karmanos physicians, including endoscopic resections and the da Vinci Surgical System. Karmanos has been a leader in the use of the da Vinci system for gynecologic surgeries. Percutaneous cryotherapy at Karmanos allows ablation of local tumor masses without the need for an intravascular approach. The procedure uses extremely cold temperatures to destroy diseased tissue and has a faster recovery time.

Other Notable Programs

Karmanos has launched the National Oncogenomics and Molecular Imaging Center (NOMIC). The focus of NOMIC is to develop technology that characterizes the oncogene signatures for cancers in individual patients. In addition, the NOMIC will develop models of human cancers. From these models, oncogene signatures will be developed, validated, and made available to all institutions within the National Functional Genomics Consortium.

Karmanos is also home to the National Center for Vermiculite and Asbestos-Related Cancers, which was formed to address the need for early diagnosis and aggressive treatment of asbestos-related diseases.

The J.P. McCarthy Cord Stem Cell Bank at Karmanos is a public, nonprofit stem cell bank with more than 1,200 umbilical cord blood units in its inventory. The bank is one of only 21 internationally recognized cord stem cell banks affiliated with the National Marrow Donor Program and is the only bank of its kind in Michigan. ◆