



forefront

TRANSLATING RESEARCH INTO CLINICAL ADVANCES • VOL. 2



Collaboration with no end

Mayo Clinic reaches out to reduce health disparities



forefront / **contents**

MAYO CLINIC
CANCER CENTER

OUR MISSION

To relieve the burdens of cancer by promoting basic and clinical research on the incidence, causes and progression of cancer and translating discoveries into improved methods for prevention, detection, diagnosis, prognosis and therapy.

OUR PRIMARY VALUE

The needs of the patient come first.



A Comprehensive Cancer Center Designated by the National Cancer Institute

FOREFRONT

Forefront is the magazine of Mayo Clinic Cancer Center, a leader in translational cancer research and the effort to discover better ways to prevent, detect and treat cancer for patients around the globe.

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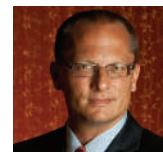
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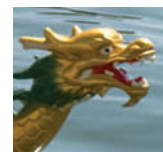
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A union of forces

It is my pleasure to welcome you to the second edition of *Forefront*, which chronicles our work at the Mayo Clinic Cancer Center.

We are a National Cancer Institute-designated cancer center with locations in Phoenix/Scottsdale, Ariz.; Jacksonville, Fla.; and Rochester, Minn. We serve diverse patient populations across a broad geographic area and collaborate across the full spectrum of cancer research, from basic biology to treatment.

When I think about the overall theme of the stories that appear on the following pages, a simple quote comes to mind: "The best interest of the patient is the only interest to be considered, and in order that the sick may have the benefit of advancing knowledge, union of forces is necessary."

William James Mayo, M.D. shared that wisdom in a 1910 commencement address at Rush Medical College. Dr. Mayo's words are as appropriate today as they were more than 100 years ago as they describe the collaboration that takes place among our researchers, clinicians, staff, patients and external associates every day. Research is a team sport and partnership is most definitely at the heart of our success.

Take Mayo Clinic's long-standing commitment to reducing health disparities among American Indian and Alaska Native peoples, for example. Our efforts in Alaska, which began in the 1950s, continue today as we use our expertise and new technologies to partner with communities to prevent, identify and treat people who are at an elevated risk for cancer.

Our commitment to people in Alaska is perhaps best captured by an administrator with the Alaska Native Tribal Health Consortium who commented, "No one has gone as far as Mayo Clinic to improve the Health of Alaska Natives. They do not abandon a project and are willing to partner with others, such as the CDC, to address a problem."

In a different vein, cancer patients everywhere have been the beneficiaries of a 44-year-old partnership between Mayo Clinic and the international nonprofit Fraternal Order of Eagles. The Eagles hold the



longest record of continuous philanthropy at Mayo Clinic, having funded dozens of innovative cancer research projects over the years that have spurred larger research projects funded by the National Cancer Institute and American Cancer Society.

In Arizona, we are collaborating with the nonprofit Translational Genomics Research Institute on projects that compare a patient's damaged genes with normal healthy ones. This work represents a new frontier in treatment for diseases such as melanoma, multiple myeloma and pancreatic cancer.

On the inside back cover of *Forefront* you'll find a partnership story of a different kind — one that involves breast cancer survivors taking to the water in a dragon boat for mutual support, physical activity and fun. Their competitiveness and teamwork are inspiring.

I share these examples with you because partnership and collaboration are essential to our work at Mayo Clinic Cancer Center. Whether researching and developing the next breakthrough cancer treatment or administering expert care with compassion, it takes the best efforts of everyone involved to provide hope and save lives.

Robert B. Diasio MD

Robert B. Diasio, M.D.

Director

Mayo Clinic Cancer Center

and William J. and Charles H. Mayo Professor



Health Disparities Research

WITH NO END

Mayo Clinic began its collaboration with local health care providers in Alaska even before the region achieved statehood in 1958. Today, innovative partnerships between Mayo Clinic, the Alaska Native Medical Center and the Alaska Native Tribal Health Consortium target cancer on multiple fronts.



Alaska is a land of mystery, whose size, geography and natural beauty have captured the imaginations of outsiders for generations. And much like the land, the Yupik Eskimos, a native people who inhabit Alaska's Yukon-Kuskokwim (Y-K) Delta region, can be a source of mystery to the uninitiated. The Yupik are a diverse group of semi nomadic people who migrated to the Y-K Delta region 30,000 years ago. Modern Yupik settlements in the Y-K Delta feature a unique blend of traditional lifestyle and 21st century conveniences such as Internet access and modern health facilities.

This melding of the traditional and the new may be a curiosity for some but not for Christine DeCourtney, Cancer Program planning manager at the Alaska Native Tribal Health Consortium. DeCourtney likes to tell a story about a medical mystery to make a point about improving the health of the population in the Y-K Delta region.

learned that the Yupik have one of the world's highest rates of colorectal cancer, along with poor outcomes due to lack of effective screening. Colonoscopy is only available in limited areas of Alaska, and fecal blood tests would not work because of bleeding from persistent *H. pylori* infection.

Because of these circumstances, Dr. Ahlquist and his colleagues developed a new screening test for Alaska Natives — and for populations around the world. The test, which is user friendly and can be returned by mail, detects DNA from 90 percent of colorectal cancers and 70 percent of precancerous polyps from throughout the colon.

Dr. Ahlquist is conducting extensive and rigorous testing of the new DNA test for a planned submission to the Food and Drug Administration in 2012. "The test could be as accurate as a colonoscopy in time," he says. This summer, he returned to Alaska to offer the test to the Alaska Native Tribal Health Consortium.

"No one has gone as far as Mayo Clinic to improve the health of Alaska Natives. They do not abandon a project and are willing to partner with others, such as the CDC, to address a problem."

— Christine DeCourtney, Cancer Program planning manager, Alaska Native Tribal Health Consortium

In the early 1990s, the Yupik were suffering from severe anemia. This didn't seem to make sense, she says, because the diet in that region is rich in iron from walrus, seal and whale meat. So a research team from Mayo Clinic in Rochester, Minn., along with an investigator from the Centers for Disease Control and Prevention (CDC), traveled by plane to the Y-K Delta area to understand why people were losing blood.

The best way to find out what was going on was to examine stool samples from those suffering from anemia, Ms. DeCourtney explains. And so as not to offend the Native population by taking something away that they might have no cultural right to, the researchers offered to pay for the stool samples they diligently gathered, says DeCourtney. "They literally 'got down and dirty,' picking up stool samples from primitive latrines," she says.

The Mayo Clinic team, led by gastroenterologist David Ahlquist, M.D., quickly discovered that the population was infected with *H. pylori* bacteria, which produced bleeding caused by stomach ulcers. Since *H. pylori* is a risk factor for stomach cancer, the discovery explained the high incidence of this cancer in the Native Alaskans. But Dr. Ahlquist also

DeCourtney says, "No one has gone as far as Mayo Clinic to improve the health of Alaska Natives. They do not abandon a project and are willing to partner with others, such as the CDC, to address a problem. A lot of institutions want to work with us in order to include minorities in their research, but the vast majority are helicopter projects. They fly over, figuratively, and never come back."

In 2006, Mayo Clinic and the Indian Health Service formalized a commitment to their partnership, but the "longstanding relationship of trust" between Mayo Clinic and Alaska Natives began even before Alaska was a state, DeCourtney says. Starting in the 1950s, teams of Mayo Clinic cardiologists traveled to Alaska to conduct pediatric and adult cardiac clinics until local medical facilities were able to provide these needed services.

Cancer then became the focus because the Alaska Native people have some unique issues, says Mayo Clinic oncologist Steven Alberts, M.D., who has been working to improve the health of Alaska Natives since 1982. These issues include remote locations, topographic extremes, economic challenges and reduced access to care and preventive cancer screening.

Despite a meat-rich diet, many Alaska Natives suffered from anemia. A Mayo team identified the cause as *H. pylori* bacteria, a risk factor for cancer. Mayo Clinic researchers developed a simple and effective screening test that replaces colonoscopy.



Mayo Clinic cancer education seminars for health care providers give local doctors valuable tools to treat patients.

50 percent of children in the Y-K Delta region use tobacco. Mayo Clinic has targeted tobacco use with programs that educate children and adults and have resulted in a 25 percent quit rate.

Mayo Clinic gastroenterologist David Ahlquist, M.D., is working on giving Alaska Native people access to clinical trials.



Patients and doctors alike must travel vast distances to receive and provide even the most basic health care services.

Using videoconferencing technology, Mayo Clinic physician Sandhya Pruthi, M.D., provides individualized prevention plans for women at high-risk for breast cancer.

There has also long been a notable and persistent dearth of oncologists in the state. Today, there are only 15, with only two oncologists providing care for cancer patients at the Alaska Native Medical Center (ANMC) in Anchorage, where 90 percent of Alaska Natives are treated. They handle 400 new cancer cases a year.

Because of the limited ability for Alaska health care providers to obtain updates in cancer care and prevention, Dr. Alberts and Judith Kaur, M.D., began an annual cancer-related education seminar for health care providers in 1998. That program continues today. It is held at both the ANMC and, when possible, at one of six regional hospitals.

Other programs are making steady inroads into cancer prevention and detection. For example, Mayo clinical psychologist Christi Patten, Ph.D., and her team have been developing innovative programs to reduce tobacco use among native children, teens and pregnant women. According to the National Center for Health Statistics, these groups have the highest rate of tobacco use in the United States. Seventy-nine percent of pregnant women and 50 percent of children in the Y-K Delta use some form of tobacco, some starting as early as age 3.

These populations have long made their own chewing tobacco, a concoction of tobacco and filler with salmon ash

or birch fungus known as Iq'mik. They believe it is safer, but actually it is more toxic than commercial chewing tobacco or cigarettes, and its widespread use has resulted in high rates of lung and oral cancers, Dr. Patten says.

To educate pregnant women about risks to their unborn children, Dr. Patten has developed a culturally relevant video, featuring regional Native women. She has organized fun camps for children where they learn about tobacco cessation in non-threatening ways. A pilot program resulted in a 25 cent quit rate. "This is very meaningful work," she says. "The Native community has made reducing tobacco use their No. 1 priority."

Sandhya Pruthi, M.D., gives Alaska Native women at risk of breast cancer an individualized prevention plan. But she does this in Rochester, Minn., using videoconferencing through the Center for Innovation. She "meets" with as many as eight women a month this way, spending an hour with each. "Patients don't want to leave at the end. They love it," says Dr. Pruthi. "It is a whole new world to be able to talk to patients this way. It's very much like seeing them in my Rochester clinic."

And Jon Tilburt, M.D., is examining the quality of follow-up care among Alaska Native men with an elevated prostate-specific antigen (PSA).

The programs tailored for Alaska Natives by Drs. Patten and Pruthi can be recast for use elsewhere in the U.S., if not internationally, they say.

Collaboration with no end

1950s, Mayo Clinic cardiologists travel to Alaska to conduct pediatric and adult cardiac clinics until local medical facilities were established to provide these services.

1958, Congress approves statehood for Alaska.

1982 Mayo Clinic oncologist Steven Alberts, M.D. first travels to Alaska to provide preventive screening and cancer care to Native population.

1990s, Mayo Clinic and Centers for Disease Control researchers travel to Y-K Delta to study blood loss in Native population.



“It is a whole new world to be able to talk to patients this way. It’s very much like seeing them in my Rochester clinic.”

— Sandhya Pruthi, M.D.

Last year, the Mayo Clinic Cancer Center received a \$6 million grant from the National Cancer Institute to help expand its efforts in cancer prevention and control within American Indian and Alaska Native communities over the next five years.

Dr. Alberts is hoping to break another barrier — access to clinical trials — that has prevented Alaska Natives from receiving the same kind of care offered to other Americans. He is setting up an agreement to provide admission to Mayo Clinic studies and those conducted by the North Central Cancer Treatment Group to cancer patients being treated at the ANMC. The two oncologists at the hospital will guide the program with training and assistance from Mayo Clinic. “I am quite excited about this,” says Dr. Alberts. “Native Alaskans and those who care for them are wonderful people to work with.”

Clinical trials have only been available in Alaska for the past five years, and then only at private hospitals in Anchorage, says DeCourtney. “Opening studies to Alaska Natives will be extremely important — yet another example of Mayo Clinic’s commitment to us.”

2001, Mayo Clinic, clinical psychologist Christi Patten, Ph.D., and team begin developing partnership to reduce tobacco-related health disparities among Alaska Native population.

2006, Mayo Clinic and Indian Health Service formalize a partnership to work on Alaska Native health issues.

1998, Mayo Clinic Drs. Steven Alberts, M.D., and Judith Kaur, M.D., begin annual cancer education seminars for Alaska health care providers.

2010, Mayo Clinic breast cancer researcher Sandhya Pruthi, M.D., establishes telemedicine program to give Alaska Native women at risk of breast cancer an individualized prevention plan.

2010, Mayo Clinic receives \$6 million grant from National Cancer Institute to expand cancer prevention and control efforts in American Indian and Alaska Native communities.





MOLECULAR DETECTIVES

SOLVING THE MOLECULAR MYSTERIES IN EACH OF US

Mayo Clinic is collaborating with the nonprofit Translational Genomics Research Institute (TGen) to uncover the clues of cancer and decipher their meaning. Like detectives working on a big case, they dig down deep — to the molecular level — and follow every lead.

Whether it be crime or cancer research, investigators know that collaboration holds the key to solving a difficult mystery. Through genome analysis, which compares a patient's damaged genes with normal healthy ones, medical sleuths are gaining new insight into melanoma, multiple myeloma and pancreatic cancer. Like detectives on a big case, they dig down to the molecular level and follow every lead.

"Combining the clinical excellence and sophistication of a group like Mayo Clinic with TGen, which is involved in translating genetic information into knowledge that can be valuable in making clinical decisions, makes for a great partnership," says Jeffrey Trent, Ph.D., president and research director of Arizona-based TGen. "Both sides bring something to the equation."

Collaborations between Mayo and TGen began in 2003, a year after TGen formed. Today, more than 20 TGen scientists are involved in research projects with Mayo Clinic Cancer Center. Data gained from Mayo Clinic-TGen collaborations go into a comprehensive database that, over time, will feed efforts to provide individualized treatments.

"We are recognizing that there is tremendous molecular diversity behind something that we have always labeled with one diagnosis," says Aleksandar Sekulic, M.D., Ph.D., assistant professor in Mayo Clinic's Dermatology Department in Arizona and member of TGen's Integrated Cancer Genomics Division.

"This recognition is shifting the paradigm of how we approach and treat cancers," he says. "We are focusing on targetable, molecular features in the cancer tissue of a given patient rather than the diagnosis that patient carries. As a result, the gene or target-centric approach is replacing the disease-centric approach that has prevailed for centuries."

A genome is the DNA sequence of a living organism. Humans have 25,000 genes, and DNA in humans includes an ordered set of four chemicals or bases: cytosine, guanine, adenine and thymine. These bases carry vital information, and how they combine into about 3.2 billion base pairs has molecular detectives scurrying to gather leads.

"I had the opportunity to watch the development of the first genome," says Trent, who was scientific director of the National Institutes of Health's National Human Genome Research Institute, which led the International Human Genome Project. "That took us 10 years. Now it takes us about 10 days, and what once cost almost \$3 billion to do now cost about \$30,000."



“Genome sequencing of large collections of samples will yield new insights into cancer not anticipated by existing knowledge.”

Mayo Clinic and TGen teams use next-generation genomic technologies that produce high-density pictures, says Rafael Fonseca, M.D., deputy director of the Mayo Clinic Cancer Center. “Procedures have been optimized. We are getting multiple views to help us look for mutations.”

Recently, in the journal *Cancer Prevention Research*, a team including Dr. Sekulic and Trent noted that 72 percent of squamous cell carcinoma tumors they studied had reduced levels of a particular gene — INPP5A.

“We are certain that molecular changes in skin cancers occur due to exposure to sunlight as well as secondary mutations,” Dr. Sekulic says. “The ability to scan entire genomes for specific genetic changes enabled us to identify INPP5A as a gene altered in skin cancer. This finding highlights previous observations that cancers often amplify growth-promoting genes or turn off regulatory genes. Understanding such molecular defects in cancer at a single gene level has tremendous potential to impact the way we view and approach cancer.”

Collaborative work between Mayo and TGen also has provided new clues on multiple myeloma, a malignancy of the blood. Through an effort led by Keith Stewart, M.B., Ch.B., professor of medicine and dean of Research at Mayo Clinic in Arizona, and John Carpten, Ph.D., who directs TGen’s Integrated Cancer Genomics Division, the genome of a woman who experienced repeated multiple myeloma relapses was produced. The investigators documented genetic changes, and each new tumor was ancestrally related to the first, sharing six mutations. As a result of this work, new genetic clues emerged. Dr. Stewart is the Vasek and Anna Maria Polak Professor of Cancer Research.

In the March 24 issue of *Nature*, a 50-member team reported on the large-scale sequencing of 38 multiple myeloma tumors and their comparisons with matched normal DNA. “Genome

sequencing of large collections of samples will yield new insights into cancer not anticipated by existing knowledge,” wrote the team, which included TGen’s Trent and Mayo Clinic Drs. Fonseca, Stewart, Leif Bergsagel, M.D., and Vincent Rajkumar, M.D. Dr. Fonseca is the Getz Family Professor of Cancer.

The team also found strong evidence for a breakdown in an immune-system pathway known as NFkB, which was identified previously in a project led by Dr. Bergsagel. Dr. Bergsagel is the David F. and Margaret T. Grohne Professor of Novel Therapeutics in Cancer Research.

The challenge for molecular detectives is to determine what information is readily useful. One key, Trent says, is matching genetic mutations to already existing FDA-approved drugs that may already target them.

In February, Mayo Clinic-TGen researchers announced they had completed the genome of a patient with pancreatic cancer. Comparing normal cells with diseased cells, they isolated numerous genetic mutations.

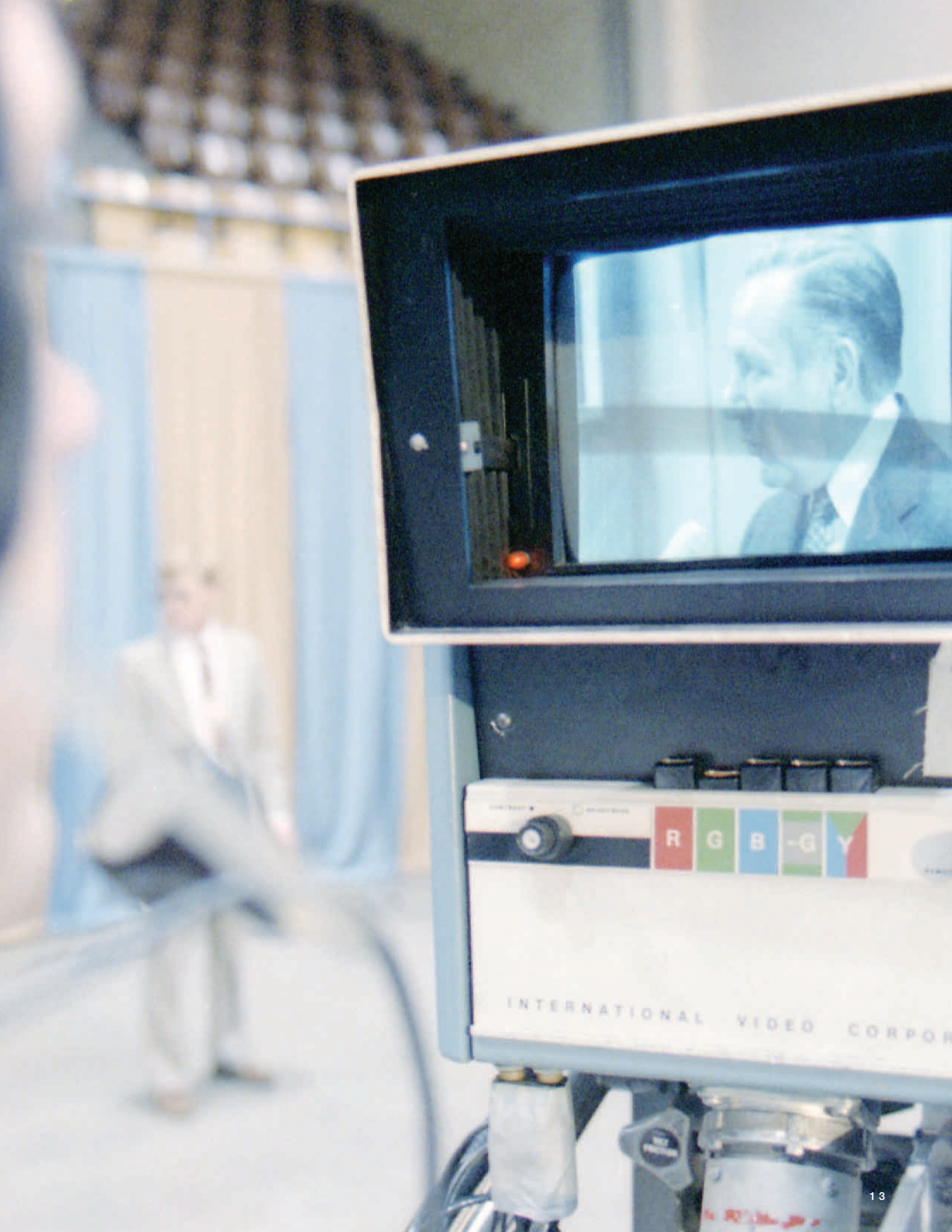
The pancreatic cancer patient was in a clinical trial for which one aspect of success was to complete and analyze an entire genome within 12 weeks so insights gained might be useful to the patient. “It took us only six and a half weeks from biopsy to sequencing to receiving a full analysis,” Dr. Stewart says, “and we found things that we felt were clinically relevant and potentially useful in this patient’s therapy.”

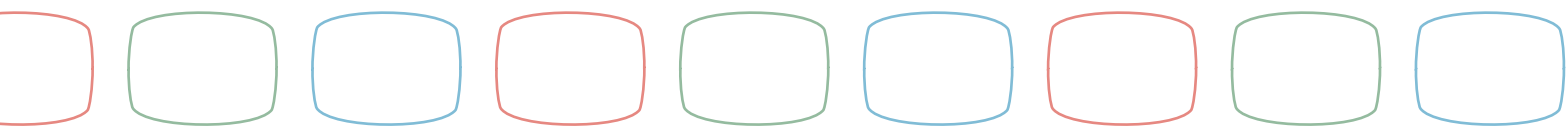
“When we began working with TGen, we were looking at promises, using low-resolution technologies for things like gene profiling,” says Dr. Fonseca. “Now we are taking it to the next level to identify and understand the specific genetics of a tumor of a particular patient. Based on that information, we can ask: What may be the Achilles’ heel of a person’s tumor that we could attack?”

Partnership over
the years and always

O N A I R

WHEN IT COMES TO COLLABORATION AND PARTNERSHIP, MAYO CLINIC AND THE FRATERNAL ORDER OF EAGLES HAVE A UNIQUE AND ENDURING RELATIONSHIP. AND JUST LIKE EAGLES IN THE WILD THAT PAIR UP FOR LIFE, EAGLES MEMBERS IN SOUTHEASTERN MINNESOTA HAVE SHOWN A SUSTAINED COMMITMENT TO FUNDING CANCER RESEARCH AT MAYO CLINIC.





F

or more than four decades, Mayo Clinic Cancer Center has been the grateful beneficiary of donations from the Eagles. It's the longest record of continuous philanthropy in Mayo Clinic's history, and each year that money is used to fund dozens of innovative cancer research studies.

"The Eagles help us do a better job. Over the years, their support has made possible hundreds of projects aimed at improving our ability to understand and optimally treat cancer," says Robert Diasio, M.D., director of Mayo Clinic Cancer Center.

Behind this long-standing relationship is yet another time-tested tradition: the longest-running locally produced telethon in the country.

Calling in for cancer

Against a diverse backdrop of area singers, dance groups and scores of other talented performers, donations for cancer research are pledged by audience members and those watching at home for 20 nonstop hours each January during the 5th District Eagles Cancer Telethon. Held in Rochester, Minn. — home to Mayo Clinic's Rochester campus — and broadcast regionally, the telethon has been a southeastern Minnesota fixture since 1955.

Also donated during the telethon is money raised in the months preceding it, when regional Eagles chapters collect

donations in their communities with often creative fundraisers such as tractor pulls, 5K runs, auctions and golf tournaments.

As the telethon evolved over time, so did its beneficiaries. In 1967, the Eagles made their first gift — \$10,000 — to Mayo Clinic Cancer Center.

"We thought \$10,000 was great," says Bob Callier, who this year directed his 26th — and final — telethon (see sidebar).

And the gifts began to grow. In 1978, the Eagles hit six figures, donating \$100,000 to the Cancer Center. 1997 was the first year they contributed more than \$300,000. This year's contribution was \$430,000.

A feat of philanthropy

With their 2011 gift, the Eagles soared to a height never before reached by a service organization in Mayo's history: \$10 million in cumulative contributions. The group is now honored as a Philanthropic Partner, Mayo's highest benefactor designation.

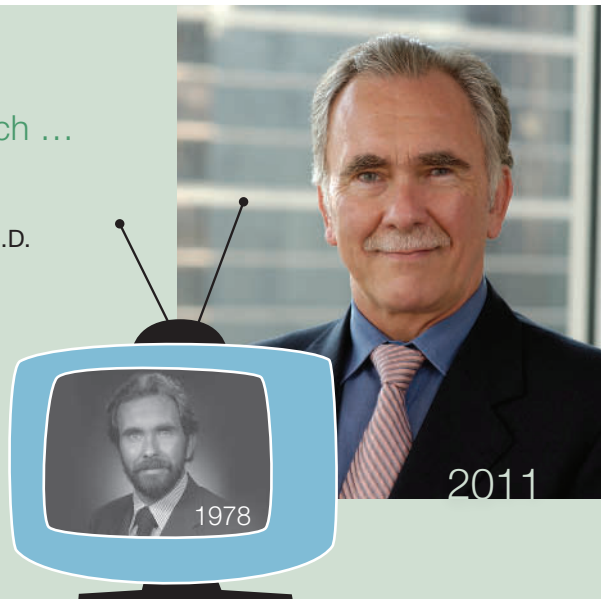
"It's an absolutely amazing milestone," says Dr. Diasio. "It shows the strong commitment of so many different people over so many years."

This March, the Eagles were officially recognized for this achievement by John Noseworthy, M.D., president and CEO of Mayo Clinic, and Dr. Diasio at a ceremony dedicating a plaque in their name in the Mathews Grand Lobby of the Mayo Building in Rochester.

"My Eagles project launched my shift from descriptive research ... to investigative research in cancer epidemiology."

— Brian Patrick O'Neill, M.D.

Brian Patrick O'Neill, M.D. as a young investigator in 1978 and today as principal investigator of the Mayo Clinic Brain Cancer Specialized Program of Research Excellence.





THEN In 1975, total extramural research funds (non-industry) received by Mayo Clinic Cancer Center totaled \$6.8 million.

NOW In 2010, that figure was more than \$145 million.



Bold ideas, bright futures

Eagles grants — awarded to Mayo cancer researchers on a competitive, committee-reviewed basis — are used to nurture novel ideas and young investigators who have the potential to directly benefit patients.

Many recipients of Eagles dollars are up-and-coming junior researchers, the “next generation” of cancer scientists. With the potential for highly productive research careers, these investigators utilize Eagles grants as a springboard to their first major federal or foundation grant.

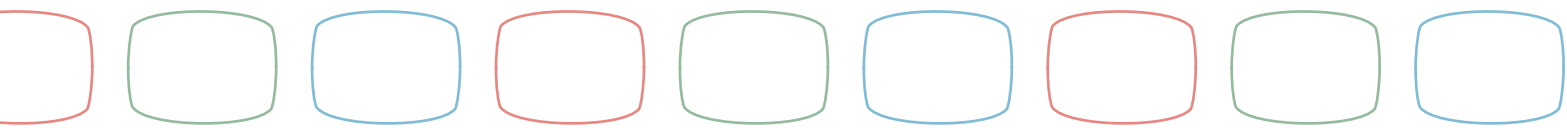
Additionally, a large portion of Eagles funding each year supports exploratory and developmental research projects. These projects empower researchers to test novel hypotheses and obtain the preliminary data necessary to contend for fiercely competitive National Cancer Institute or American Cancer Society grants.

Brian Patrick O’Neill, M.D., professor of neurology and a consultant in the Department of Neurology, credits a 1995 Eagles grant with enabling him to explore a fresh direction for his research.

“My Eagles project launched my shift from descriptive research, such as case reports and retrospective series, to investigative research in cancer epidemiology,” says Dr. O’Neill. The project, which investigated risk factors for primary central nervous system lymphoma, laid the groundwork for a very productive research career in neuro-oncology.

Today, Dr. O’Neill co-leads Mayo Clinic Cancer Center’s Neuro-oncology Program, and serves as principal investigator of the Mayo Clinic Brain Cancer Specialized Program of Research Excellence (SPORE), one of only three such National Cancer Institute-funded programs in the country.

“Small grants, like those made possible by the Eagles, are the lifeline for young investigators,” says Dr. O’Neill. “As federal funding become more and more competitive, these grants are the only way that ‘rising stars’ can accrue critical pilot data.”



A two-way street

Though similarities abound between Mayo and the Eagles — both are not-for-profit organizations that have been around since the late 19th century — there’s one in particular that may best explain why their partnership has stood the test of time. It’s their common purpose.

As Dr. Diasio puts it, “We’re both in the business of caring for and helping people.”

Also contributing to the groups’ strong relationship is their penchant for lending a hand to each other. Mr. Callier recalls when, back in the late 1980s, he was establishing the telethon’s first official office. The space was good, but it was bare.

“I called a Mayo physician and told him about it,” says Mr. Callier. “Within a week, chairs, desks and filing cabinets showed up.”

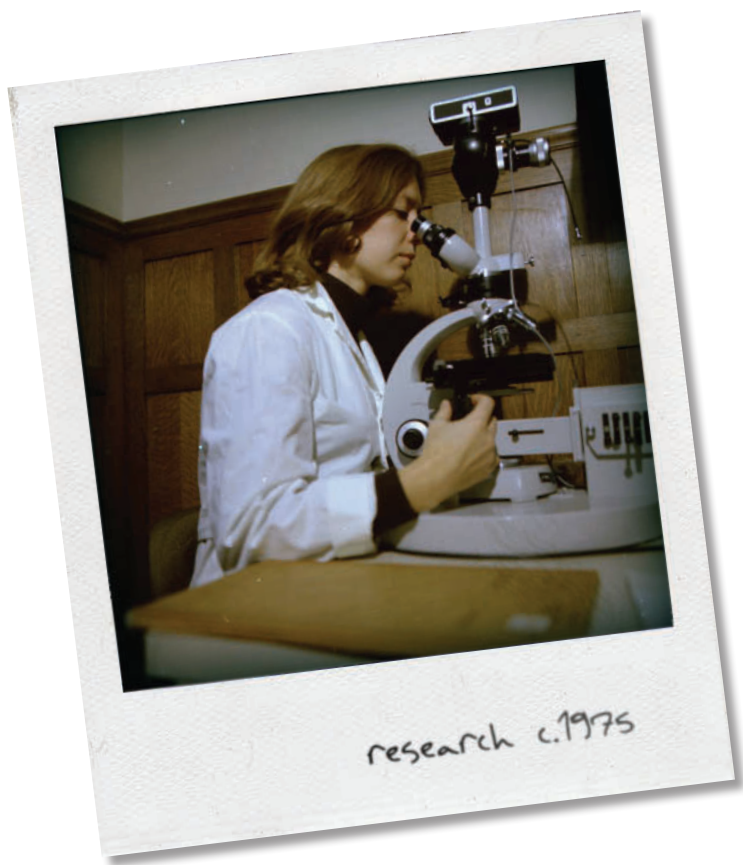
Four more decades?

The 2012 telethon will be number 58, and it shows no signs of slowing down. As the telethon and the Mayo-Eagles partnership continue to grow, it’s a little too easy to see only numbers: this many telethons, that many dollars, this many research projects.

At its core, the relationship is about improving patients’ lives.

“Funding from the Eagles has not only stimulated cancer research, but also helped patients,” says Dr. Diasio. “That’s the ultimate goal of everything we do.”

To learn more about supporting Mayo Clinic, please call 800-297-1185 or visit mayoclinic.org.



Research techniques and equipment may have changed over the years but the Eagles’ commitment to Mayo Clinic has been constant.

“The Eagles help us do a better job. Over the years, their support has made possible hundreds of projects aimed at improving our ability to understand and optimally treat cancer.”

— Robert Diasio, M.D.

Force behind the Eagles Telethon steps down after 25 years

When Bob Callier first became involved with the Fraternal Order of Eagles, Dwight Eisenhower was president and Alaska had recently become our 49th state. It was 1959. Mr. Callier didn't know it at the time, of course, but 27 years later he would become director of the Eagles 5th District Cancer Telethon.

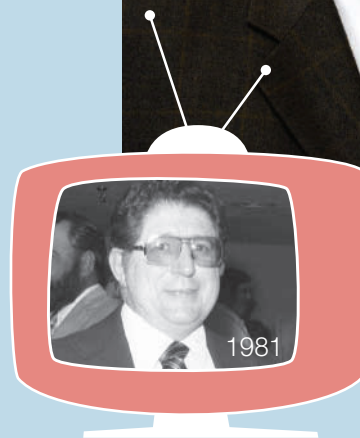
In January 2011, having made the decision to transfer the director's reins, Mr. Callier oversaw his final telethon. On his watch, the Eagles contributed — by way of the telethon — more than \$8 million to cancer research at Mayo.

“It's been very gratifying. It gets into your blood,” Mr. Callier says of his 26-year tenure as telethon director, a role he calls a “365-day-a-year job.” While he'll be able to do without the middle-of-the-night phone calls, he says he'll miss the great people involved and the exciting buildup to each event.

June, Mr. Callier's wife and a cancer survivor, has also played a hand behind the scenes in helping the telethon run smoothly. “I couldn't have done it without her,” he says.

After all these years, Mr. Callier still gets emotional when recounting telethons gone by. It's in the wee hours of the morning “when you'll see grown men cry ... they're so proud of what they've accomplished,” he says, brushing a tear from his own eye.

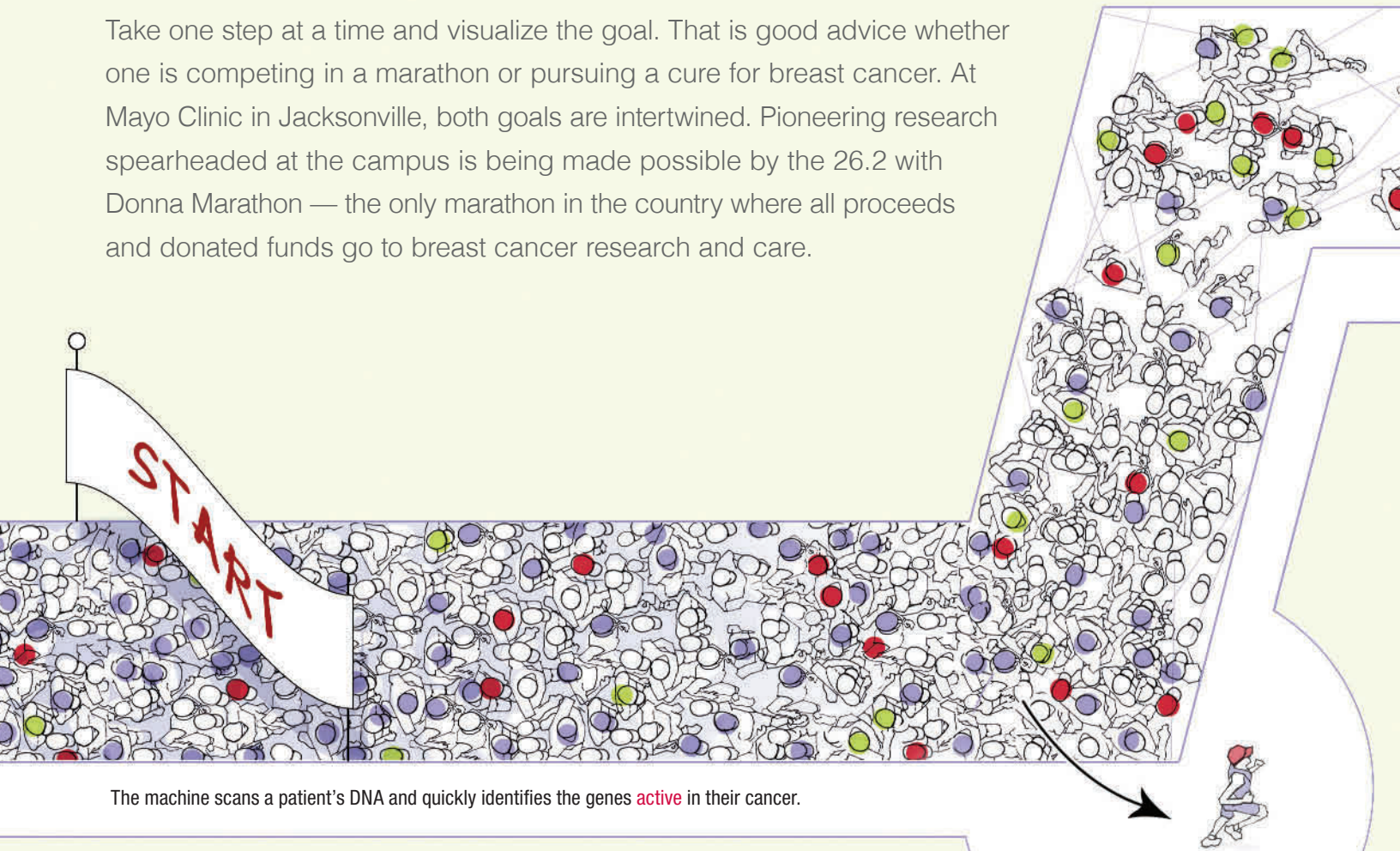
Mr. Callier's telethon advice for the new directors, Mike and Teresa Chapman? Protect it. “Always keep in mind what's best for the telethon,” he says.



RUNNING A BOLD NEW COURSE

Targeting the origins of breast cancer

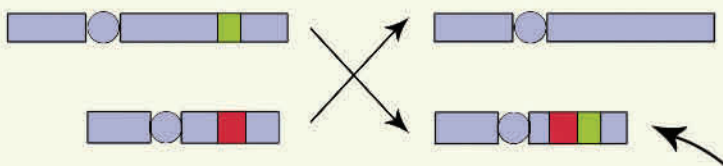
Take one step at a time and visualize the goal. That is good advice whether one is competing in a marathon or pursuing a cure for breast cancer. At Mayo Clinic in Jacksonville, both goals are intertwined. Pioneering research spearheaded at the campus is being made possible by the 26.2 with Donna Marathon — the only marathon in the country where all proceeds and donated funds go to breast cancer research and care.



The machine scans a patient's DNA and quickly identifies the genes **active** in their cancer.

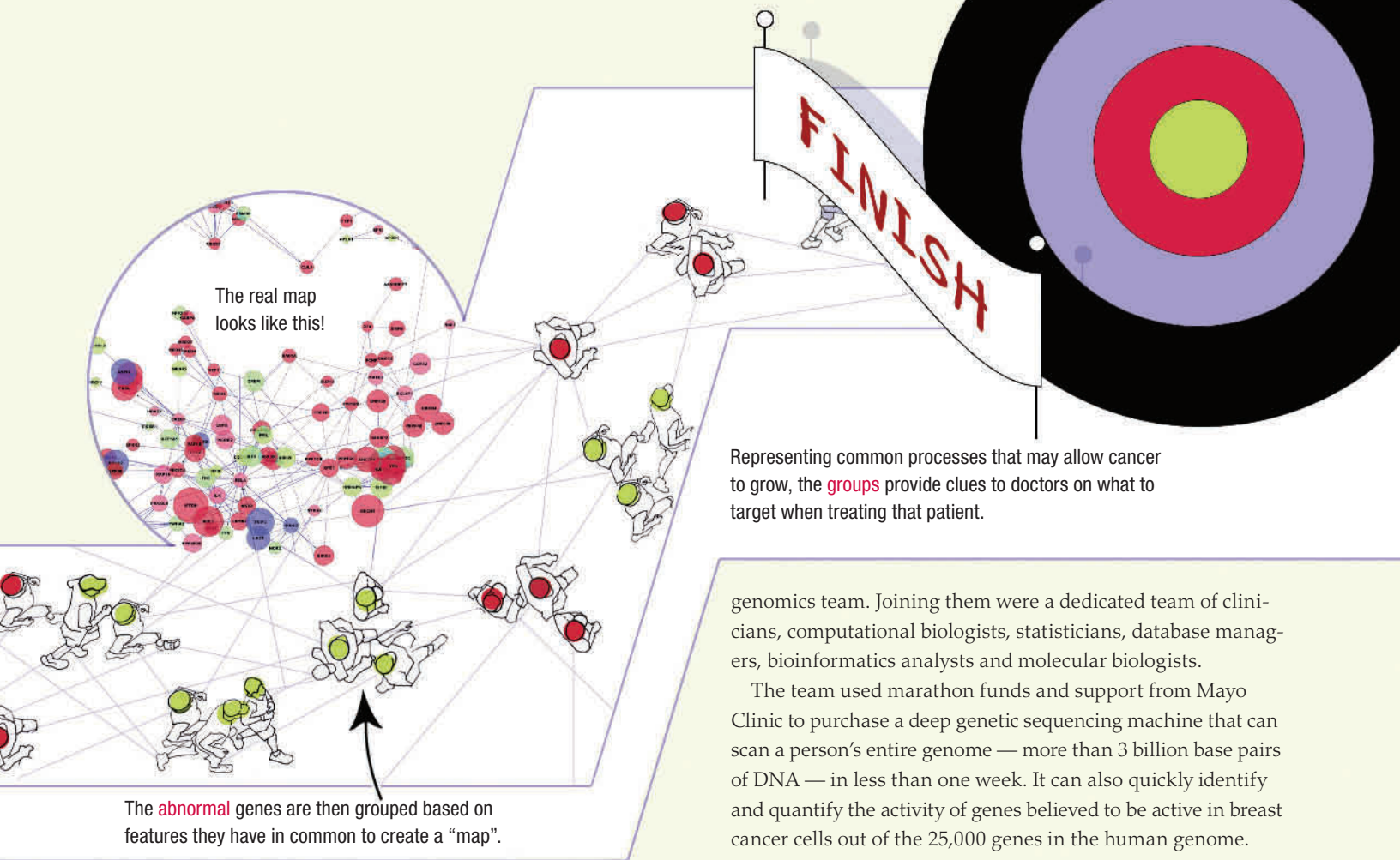
That's like picking one runner out of 25,000!

What is a fusion gene?



Chromosomes carry a blueprint for proper cell growth and development

A rearrangement of parts creates "fusion genes". They carry **abnormal** blueprints which can confer uncontrolled cell growth allowing cancer to develop.



Mayo Clinic used support from the marathon to help establish the Breast Center Translational Genomics Program. The two-year-old program has already made bold inroads into what could be the origins of breast cancer.

Program investigators and collaborators have found more than 40 fusion genes in all major tumor subtypes of breast cancer. A fusion gene is a product of chromosomal rearrangements, which were known to be responsible for some hematological malignancies and only recently were found in solid cancers such as breast cancer tumors.

Some of the fusion genes found in the 31 breast cancer cell lines studied may be detritus, by-products of cancer's relentless assault on the cell, but others could prove to be the source or driver of breast cancer development. This is just the start down a new avenue in breast cancer research.

Such "high risk, high gain" investigation tends not to be supported by federal funding agencies," says Edith Perez, M.D., director of Mayo Clinic's Breast Program in Florida, deputy director of Mayo Clinic Cancer Center and Serene M. and Frances C. Durling Professor. But marathon funds and support from Mayo Clinic provide "freedom of discovery" that she says can lead to novel discoveries.

Dr. Perez asked some key researchers to join the program: Jacksonville cancer biologist E. Aubrey Thompson, Ph.D., as manager; Rochester bioinformatics expert Yan Asmann, Ph.D., to lead development of novel analytical methodologies; and Brian Necela, Ph.D., in Jacksonville, to head the functional

genomics team. Joining them were a dedicated team of clinicians, computational biologists, statisticians, database managers, bioinformatics analysts and molecular biologists.

The team used marathon funds and support from Mayo Clinic to purchase a deep genetic sequencing machine that can scan a person's entire genome — more than 3 billion base pairs of DNA — in less than one week. It can also quickly identify and quantify the activity of genes believed to be active in breast cancer cells out of the 25,000 genes in the human genome.

The machine also produces maps. The hypothesis is that this genetic landscape is not randomly produced, but reflects common processes that are essential for tumor survival and metastasis within different types of breast tumors, says Dr. Thompson.

They decided to look first for fusion genes because few have been identified in solid tumors and the method for finding them seemed straightforward. But it wasn't. Dr. Asmann had to develop software that could effectively eliminate thousands of false-positive fusion genes from the machine's voluminous output. She wrote and tested her own algorithms, a laborious multistep process that took months. Dr. Asmann's novel algorithm also generates a "template" sequence that enables quick validation of hundreds of fusion products within a week.

The team has yet to understand whether the fusion genes they found are responsible for cancer formation, so much investigation remains.

Still, after only two years of focused work, the system is now virtually plug and play. "We can plug in any kind of tumor and turn the crank," says Dr. Thompson. "The contribution of the new program has been to figure out how to identify all of the fusion genes in a given tumor, and the new data indicates that these mutations are much more common than generally appreciated."

The team has used the system to search for fusion genes in pancreatic and lung cancer and has discovered some novel possibilities.

Soon, Dr. Asmann's software will be made available to investigators worldwide for research on other tumor types.

MEET THE INVESTIGATOR

At Mayo Clinic Cancer Center, more than 450 researchers dedicate their professional lives to lessening the burden of cancer on the world. Each one has a unique story to tell. Here are the stories of three.



Leif Bergsagel, M.D.

Continuing a family tradition of multiple myeloma research

The apple, in this case, actually did fall pretty close to the tree.

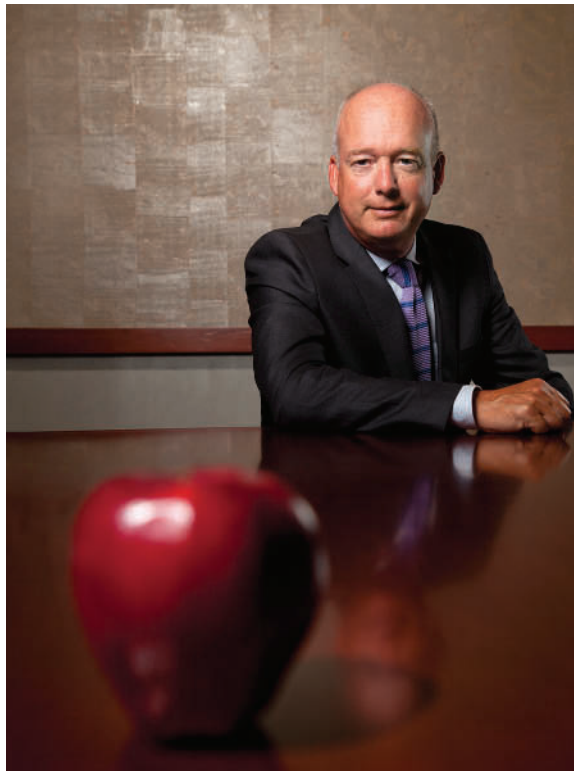
Cancer geneticist Leif Bergsagel, M.D., professor of medicine and a consultant in the Division of Hematology/Oncology at Mayo Clinic's campus in Arizona, followed in the footsteps of his father — a distinguished oncologist and multiple myeloma investigator — by going not only into medicine, but also into multiple myeloma research.

Part of the hematologic family of cancers that includes lymphoma and leukemia, multiple myeloma affects plasma cells, a kind of white blood cell found in bone marrow.

Dr. Bergsagel, who was educated in Canada and joined Mayo in 2004, is part of a strong contingent of researchers at Mayo's Arizona campus who are investigating this disease from its genetic underpinnings

to new and improved ways to treat it. He says collaborations with investigators who today are his colleagues — namely Rafael Fonseca, M.D., and Keith Stewart, M.B., Ch.B. — actually predate any of their arrivals at Mayo's campus in Arizona.

"After completing my oncology and cancer genetics training, I took a position at Cornell University. While I was there, Dr. Stewart was in Toronto and Dr. Fonseca was at Mayo's campus in Rochester, and we were collaborating. Then the three of us decided, more or less at the same time, to relocate to Arizona and work together," says Dr. Bergsagel.



Helping their research thrive are the excellent resources available at Mayo.

"The institutional support for research at Mayo is very good, particularly for the research we're doing," Dr. Bergsagel says. "Mayo supports basic research better than most places do; much of the research is very translational — a big plus. And the multiple myeloma patient tissue bank that's been established over the years, both in Rochester and here in Arizona, is really a unique resource that links patient samples to clinical outcomes."

In addition to his research, Dr. Bergsagel also sees patients. He finds it satisfying that — all in the realm of multiple myeloma — he can conduct basic research, treat patients and be involved in developing new treatments. For multiple

myeloma patients, he says, recent treatment advances mean that disease symptoms can be effectively managed; more than half of patients will be alive five years after diagnosis. Further, he's optimistic about what the future holds.

"We may not necessarily cure patients, but they'll be functionally cured — they'll live a very long time and end up dying of something else," Dr. Bergsagel explains. "The way we're going to get there is by basically taking drugs we know work and finding the best ways to use them, which involves doing very careful clinical trials tied with correlative studies in the laboratory."

Gloria Petersen, Ph.D.

The challenge of genetic epidemiology leads to focus on pancreatic cancer

Gloria Petersen, Ph.D., is willing to go anywhere she might find an answer.

That means Kenya, where she's gathered data for her doctoral dissertation on baboon genetics. It also means Alaska, where she's traveled by bush plane and snowmobile to remote Eskimo villages in the middle of winter. And it means a park in Washington, D.C., where she's drawn a blood sample from a homeless man — with his and his family's consent, of course — who was an important link in a family chain.

Always fascinated by human biology and human variation, Dr. Petersen completed undergraduate and graduate work in physical anthropology, followed by a post-doctoral fellowship in medical genetics. While working throughout the 1990s at The Johns Hopkins University, Dr. Petersen contributed to several key genetic discoveries related to colon cancer.

But it was the challenge of studying the genetic epidemiology of another type of cancer — pancreatic cancer — that led her to Mayo Clinic in Rochester, Minn., in 1999.

"Pancreatic cancer is a very difficult disease to study. Epidemiologists 'miss' most patients," says Dr. Petersen. The fourth-deadliest cancer, pancreatic cancer proliferates quickly and usually isn't caught early. In more than half of patients, the cancer has spread to distant organs by the time of diagnosis.

Coupled with the fact that the one-year survival rate among all newly diagnosed patients hovers around just 20 percent, the



unfortunate reality is that most pancreatic cancer patients pass away before blood samples and other information can be collected.

At Mayo, Dr. Petersen can sidestep those obstacles.

"We're able to talk to patients right at the time of diagnosis, and most of them want to be involved in research," she says. Over time, she's built a registry — complete with biospecimen and questionnaire data — of more than 2,900 pancreatic cancer patients and is using it to study hereditary factors that may contribute to the disease.

In the decade since joining Mayo, Dr. Petersen has helped grow its pancreatic cancer research efforts from a "tiny handful of interested researchers" to a robust translational and epidemiological program that includes scores of Mayo scientists.

She cites Mayo's culture and support

for research as a reason such progress has been possible.

"Finding solutions to problems and helping patients are the foremost priorities here, and research crosses boundaries — clinicians are actively involved with researchers. I'm studying unique problems that could only be solved at Mayo," Dr. Petersen says. She's hopeful that her pancreatic cancer research, and that of others, will lead to improved care for patients.

"In the next decade, I think we'll develop better means for early detection as well as more effective therapies. And, using genomic data, we'll have an improved ability to assess a person's risk of developing pancreatic cancer," says Dr. Petersen.

Derek Radisky, Ph.D.

Mother's experience with ovarian cancer inspires career in biomedical research

Inspiration from his graduate adviser and postdoctoral mentor first led Derek Radisky, Ph.D., into science. But it was his mother's experience with ovarian cancer that steered him toward biomedical research.

At the Mayo Clinic campus in Florida today, Dr. Radisky, a cancer biologist, is studying the pathogenesis of breast cancer by thinking outside the box — or rather, outside the cell. Due to their surroundings, cells in breast tissue look different and act differently than those in thyroid tissue, for example, despite having the same DNA.

"Cells interpret DNA differently because of signals from outside the cell. When you change a cell's environment, you change how it behaves," Dr. Radisky explains. For that reason, his research into breast cancer progression focuses on the entire tissue environment, not just the presence of genetic mutations. To study disease progression, he has to get to people — and their tissue — before the cancer does.

"So many things have happened by the time a cancer becomes a cancer," Dr. Radisky says. "We're comparing people who look similar but don't have cancer yet, and then defining the characteristics that lead to cancer."

These similar-looking people are women with noncancerous breast lumps, a condition called benign breast disease. When a woman notices a lump and a subsequent mammogram shows an anomaly, the lump is biopsied. That tissue sample — which Dr. Radisky says contains information that may help determine if the woman is at risk for cancer — is preserved and linked to the patient's electronic medical record.



About 14,000 biopsied women are now part of a Mayo benign breast disease cohort developed and overseen by Dr. Radisky's key collaborator, Mayo oncologist and cancer researcher Lynn Hartmann, M.D. By comparing patient characteristics and tissue samples of women in the cohort who don't go on to develop breast cancer with those who do — approximately 1,000 women to date — they hope to gain insight into cancer triggers.

As a stepping stone toward an ultimate goal of actually preventing breast cancer development, Dr. Radisky hopes to develop a clinical test for biopsy samples — generalizable and available to women everywhere — that could determine who will develop cancer and who will not.

"This project would not be possible anywhere else. Patients who get biopsied often move, but Mayo has patients who keep coming back. In many cases, they make an extra effort to make tissue available to us. Women who participate in breast cancer clinical research are the 'foot soldiers' who are helping us in our effort to identify cancer causes and how to prevent it," says Dr. Radisky.

Also making well-annotated research like this possible, he says, are the resources provided by the Mayo Clinic Breast Cancer Specialized Program of Research Excellence (SPORE), a major National Cancer Institute grant, not to mention the atmosphere at Mayo.

"Mayo is set up to facilitate collaboration," Dr. Radisky says. "You need input from clinicians to solve important problems, and that happens a lot more easily here than anywhere else."



Mayo Clinic reproductive endocrinologist, Jani Jensen, M.D.

Advancements in fertility preservation provide oncology patients new options

Many young people who've just learned that they have cancer also are told that the therapies that may save their lives could rob them of their ability to have children. For example, infertility caused by chemotherapy and radiation affects a sizable population. Of the 1.5 million people diagnosed with cancer in 2009, nearly 10 percent were still in their reproductive years.

The good news, according to an article in the January issue of *Mayo Clinic Proceedings*, is that techniques to harvest and store reproductive cells have vastly improved in the last several

years. "Fertility preservation is still an emerging discipline," says Mayo Clinic reproductive endocrinologist Jani Jensen, M.D., lead author of the paper. "But rapid advances in technology in the last several years are now providing new options for patients."

In the review, a team of Mayo researchers looked at both long-standing and emerging fertility preservation technologies. While freezing sperm remains a stable and reliable technique, freezing eggs harvested from women has had considerable success in the last five years. "Cryopreservation of eggs

used to be considered the Holy Grail of therapy, not just for cancer patients, but for any woman who wanted to halt the biological clock," says Dr. Jensen. Oocytes are particularly fragile cells that rupture easily, and even though research to preserve them dates back to the 1970s, the first successful birth from a stored egg didn't occur until the mid-1980s.

"But in the last five years," Dr. Jensen says, "there have been considerable improvements in [oocyte] freezing technology. Since 2004, there have been thousands of babies born worldwide from frozen eggs."



Keith Stewart, M.D.
Dean for research at
Mayo Clinic in Arizona

Edith Perez, M.D.,
Director of Mayo Clinic's Breast
Program in Florida and deputy director
of Mayo Clinic Cancer Center



Dr. Keith Stewart appointed as NIH's Developmental Therapeutics study section chair

Keith Stewart, M.B., Ch.B., dean for Research at Mayo Clinic Arizona, was appointed chair of the National Institutes of Health's (NIH) Developmental Therapeutics Study Section. His term will run from July 1, 2011, to June 30, 2013.

Members are selected on the basis of their demonstrated competence and achievement in their scientific discipline as evidenced by the quality of research accomplishments, publications in scientific journals, and other significant scientific activities, achievements and honors.

Dr. Edith Perez appointed to Minorities in Cancer Research Council in Cancer Research Council

Edith Perez, M.D., was appointed to the American Association of Cancer Research's (AACR) Minorities in Cancer Research (MICR) Council. Dr. Perez is the director of Mayo Clinic's Breast Program in Florida and deputy director of Mayo Clinic Cancer Center. Her three-year term began in April.

The MICR Council is dedicated to preventing and curing cancer while meeting the professional needs and advancing the careers of minority scientists. The council also advises AACR leadership on issues of concern to minority investigators.

Three national cancer clinical research cooperative groups merge

In March, the American College of Surgeons Oncology Group (ACOSOG), Cancer and Leukemia Group B (CALGB), and North Central Cancer Treatment Group (NCCTG), which are all National Cancer Institute (NCI)-funded cancer cooperative groups, announced plans to merge. The three

groups have chosen Alliance for Clinical Trials in Oncology as the new name for the integrated cooperative group.

"This announcement reflects the call in April 2010 from the Institute of Medicine to strengthen and streamline operations among NCI clinical trials cooperative group programs," says Jan

Buckner, M.D., NCCTG group chair and chair of the Division of Medical Oncology at Mayo Clinic in Rochester, Minn.

The first joint Alliance meeting, which will include all members, will be held Nov. 17-19 in Chicago.



Sue Falco

Patient raises funds to fight young-onset colorectal cancer

Sue Falco was too young to be sick — or so her former physicians believed. She was 38 years old and it was obvious to her that something was missed in her previous colonoscopy — perhaps a dangerous, hard-to-see, fast-growing flat polyp.

Second opinions from two academic medical centers said her tumor was actually stage 2 and she needed radical surgery to remove her rectum with no guarantee that her sphincter muscle could be saved. She ran the risk of needing a colostomy bag for the rest of her life.

But her dad learned about an innovative surgery at Mayo Clinic, and Sue went to see Eric Dozois, M.D., program director of colon and rectal surgery in Rochester, Minn.

In May 2008, 90 percent of Sue's rectum and a portion of her colon were removed, and the remaining rectum was reconnected to her colon. "It was a miracle," she says. "The skilled surgical team at Mayo were able to do a direct connect."

Dr. Dozois says Sue is just one of many young-onset colorectal cancer patients being referred to Mayo Clinic

for treatment. He heads the Young Onset Colorectal Cancer Group at Mayo, a multispecialty group of physicians and scientists who specialize in seeing and evaluating these patients. The group includes a geneticist, two gastroenterologists, an epidemiologist, three surgeons, a pathologist, basic scientists and statisticians.

"We are developing clinical pathways that provide a very specialized approach for the young patient who either has known cancer or has suspected cancer," Dr. Dozois says.

As she recovered from surgery, Sue promised herself that she would fight for other young colorectal patients. On the first anniversary of her surgery, she ran a "Get Your Rear in Gear" 5K race in Raleigh, N.C., a fundraiser for the national Colon Cancer Coalition. The next year she established the race in Charlotte, N.C., where she lives. With more than 1,600 participants, it is one of the fastest growing races in that city.

Gabriel House of Care Opens on Jacksonville Campus

Earlier this year, Gabriel House of Care opened on a 4-acre lakeside site on Mayo's Jacksonville campus. Owned by Mayo Clinic and leased to and operated by St. Andrew's Lighthouse, Gabriel House provides a home away from home to visiting transplant and cancer patients and their families who must remain in the Jacksonville area for long periods to receive specialized care.

Philanthropy supported all construction costs and an endowment supports ongoing maintenance. Jorge and Leslie Bacardi of the Bahamas made the

naming gift for the house to express their gratitude to Mr. Bacardi's organ donor, a 19-year-old college student who passed away unexpectedly in 2008. Before they learned the donor's identity, they called him "Gabriel," a reference to the archangel of consolation and incarnation. They chose the name to honor the donor, all organ donors and the medical professionals who make transplants possible.

Ed Asher, executive director of St. Andrew's Lighthouse says the house will "promote a sense of community and encourage patients and their families to

share experiences and build friendships that can facilitate healing." For example, the architecture and interior design is similar to a Southern inn and is reminiscent of a bed and breakfast. Multiple common areas are designed for socializing, including a great room, game/TV room, exercise room, library, meditation area, community kitchen and dining room. A large screened porch overlooks a lake, and all 30 patient rooms have private baths, wood floors and residential-style furnishings.

Cancer Education Center celebrates 10 years of service

Tens of thousands of patrons have accessed the expertise of Mayo Clinic's Stephen and Barbara Slaggie Family Cancer Education Center in Rochester, Minn. The center, which celebrates 10 years of service this year, offers reliable and relevant information about all aspects of cancer through cancer-specific classes, brochures, consumer health books, magazines, newsletters, health education videos, professional medical journals, medical reference books, children's books and news files.

Cancer Center staff members include nurse educators, American Cancer Society navigators, a librarian, a clinical

trial referral coordinator and trained volunteers who assist patients and their families in their search for information. These resources help empower people to become active partners in their cancer care experience.

"When cancer strikes a family, there can be fear and uncertainty," says benefactor Stephen Slaggie. "Through the Cancer Education Center at Mayo Clinic, we know that patients will receive information on the latest and most effective treatments. Most of all, we are certain that every patient will find guidance, help and support.

Targeting tumors with proton therapy Mayo Clinic enters the world of proton beam therapy

Mayo Clinic is taking steps to use radiation's own biologically disruptive forces to treat and possibly cure cancers that have not responded well to traditional treatment, including X-rays that irradiate everything in their path.

The first giant step in this process took place earlier this year with the announcement of the Mayo Clinic Proton Beam Therapy program as part of Mayo's three-site cancer center in Minnesota, Arizona and Florida.

The new program will be based on intensity modulated proton therapy (IMPT) pencil beam scanning, which is the most precise form of proton therapy available today. Centers are being built on the Minnesota and Arizona campuses at a combined cost of about

\$400 million. These facilities will begin treating patients in mid-2015 and in early 2016, respectively.

"There will be advantages to treating almost every deep-seated tumor with this technology — many of which are located next to critical organs and body structures," says Robert Foote, M.D., chair of Mayo Clinic's Department of Radiation Oncology in Rochester. "Because little radiation hits normal tissue, more radiation can be given in fewer therapy sessions in order to more effectively kill tumors." Dr. Foote says the technology is also 10 times faster than systems in use today, allowing treatment for tumors that previously could not be targeted such as those in the lungs that move due to respiration.



Carol Reynolds goes bald for breast cancer.

Mayo Clinic Pathologists Go Bald for Breast Cancer

Would you go bald for breast cancer? That was a question Carol Reynolds, M.D., and Dan Visscher, M.D., Mayo Clinic pathologists, were happy to answer. And answering affirmatively allowed them to send a message of empathy to patients, colleagues, friends and family members who battle cancer, while encouraging colleagues to contribute to the cause.

By going bald for breast cancer last September, Drs. Reynolds and Visscher joined a movement among pathologists across the nation to raise awareness and research funds for breast cancer awareness month in October. The Mayo duo jumped on the bandwagon a month early because they were part of a team who participated in the Join the Journey walk for breast cancer awareness in September in Rochester, Minn.

The clipper fest really took off when Gary Keeney, M.D., chair of Mayo Clinic's Division of Anatomic Pathology, issued the following challenge: Top the \$10,000 mark and he'd go under the razor, too.

More than 60 colleagues piled into a conference room to see the news-making clips. They were there to show their friends some empathy, which included shout-outs, shared laughter and — thanks to the \$12,390 raised — some very generous compliments.



Artist's rendering of Mayo Clinic Proton Beam Therapy Center in Rochester scheduled to open in 2015.



How to race your dragon

Breast cancer survivors team up for fun, fellowship and competition

If on a Wednesday evening in the summer you were asked to track down a large breast cancer support group in Rochester, Minn., you might logically begin by visiting the city's community centers, churches and coffee shops. Maybe you'd stop downtown at Mayo Clinic. About the last place you'd check would be a lake in the heart of Rochester. But that's where you'd find Making Waves, a breast cancer support group that bonds in a wooden boat with a dragon figurehead.

Not your typical support group, Making Waves is a team that partakes in dragon boat racing, a 2,500-year-old Chinese paddling sport in which teamwork and competition intersect with ancient culture. The team meets on Silver Lake in Rochester.

In recent years, dragon boating has gained popularity among breast cancer survivors. The Making Waves team — comprising both survivors and their supporters — was founded six years ago by Join the Journey, a Rochester-based nonprofit group that promotes breast cancer awareness and offers support to patients.

Many Making Waves members are Mayo Clinic employees, including Toni Kay Mangskau, a clinical trials referral coordinator with Mayo Clinic Cancer Center. She got involved with the team two years ago following her own battle with breast cancer.

"When I was going through reconstruction, I lived right on Silver Lake. I knew that dragon boating was occurring right across the street and I thought, 'That is how I'm going to heal,'" says Mangskau.

Although some breast cancer survivor dragon boat teams are highly competitive, Making Waves is more about support and friendship, and everybody's in it together, explains Mangskau. But the team does compete, though until spring 2011 had only done so in the Midwest.

Last March, the team visited Arizona for a dragon boat festival. Their host was Team Synchronicity, a Mayo-sponsored team comprised of employees at Mayo's campus in Arizona. At the festival, Making Waves raced in several divisions and took home the "Best Cheer" award, an honor usually won by Team Synchronicity.

Fighting breast cancer and excelling at dragon boating require teamwork, persistence and a positive attitude. Perhaps that's why breast cancer survivors are drawn to the sport. In any case, Mangskau credits the support she found in Making Waves with helping her recover.

"I don't know what I would have done without those women," Mangskau says. "I couldn't have coped as well as I did."

"I don't know what I would have done without those women.
I couldn't have coped as well as I did."

— Toni Kay Mangskau

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	Title
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Robert Smallridge, M.D.	Deputy Director at Large
Edith Perez, M.D.	Deputy Director, Florida
Rafael Fonseca, M.D.	Deputy Director, Arizona
Charles Erlichman, M.D.	Deputy Director, Clinical Affairs
Daniel Billadeau, Ph.D.	Associate Director, Basic Sciences
Robert Jenkins, M.D., Ph.D.	Associate Director, Translational Research
Gloria Petersen, Ph.D.	Associate Director, Population Sciences
Aminah Jatoui, M.D.	Associate Director, Education and Training
Brian Nelson	Associate Director, Administration
Drew Memmott	Administrator
Thomas Keith	Administrator
Sharri Hackbarth	Administrator
Vidya Prasad	Business Specialist

CANCER RESEARCH PROGRAMS

Cancer Imaging

Val Lowe, M.D.	Program Co-Leader
Richard Ehman, M.D.	Program Co-Leader

Cancer Prevention and Control

Richard Hurt, M.D.	Program Co-Leader
Charles Loprinzi, M.D.	Program Co-Leader

Cell Biology

Panagiotis Z. Anastasiadis, Ph.D.	Program Co-Leader
Jan van Deursen, Ph.D.	Program Co-Leader

Developmental Therapeutics

Scott Kaufmann, M.D., Ph.D.	Program Co-Leader
Zhenkun Lou, Ph.D.	Program Co-Leader

Gastrointestinal Cancer

Gregory J. Gores, M.D.	Program Co-Leader
Mark A. McNiven, Ph.D.	Program Co-Leader

Genetic Epidemiology and Risk Assessment

James Cerhan, M.D., Ph.D.	Program Co-Leader
Mariza de Andrade, Ph.D.	Program Co-Leader (through 12/31/2011)
Alexander S. Parker, Ph.D.	Program Co-Leader (beginning 01/01/2012)

Gene and Virus Therapy

Evanthia Galanis, M.D.	Program Co-Leader
Stephen Russell, M.D., Ph.D.	Program Co-Leader

Hematologic Malignancies

Leif Bergsagel, M.D.	Program Co-Leader
Thomas E. Witzig, M.D.	Program Co-Leader

Immunology and Immunotherapy

Keith L. Knutson, Ph.D.	Program Co-Leader
Larry Pease, Ph.D.	Program Co-Leader

Neuro-Oncology

Joseph C. Loftus, Ph.D.	Program Co-Leader
Brian P. O'Neill, M.D.	Program Co-Leader

Prostate Cancer

Eugene D. Kwon, M.D.	Program Co-Leader
Donald Tindall, Ph.D.	Program Co-Leader

Women's Cancer

Sean C. Dowdy, M.D.	Program Co-Leader
James Ingle, M.D.	Program Co-Leader

SPECIALIZED PROGRAMS OF RESEARCH EXCELLENCE (SPORES)

Brain Tumor SPORE

Brian Patrick O'Neill, M.D.	Principal Investigator
Robert Jenkins, M.D., Ph.D.	Co-Principal Investigator

Breast Cancer SPORE

James Ingle, M.D.	Principal Investigator
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Lymphoma SPORE

(Shared with the University of Iowa)

Thomas Witzig, M.D.	Mayo Lead Investigator
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Multiple Myeloma SPORE

(Shared with Dana-Farber Cancer Center)

Leif Bergsagel, M.D.	Principal Mayo Project Investigator
Rafael Fonseca, M.D.	Principal Mayo Project Investigator

Ovarian Cancer SPORE

Lynn Hartmann, M.D.	Principal Investigator
Scott Kaufmann, M.D., Ph.D.	Co-Principal Investigator

Pancreatic Cancer SPORE

Gloria Petersen, Ph.D.	Principal Investigator
------------------------	------------------------

Prostate Cancer SPORE

Donald Tindall, Ph.D.	Principal Investigator
Brian Davis, M.D., Ph.D.	Co-Principal Investigator

AFFILIATIONS AND COLLABORATIONS

American Cancer Society
American College of Surgeons Oncology Group
Biodesign Institute - Arizona State University
Cancer and Leukemia Group B
*Cancer Prevention Network
Children's Oncology Group
Coalition of National Cancer Cooperative Groups
Eastern Cooperative Oncology Group
GLIOGENE
Gynecologic Oncology Group
Hormel Institute - University of Minnesota
Indian Health Service
Minnesota Partnership for Biotechnology and Medical Genomics
Native Programs
National Cancer Institute
*North Central Cancer Treatment Group
Ontario Institute for Cancer Research
Pancreatic Cancer Genetic Epidemiology
Pharmacogenetics Research Network
*Phase I Program
*Phase II Consortium
Radiation Therapy Oncology Group
Translational Genomics Research Institute (TGen)
* Based at Mayo Clinic

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About The 26.2 with Donna

Established in 2008, The 26.2 with Donna National Marathon to Finish Breast Cancer has funded pioneering breast cancer research. The marathon is the only one in the country where all race proceeds and donated funds go to breast cancer research and care. Mayo Clinic has received more than \$1 million from race proceeds since 2009 to make inroads into the origins of breast cancer. The 2012 edition of The 26.2 with Donna will take place on Feb.12, 2012.

