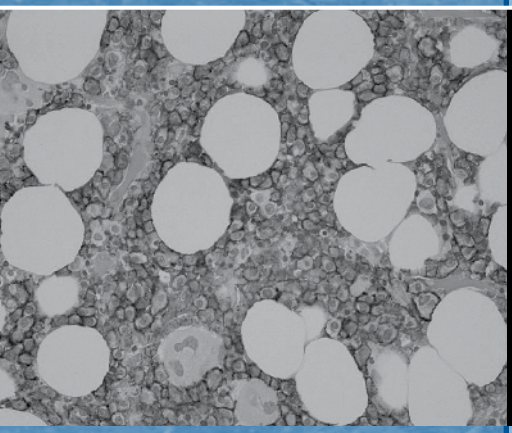
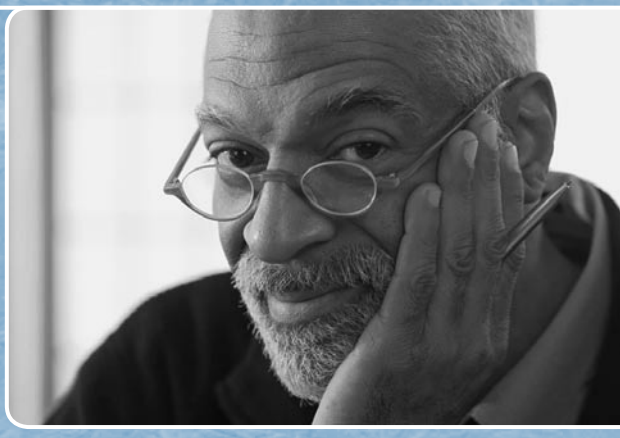
Legacy Cancer Services

2008 Annual Report

featuring Multiple Myeloma





LEGACY
HEALTH

Legacy Emanuel

Legacy Good Samaritan

Legacy Meridian Park

Legacy Mount Hood

Legacy Salmon Creek

Contents

Comprehensive Cancer Services

Legacy Cancer Services provides a comprehensive range of multidisciplinary services designed to help patients and their families through the diagnosis, treatment and recovery of their cancer. Legacy Cancer Services and its affiliated physicians provide high-quality, compassionate, efficient and cost-effective care to both adult and pediatric patients. This is accomplished by making the entire spectrum of cancer services available to all patients and their referring physicians. The following services comprise the cancer program.

Autologous Blood Stem Cell Transplant

Autologous (meaning from one's own) blood stem cell transplantation is performed at Legacy Good Samaritan Hospital as part of a nationally accredited program. Physicians, nurses and other health care team members are specially trained to provide high-quality, personalized care to patients and families undergoing this intensive form of cancer treatment. Patients with specific malignancies, including non-Hodgkin's lymphoma, Hodgkin's disease, acute leukemia, multiple myeloma, germ cell tumors and primary amyloidosis, may benefit from autologous transplantation.

- Northwest Marrow Transplant Program — Legacy Health and Oregon Health & Science University have joined their clinical and research activities related to blood and bone marrow transplant to form the Northwest Marrow Transplant Program, which is dedicated to enhancing patient care and conducting research in marrow and stem cell transplantation.
- Marrow and Blood Stem Cell Donation — Legacy Good Samaritan has served as a collection center for the National Marrow Donor Program (NMDP) since 1995. Healthy individuals who have volunteered to donate bone marrow or blood stem cells to a designated recipient undergo collection of these cells as an outpatient. Bone marrow donation is performed in the operating room under general anesthesia. Blood cell donation is performed after four days of stem cell "priming" medication, whereupon these cells are collected from the bloodstream by an apheresis machine. Life-saving marrow or stem cells are then transported to the recipient, who may be undergoing treatment either in the U.S. or in another country.

Brain and Spinal Cord Tumor Services

Legacy's Brain and Spinal Cord Tumor Services offer state-of-the-art technology and comprehensive resources for adults and children, delivered in a compassionate manner. Our network of specialized physicians, coupled with our support services, provide a full spectrum of care. Legacy offers the most sophisticated cancer treatment available for surgery, chemotherapy and radiation, including Novalis® Shaped Beam Surgery, Intensity Modulated Radiation Therapy (IMRT) and Image-Guided Radiation Therapy (IGRT). The program includes components of the Rehabilitation Institute of Oregon (RIO), Legacy Research, the Oregon Comprehensive Epilepsy Program and the Children's Cancer Program, and holds a monthly multidisciplinary CNS Tumor Conference. The Brain Tumor Support Group is also a vital resource to many patients.

Breast Health Centers

The goals of the Legacy Breast Health Centers are to offer women comprehensive, compassionate care — all in one convenient location — and to provide each and every patient with prompt personalized care. The Breast Health Centers, located at Legacy Good Samaritan, Legacy Meridian Park and Legacy Salmon Creek, provide expertise in screening and diagnostic mammograms, breast ultrasound and breast biopsies. Digital mammography is available at all sites. The R2 ImageChecker® provides a computerized double-check of breast X-ray images to assist radiologists in reviewing mammograms. If changes in the breast are seen on a screening mammogram, it is important that further diagnostic tests can occur promptly. Breast Specific Gamma Imaging (BSGI), a molecular breast imaging technique, is available at Legacy Good Samaritan. It is a complementary diagnostic procedure to mammography and ultrasound for difficult-to-diagnose patients, such as those with dense breast tissue, previous surgical scaring and for women with palpable lumps without positive mammography. The Breast Health Centers each have a multidisciplinary team available, including radiologists, surgeons, nurses, technologists and counselors. Legacy Breast Health Center nurses help guide women through the diagnostic process by providing necessary support, education and answers to questions or concerns.

Cancer Care Conferences/Tumor Boards

Cancer care conferences offer the multidisciplinary team an opportunity to discuss an individual's diagnosis, pre-treatment evaluation, staging, treatment strategy and rehabilitation goals for a broad spectrum of cancer cases. Physicians present current cases for discussion. These conferences also provide education for medical staff, residents and allied health care providers. In addition to general cancer conferences, Legacy offers a regular schedule of specialty conferences for the following tumors: breast, central nervous system, gastrointestinal, gynecologic, head and neck, hematologic, pediatric, prostate/urologic and thoracic malignancies. Monthly oncology grand rounds are also offered.

Cancer Care Unit

The Cancer Care Unit on the Legacy Good Samaritan campus is the focused medical/surgical cancer inpatient unit for Legacy Health. The specially trained staff on the Cancer Care Unit provide state-of-the-art clinical treatments, thorough patient education and family support, while delivering compassionate care. The unit has 20 beds ; most are private with a shower. This includes six rooms for autologous blood stem cell transplant and two Comfort Care suites designed to care for inpatients with terminal illness. The unit has flexible visiting hours and houses the John Stanwood Family Room.

Cancer Data Management/Cancer Registry

Cancer Data Management employs a team of registrars to collect data on every patient diagnosed with cancer and/or initially treated in the Legacy system. Their responsibilities include case identification; data collection systems; lifetime follow-up of cancer patients; submission of data to the National Cancer Data Base (NCDB), the Oregon State Cancer Registry (OSCaR) and the Washington State Cancer Registry (WSCR); quality monitoring of registry data and responding to data requests. Data collected by the registrars is vital to Legacy's ACoS-accredited Network Cancer Program.

Cancer Genetics and Risk Assessment Program

Cancer genetic counseling and risk assessment provide information on the genetic component of cancer and an analysis of family history. Individuals with a diagnosis or a strong family history of colon, breast, ovarian and other cancers may wish to pursue a genetic consultation. A cancer genetic consultation includes an evaluation of personal and family cancer history, education about the inherited components of cancer, identification of cancer syndromes and, if appropriate, genetic testing. Also offered are pre-symptomatic detection, development of personalized screening recommendations and discussion of prevention strategies.

Cancer Prevention and Early Detection

Legacy Cancer Services staff play an active role in community education by providing information on cancer prevention and early detection at community events, health fairs and upon request. Periodically, free or low-cost cancer screenings are offered, often in conjunction with other community organizations.

Cancer Rehabilitation Services

Cancer Rehabilitation Team members help individuals and their families adjust to the impact of cancer through:

- Lymphedema management — treats swelling of the arm, leg or other body part caused by an abnormal build-up of protein and excess water in the tissue space. The goals of this therapy are to reduce the swelling, minimize recurrence, decrease pain and discomfort, provide education and minimize psychological distress. The services are provided by nationally certified and trained physical and occupational therapists.
- Occupational therapy — educates and assists in the adjustment to possible limitations of endurance, self-care skills or other activities of daily living.
- Physical therapy — maximizes the level of independence within the limits of the individual's disability and illness through use of exercise, ambulation, assessment of equipment needs, family training and assistance with pain management.

- Speech therapy — provides instruction, training and therapy for those with speech, swallowing and communication difficulties.

Children's Cancer and Blood Disorders Program

The Children's Cancer Program staff at Legacy Emanuel Children's Hospital have been specially trained in caring for children and adolescents with cancer. Focusing on family-centered treatment and the cure of childhood cancer, our inpatient and outpatient oncology teams provide medical management, family education, help with reintegration into the community and long-term follow-up care. Patients have access to the most up-to-date and progressive treatments through participation in the Children's Oncology Group (COG), a national consortium of children's hospitals that treat cancer. Services include chemotherapy, radiation therapy, comprehensive nursing services, home infusion/nursing services, pediatric surgery, pediatric neurosurgery, intensive care unit, pediatric subspecialty support and hospice.

Colorectal Cancer Center of Excellence

The Colorectal Cancer Center of Excellence at Legacy Good Samaritan brings together a full range of specialists to offer a comprehensive team approach to the prevention and treatment of colon and rectal cancers. With the latest in screening, diagnosis, treatment, recovery and support services, we provide individualized, up-to-date and compassionate care. Oncology nurse navigators guide, support and educate patients as they move through their cancer experience. Complex cases are presented at the Gastrointestinal Tumor Conference, meeting twice a month. Participation in clinical trials and genetic counseling services are also important elements of the program.

Consultation Service

Consultation Service provides information and referrals to patients and families seeking a second opinion regarding their cancer diagnosis or cancer care. We offer individualized referrals to appropriate cancer care physicians.

Day Treatment/Infusion Clinics

The Day Treatment/Infusion Clinics are located at all five Legacy hospitals. They provide chemotherapy, blood products, antibiotics and other infusions allowing patients to maintain independent lifestyles and avoid unnecessary hospitalization. IV line placement and education including PICC (Peripherally Inserted Central Catheter) are also offered. A physician referral is necessary. The clinic locations at the hospitals allow convenient access to pharmacy, laboratory, X-ray and other support services.
Autologous blood donation is a service provided at Legacy Meridian Park for those wishing to donate their own blood for possible use during their elective surgery.

End of Life Care/Hospice/Hopewell House

Palliative care, often called "comfort care," is provided to any hospital patient nearing the end of life. Consultations are offered specifically at Legacy Good Samaritan, Legacy Emanuel and Legacy Meridian Park.

Hospice is a special program that focuses on quality of life for adults and children with terminal illness. Care is provided in the patient's place of residence whether it be their home, assisted living, or care facility. Legacy Hopewell House Hospice is licensed as a specialty hospital. Hospice patients needing acute pain and other symptom management have found Hopewell House to be the next best thing to home.

Regardless of where the care is provided, hospice focuses on providing a full range of physical, emotional, social, and spiritual comfort to both the patient and family. The interdisciplinary care team includes the medical director, registered nurses, medical social workers, home health aides, physical therapy, occupational therapy, pastoral services, dietitian, music thanatologist and volunteers. Bereavement support is provided to family/significant others of the deceased for 13 months following the death of the patient.

Green Gables Guest House

Green Gables Guest House, on the Legacy Good Samaritan campus, provides affordable lodging for out-of-town Legacy patients and their families. The house accommodates up to 10 people; guests may stay as long as they are receiving treatment. Hospitable and caring volunteers help make the house seem like home away from home for its guests.

Hepatic, Biliary and Pancreatic Program

Legacy Good Samaritan is a leading regional center for the treatment of liver, bile duct and pancreas tumors. Legacy offers a full range of treatment options, including tumor resection, radiofrequency ablation, chemo- and radio-embolization for liver tumors, and advanced radiation therapies. The primary goal is to improve the survival and quality of life for patients. The Hepatic, Biliary and Pancreatic Program is a collaboration between cancer services, medical and surgical oncology, gastroenterology, radiation oncology and interventional radiology. Components include a prospectively maintained database, active clinical research, and education programs for physicians and patients.

Legacy Cancer Healing Center

Integrative Cancer Care and Support Services provide holistic care to help individuals and their families adjust to the impact of cancer through evidence-based complementary therapies including:

- Adult Nurse Practitioner (ANP) — provides individual assessment and follow-up to achieve optimum wellness during cancer treatment and through survivorship. The ANP coordinates integrative cancer care services with the patient/family and the care providers.
- Dietitian — provides guidance in achieving a healthy lifestyle through individualized nutritional counseling and/or community presentations.
- Expressive art therapy — uses various artistic media to assist patients in expressing themselves through creative as well as verbal avenues. Art therapy assists adults and offers individual and group counseling to children of ill parents, specializing in addressing anticipatory grief issues for school-age children and adolescents.
- Healing gardens — provides therapeutic gardens accessible to patients and families for renewal and reflection.
- Massage — applies a range of therapeutic treatments including manual massage therapy to positively affect the individual's health and well-being.
- Medical Social Worker — addresses emotional, social and financial needs and coordinates community services and resources.
- Movement classes (NIA, T'ai chi and yoga) — increases mobility, flexibility and endurance, while providing support and enhancing life quality.
- Music for healing — volunteers provide music for relaxation, distraction and comfort for patients and families in the Legacy Good Samaritan Cancer Care Unit.
- Music thanatology — a palliative music practice for end-of-life care — brings harp and voice to the bedside, addressing discomfort and suffering with the therapeutic qualities of music.
- Psychosocial counseling — identifies emotional needs and adjustment issues, and assists in the development of coping skills.
- Stress management — assists in an individual's adjustment to illness, disability and treatment through life planning, relaxation training and guided imagery.
- Survivorship services — Through the Legacy Cancer Healing Center, our nurse practitioner offers a personalized roadmap to essential follow-up care to promote long-term survival.

These services are available to individuals with all types and stages of cancer, providing a continuity of care and support throughout the course of treatment.

Oncology Clinical Research

Legacy Oncology Research participates in a variety of oncology clinical trials including those sponsored by industry, investigator-initiated trials supported by Legacy Foundation and national cancer research organizations, including Walter Reed Army Medical Center.

National research base affiliations are established with the following organizations: University of Rochester Cancer Center (URCC) involved in symptom management studies; Southwest Oncology Group (SWOG) conducting cancer treatment and prevention trials; Cancer and Leukemia Group B (CALGB) conducting cancer treatment studies including leukemia and lymphoma trials; Eastern Cooperative Oncology Group (ECOG) with clinical trials for all types of adult malignancies; M.D. Anderson Cancer Center (MDACC) conducting cancer treatment, control and prevention studies in adults, adolescents and children; North Central Cancer Treatment Group (NCCTG) conducting cancer treatment, prevention and symptom management trials; National Cancer Institute of Canada

Clinical Trials Group (NCIC) offering cancer treatment and control trials; Radiation Therapy Oncology Group (RTOG) supporting trials involving the latest radiation therapy techniques; National Surgical Adjuvant Breast and Bowel Project (NSABP) researching breast, colon and rectal cancers; Gynecologic Oncology Group (GOG) studying women with pelvic malignancies of the ovary, uterus, and cervix; Children's Oncology Group (COG) researching cancers in children and adolescents; American College of Surgeons Oncology Group (ACoSOG) which primarily evaluates the surgical management of patients with solid tumors; and Northwest Marrow Transplant Program (NWMTP) conducting trials for adult and children undergoing blood and marrow transplantation. Legacy is proud to be able to offer our patients the latest in technology, innovation and treatment through our clinical research.

Oncology Nurse Navigator

Legacy Good Samaritan offers the services of oncology nurse navigators, who are registered nurses trained in cancer care, to help patients navigate through their cancer diagnosis and treatment. The oncology nurse navigator guides, supports and educates patients and their families and helps coordinate the efforts of the medical team. In addition, a patient navigator from the American Cancer Society works closely with our oncology nurse navigators, addressing other needs such as transportation, financial and physical issues, as well as linking patients with local, state and national resources.

Prostate Cancer Center

The Prostate Cancer Center at Legacy Good Samaritan offers the latest in treatment and support services for men with prostate cancer. The field of robotic-assisted surgery has come to the forefront of urological surgery. Good Samaritan, with the highest volume of robotically performed prostate surgeries in Oregon, is proud to offer this treatment option, in addition to standard surgical methods. Legacy also has a full range of radiation treatments for prostate cancer, including IMRT (intensity-modulated radiation therapy.) And our prostate brachytherapy program, using radioactive seed implants, is the largest and most experienced in the region. To guide patients and their families through the prostate cancer diagnosis and treatment, oncology nurse navigators provide a single point of contact, offering a full array of support and educational resources.

Radiation Oncology

Radiation Oncology consists of the application of high-energy X-rays or particles to the body for the purpose of treating disease including cancer. Legacy Cancer Services provides radiation therapy at all hospital locations except Legacy Meridian Park. The treatment process includes consultation, treatment planning, on-going clinical evaluation, education and support services. Several types of radiation therapy are available, depending on the needs of a specific patient:

- Brachytherapy — a form of radiation therapy in which radioactive materials are placed within the body in direct contact with the affected area. This allows more radiation to be given safely in conjunction with external radiation treatments, and in certain situations it can be used by itself in a much shorter and more convenient course of treatment. Cancer types in which brachytherapy is particularly useful include prostate, breast, gynecologic and soft tissue sarcomas. Legacy offers a full range of the most technologically advanced brachytherapy services and is the largest and most experienced program in the region.
- Conformal External Beam Therapy — uses computerized technology to map the tumor's location and optimize the radiation dose delivered to the tumor while minimizing side effects to the surrounding tissues.
- Image Guided Radiation Therapy (IGRT) — an advancement in precision for targeting and treating tumors. The technology works by combining and integrating X-ray scanning with the use of precise radiation therapy during the actual time of treatment. This allows the radiation team to deliver the treatment with a high degree of accuracy while minimizing damage to the surrounding healthy tissue. IGRT may be used on many types of cancers and is especially suited for cancers of the prostate, head, neck and lung.
- Intensity Modulated Radiation Therapy (IMRT) — a powerful tool that delivers radiation more accurately and effectively to tumors located in the head, neck, prostate, chest and other locations. IMRT conforms the radiation beams to match the irregular shapes of tumors, but also can change the shape of each beam and modulate the dose intensity during treatment.
- Novalis® Shaped Beam Surgery — an advanced form of radiosurgery treatment. The Novalis® technology, in use at only a handful of centers nationwide, is "surgery without a scapel" — shaping beams of radiation to mirror the exact size and shape of a tumor, treating only the tumor and sparing healthy tissue. With recent upgrades, the accuracy and reliability of Novalis® has been increased. This allows its use on medically inoperable tumors in the spine, head and neck, lung, liver, breast, prostate and other areas in the body.

Support and Education Groups

Support and education groups provide emotional support and ongoing education to individuals whose lives are touched by cancer. Some groups are open to family and friends, and are offered at a variety of times and locations. See the Legacy Cancer Services website at www.legacyhealth.org/cancer for a current listing.

Surgery

Legacy Surgical Services offers comprehensive state-of-the-art surgical services at Legacy's five hospitals. Legacy's surgical capabilities comprise virtually every medical specialty and feature many of the region's preeminent surgeons. Programs in robotics, bloodless surgery, minimally invasive surgery, lithotripsy and pain management contribute to Legacy's reputation as a center of excellence.

Tumor Bank

The Legacy Oncology Laboratory opened its Tumor Bank in April of 2006. The bank collects and preserves tumor samples removed during surgery. Researchers are studying the relationships between tumor characteristics, treatment alternatives, and patient outcomes. Consent from patients is required before banking the tumor specimens. Samples from the Tumor Bank have already led to several new, exciting discoveries in our research laboratories.

Volunteer Program

Legacy Cancer Services appreciates the support of an active and energetic volunteer staff. They assist with numerous rewarding activities such as helping with Survivors' Day, preparing mailings, making phone calls and performing receptionist tasks. Volunteers help keep Green Gables Guest House in ready condition for guests and provide support for the guests while staying there.

Stem Cell Transplantation at Legacy: A Treasured Gem

By Nathalie Johnson, M.D., FACS, Medical Director, Legacy Cancer Services & Breast Health Centers

This year I am really proud to highlight one of Legacy Cancer Services' strongest programs. Our Autologous Blood Stem Cell Transplant Program has a rich history of excellence and is one of our brightest points. The program was started at Legacy Emanuel Hospital & Health Center in November of 1989, and was moved to Legacy Good Samaritan Hospital & Medical Center in May of 1994. To date it has performed almost 500 transplants. In the early years, most of these were done for breast cancer, but more recently, the vast majority of transplants are done for hematologic malignancies, with multiple myeloma leading the pack.

Keith Hansen, M.D., has been a strong leader and his team has produced outstanding outcomes. I am always impressed with the finesse and professionalism with which they carry out the arduous task of getting patients safely through transplant. In fact, our program posts one of the lowest morbidity and mortality rates noted nationally, and has been recognized for outcomes that routinely exceed the national averages.

The Autologous Stem Cell Transplant Program at Legacy Good Samaritan receives its accreditation from FACT (Foundation for Accreditation of Cellular Therapy). In 2007, it was recognized as a Blue Cross Blue Shield Blue Distinction Center for Transplants. To achieve this status requires a multidisciplinary approach, and our top-notch team of specialists and allied health professionals are *par excellence*. To support continued learning and achievement, the Northwest Marrow Transplant Program (NWMTP), a collaboration between Legacy and OHSU, sponsors continuing education forums for nursing and physicians alike. The NWMTP Nursing Conference is held on an annual basis. Every other year the program brings speakers to the Stem Cell Transplantation Interdisciplinary Conference to discuss updates and state of the art techniques in both adult and pediatric transplant.

As you read this year's report, please note the excellent outcomes achieved by our Stem Cell Transplant Program. I think you will find that the management of many hematologic malignancies has improved significantly, and this is especially true of multiple myeloma. We hope you will find the tale of transplant at Legacy Health to be riveting. In 2009, we will be celebrating our 20th anniversary and our survivors will tell the best stories of all.

Legacy Cancer Services Overview — Highlights for 2008

By Keith Hansen, M.D., FACP, Chair, Network Cancer Committee

A few of the numerous activities and accomplishments for Cancer Services during 2008 are highlighted below. Legacy Cancer Services earned the Blue Cross Blue Shield Blue Distinction® Center for Complex and Rare Cancers in May 2008. Legacy is one of approximately 90 cancer programs in the U.S. that have been awarded this designation. The accreditation is designed to identify centers that have a highly trained subspecialty and multidisciplinary care team that follows established national guidelines and treats a sufficient volume of complex and rare cancers to meet their stringent requirements.

Legacy and the American Cancer Society (ACS) established a new Patient Care Navigator program in March 2008. The ACS Patient Navigator is a social worker that can access ACS resources efficiently and obtain needed services for Legacy patients. The ACS navigator provides assistance with transportation, lodging, reimbursement assistance for certain pharmaceuticals and referral to ACS education and support services. The Legacy/ACS collaboration brought a new Gift Closet to the Legacy Good Samaritan campus in late 2008. The gift closet provides free breast prostheses, wigs, hats, Softees® and scarves to cancer patients.

The Prostate Center developed standards for the Urology/Prostate Cancer Conference and a vision for the program. Community outreach sessions were held throughout the metropolitan area as well as outlying communities. Physicians worked with the Legacy Research Department to submit a grant for a quality of life study in patients undergoing treatment for prostate cancer.

The Stanwood Rehabilitation Conference has been a Legacy tradition since 1990. This year, the focus was integrative healing and cancer care. More than 80 attendees enjoyed presentations by national and local experts who provided the latest information on exercise, postural challenges after breast or head and neck cancer treatment and the practice of integrative oncology.

Hospital Site News

Legacy Good Samaritan — The Cancer Care Unit provides care to severely immunocompromised patients including those undergoing autologous transplantation and induction therapy for acute leukemia. Enclosure of the Cancer Care Unit entrance was a high priority to increase safety for immunocompromised oncology patients. The newly remodeled entrance includes automatic doors, signs cautioning entrants to wash their hands and a sink just inside the doors.

In 2008, with the support of appreciative donors and the Legacy Good Samaritan Foundation, funding was provided for the building of comfort care suites on the Cancer Care Unit. The two suites were completed in spring of 2009 and provide a warm, soothing atmosphere for the patient and family seeking the expert symptom management care provided by the cancer care staff.

Legacy Emanuel — A monthly brain tumor conference was initiated to provide multidisciplinary consultation and prospective case review. Emanuel Radiation Oncology

Legacy Health System 2008 Primary Sites (2,659 cases)												
	Emanuel		Good Samaritan		Meridian Park		Mount Hood		Salmon Creek		LHS	
Primary Site	Patient Count	Percentage of total	Patient Count	Percentage of total	Patient Count	Percentage of total	Patient Count	Percentage of total	Patient Count	Percentage of total	Patient Count	Percentage of total
Ampulla of Vater							2	0.9%			2	0.1%
Anal Canal	3	0.7%	6	0.5%			1	0.4%			10	0.4%
Bladder	29	7.0%	22	1.7%	17	4.1%	15	6.7%	12	4.2%	95	3.6%
Bone/Conn Tissue	6	1.4%	7	0.5%			2	0.9%	2	0.7%	17	0.6%
Brain/CNS	68	16.4%	10	0.8%	12	2.9%	5	2.2%	17	5.9%	112	4.2%
Breast	7	1.7%	315	24.0%	89	21.2%	40	17.9%	57	19.9%	508	19.1%
Cervix Uteri	1	0.2%	38	2.9%	3	0.7%	3	1.3%	3	1.1%	48	1.8%
Colon	13	3.1%	48	3.7%	37	8.8%	23	10.3%	25	8.7%	146	5.5%
Corpus Uteri	6	1.4%	117	8.9%	10	2.4%	4	1.8%	6	2.1%	143	5.4%
Endocrine	8	1.9%	2	0.2%	2	0.5%	3	1.3%	3	1.1%	18	0.7%
Esophagus	3	0.7%	13	1.0%	9	2.1%	7	3.1%	5	1.7%	37	1.4%
Fallopian Tube			3	0.2%	2	0.5%			1	0.3%	6	0.2%
Gallbladder	2	0.5%									2	0.1%
Hodgkin	4	1.0%	4	0.3%	3	0.7%	2	0.9%	5	1.7%	18	0.7%
Kidney	13	3.1%	47	3.6%	20	4.8%	6	2.7%	2	0.7%	88	3.3%
Larynx	5	1.2%	1	0.1%			4	1.8%	3	1.1%	13	0.5%
Leukemia	20	4.8%	15	1.1%	10	2.4%	1	0.4%	2	0.7%	48	1.8%
Lip/Oral Cavity	42	10.1%	1	0.1%					1	0.3%	44	1.7%
Liver/Bile Ducts	7	1.7%	18	1.4%	10	2.4%	1	0.4%	2	0.7%	38	1.4%
Lung	43	10.4%	103	7.8%	50	11.9%	31	13.9%	34	11.9%	261	9.8%
Lymphoma-NH	14	3.4%	31	2.4%	22	5.2%	5	2.2%	9	3.1%	81	3.1%
Melanoma	3	0.7%	28	2.1%	8	1.9%	3	1.3%	6	2.1%	48	1.8%
Mesothelioma	2	0.5%	3	0.2%							5	0.2%
Multiple Myeloma	1	0.2%	2	0.2%	6	1.4%	5	2.2%		0.0%	14	0.5%
Pharynx	12	2.9%	7	0.5%	9	2.1%	4	1.8%	9	3.1%	41	1.5%
Other Site	6	1.4%	4	0.3%	1	0.2%	1	0.4%	2	0.7%	14	0.5%
Ovary	5	1.2%	32	2.4%	4	1.0%	1	0.4%	3	1.1%	45	1.7%
Pancreas	2	0.5%	11	0.8%	20	4.8%	14	6.3%	3	1.1%	50	1.9%
Penis	1	0.2%	1	0.1%							2	0.1%
Prostate	59	14.2%	330	25.1%	34	8.1%	20	9.0%	34	11.9%	477	17.9%
Rectum/Rectosig	3	0.7%	25	1.9%	9	2.1%	7	3.1%	14	4.9%	58	2.2%
Renal Pelvis/Ureter	2	0.5%	3	0.2%	3	0.7%	1	0.4%		0.0%	9	0.3%
Salivary Gland											0	0.0%
Small Intestine			3	0.2%	4	1.0%	1	0.4%	3	1.1%	11	0.4%
Stomach	1	0.2%	6	0.5%	6	1.4%	4	1.8%	6	2.1%	23	0.9%
Testis	7	1.7%	1	0.1%	4	1.0%			2	0.7%	14	0.5%
Thyroid	3	0.7%	23	1.7%	2	0.5%	2	0.9%	8	2.8%	38	1.4%
Unknown Primary	6	1.4%	19	1.4%	11	2.6%	5	2.2%	7	2.4%	48	1.8%
Urethra	2	0.5%	1	0.1%	1	0.2%					4	0.2%
Vagina			3	0.2%	1	0.2%					4	0.2%
Vulva	6	1.4%	12	0.9%	1	0.2%					19	0.7%
Grand Total	**415**	**100%**	**1,315**	**100%**	**420**	**100%**	**223**	**100%**	**286**	**100%**	**2,659**	**100%**

substantially expanded their stereotactic whole body radiation therapy services to patients with tumors of the lung and spine. This extremely technical approach uses high doses of very localized radiation to a small volume and achieves excellent local control rates. Moreover, the treatment time can be condensed from a six-week program to a few treatments.

Top Six Sites 2008

Primary Site	EH	GS	MP	MH	SC	LHS	ACS*
	Percentage of total						
Breast	1.7%	24%	21.2%	17.9%	19.9%	19.1%	12.8%
Prostate	14.2%	25.1%	8.1%	9.0%	11.9%	17.9%	13%
Lung	10.4%	7.8%	11.9%	13.9%	11.9%	9.8%	15%
Colon/ Rectum	3.9%	5.6%	11%	13.5%	13.6%	7.7%	10.4%
Corpus uteri	1.4%	8.9%	2.4%	1.8%	2.1%	5.4%	2.8%
Brain/CNS	16.4%	0.8%	2.9%	2.2%	5.9%	4.2%	1.5%
Percentage of total analytic cases	48%	72.1%	57.4%	58.3%	65.4%	64.1%	55.4%

**American Cancer Society 2008 estimated U.S. cancer cases*

Legacy Meridian Park — Promotion of the Breast Health Center was a key focus for Legacy Meridian Park. A series of open houses were held for physicians and the community. Massage therapy is available to women undergoing stereotactic biopsies, and educational notebooks are provided to all newly diagnosed breast cancer patients.

Legacy Mount Hood — Twice monthly cancer conferences are well attended by medical staff. The Radiation Oncology Department installed a new CT scanner for use in treatment planning.

Legacy Salmon Creek — Legacy Cancer Services cancer registrars, staff and physicians worked diligently throughout the year to prepare for the LSC American College of Surgeons Consultation Survey. Ultimately, this survey helps establish the required criteria that will lead to inclusion of LSC in the next system-wide ACoS accreditation survey of Legacy's Network Cancer Program in 2010. Cancer data management provided support for the survey process by preparing abstracts for surveyor critique, reviewing pathology reports for CAPS criteria and supplying the necessary data reports for statistical verification. The survey team conducted a site visit in January 2009.

In memory of Keith Hansen, M.D., FACP
1945–2009

Dr. Hansen passed away unexpectedly in August. Keith was a compassionate physician, conservationist, fly fishing enthusiast, wine and food connoisseur, opera lover and dedicated husband and father.

Induction Treatment for Multiple Myeloma and Transplant-Ineligible Patients

By Kasra Karamlou, M.D., Medical Oncologist

Multiple myeloma is a common plasma cell disorder characterized by presence of clonal plasma cells and excess of monoclonal immunoglobulins. There has been rapid progress in our understanding of the pathophysiology of myeloma that has led to both improvement in diagnostic techniques as well as therapeutic options and outcomes.

There have been distinct phases of therapy development for multiple myeloma. In the 1960s, melphalan was found to be an active antimyeloma agent. Its combination with prednisone became and remained the standard of care for a number of years. Subsequently, the development of high-dose chemotherapy supported by autologous stem cell transplantation, which will be detailed by Keith Hansen, M.D., was found to be superior to conventional chemotherapies of the time and became standard of care in patients eligible for the procedure. Most recently, increased understanding of the bone marrow microenvironment and its role in myeloma cell growth, survival, and drug resistance, has led to change in the treatment paradigm of the disease as well as expansion of options in patients not eligible for an autologous stem cell transplantation. Four new drugs—thalidomide, bortezomib, lenalidomide, and pegylated liposomal doxorubicin—have all been approved for treatment of myeloma in the last five years. The approval of these drugs has had an impact, not only on the transplant-eligible patients, but also more significantly in the transplant-ineligible patients.

Recent advances in interrogation of genomic changes have also allowed for molecular classifications of myeloma, which further provide scientific rationale for novel therapy development. As a whole, the overall survival of myeloma before therapy was six months. This was improved to three years with melphalan and prednisone, and currently it is greater than seven years.

In the transplant-ineligible patient, the standard of care for frontline therapy had been the melphalan/prednisone-based regimen, which could not induce more than a 5 percent complete remission rate.

The first improvement to the melphalan and prednisone backbone came with the addition of thalidomide and two such studies have been published, one from Italy and another from IFM. Both studies suggested that the combination of melphalan, prednisone, and thalidomide was superior to melphalan and prednisone in terms of response

Years from diagnosis			
	LH diagnosed 1998–2001 (N = 92)	NCDB diagnosed 1998–2001 (N = 30,730)	LH diagnosed 1999–2003 (N = 131)
1	74.5%	70.0%	78.5%
2	64.2%	54.4%	67.2%
3	46.3%	42.9%	51.9%
4	41.1%	34.1%	44.2%
5	37.3%	27.7%	38.5%
NCDB = National Cancer Database			

rates, complete remission rates, as well as progression-free survival.

Subsequently, the combination of bortezomib with melphalan and prednisone was tested in a phase I-II study by the Spanish group, which resulted in significant improvement in complete remission rate. This led to the large randomized VISTA trial, which compared melphalan and prednisone to melphalan, prednisone and bortezomib (VMP). This trial confirmed that melphalan, prednisone and bortezomib could yield impressive complete remission rates, and with a short follow-up an improvement in progression-free survival and overall survival were demonstrated. Other preliminary experience with combination of melphalan, prednisone with lenalidomide has also been reported and the results are encouraging; large randomized trials are currently ongoing addressing this issue.

There are a number of questions currently being addressed in the transplant-ineligible patient. These questions are: What is the best induction regimen? What is the optimal duration of induction treatment with the novel agents? Is maintenance treatment necessary once a maximal response has been achieved? Another question is not only to determine which of the novel agents offer the best efficacy/toxicity ratio when combined with melphalan and prednisone, but also is melphalan necessary as part of the induction regimen? An example of a non-melphalan approach is the bortezomib, lenalidomide and dexamethasone regimen, which currently looks promising and will undergo further phase III trials.

Treatment of Myeloma Bone Disease

One of the major complications of multiple myeloma is bone-related disease. Treatment of myeloma bone disease involves treatment of the underlying malignancy, localized radiation therapy to control pain, kyphoplasty or vertebroplasty for vertebral fractures, surgery, and inhibiting bone resorption in osteoclastic formation with bisphosphonate therapy.

Multiple Myeloma Age Range CY 2008		
Age	**Patient Count**	**Percentage**
40–49	1	7%
50–59	4	29%
60–69	5	36%
70–79	2	14%
80–89	2	14%
Total cases	**14**	**100%**

Bisphosphonate therapy is currently the mainstay of treatment of myeloma bone disease. This therapy has been demonstrated to decrease bone pain, slow progression of lytic lesions, and also prevent development of new pathologic fractures.

Currently, intravenous pamidronate 90 mg once monthly, and/or zoledronic acid 4 mg once monthly is the standard bisphosphonate therapy in myeloma. Both agents have shown to be comparable in phase III trials in decreasing the number of skeletal complications and need for radiation therapy. The major benefit of zoledronic acid over pamidronate is that it can be given over a shorter period of time, 15 minutes versus two hours.

The current recommendation for bisphosphonate therapy is the presence of lytic bone disease. The optimal duration and the frequency of therapy for myeloma are currently being studied and not well understood. Current ASCO recommendations suggest using either pamidronate and/or zoledronic acid in patients with lytic destruction of bone or spinal cord compression. Patients with renal impairment currently should receive

pamidronate rather than zoledronic acid over a long infusion time; however, there are ongoing studies to determine the safety of using zoledronic acid in patients with severe renal impairment.

LHS Comprehensive First Course Treatment CY 2008		
Type of Treatment	**Patient Count**	**Percentage**
Radiation	2	14%
Chemotherapy	2	14%
Radiation + chemotherapy	2	14%
Chemotherapy + hormone	4	29%
Radiation + chemotherapy + hormone	2	14%
Treated	12	86%
Not treated (no Tx/palliative)	2	14%
Total cases	**14**	**100%**

One of the more serious complications associated with bisphosphonate therapy is osteonecrosis of the jaw (ONJ). Patients with multiple myeloma have been reported to have the highest incidence of ONJ on a review by Dr. Van Wyngaert, et al. Bisphosphonate-associated ONJ is defined as the presence of exposed bone in the mandible or maxilla in patients receiving bisphosphonate therapy that does not heal within eight weeks of appropriate dental management in the absence of local metastatic disease or previous radiation therapy. Risk factors for osteonecrosis of the jaw thus far identified include dental extraction, older age and longer survival. In the largest long-term follow-up study of patients with multiple myeloma with ONJ, the process itself resolved in 60 of the 97 patients studied and did not heal over a nine-month period in 26 percent of the patients. Dental extraction was felt to precede development of ONJ in 47 percent of the patients and was more common in patients with a single episode of ONJ than in patients with recurrent non-healing ONJ. Therefore, in conclusion, the risk factors associated with development of ONJ for patients on bisphosphonate therapy appear to be duration of bisphosphonate therapy, presence of active myeloma and previous dental extraction or dental surgery.

There are a number of questions currently being asked in regards to osteonecrosis of the jaw. The pathophysiology underlying osteonecrosis of the jaw is still unclear. Stopping and/or continuing bisphosphonate therapy in myeloma patients who develop ONJ also remains a major question. In patients who have progressive bone disease, reinstitution or continuation of bisphosphonate therapy should be considered after the risks and benefits have been discussed with the patient. Other novel therapies for myeloma bone disease are currently under intense investigation. A fully humanized monoclonal antibody to RANKL (denosumab) has been developed. This drug has undergone clinical trials for myeloma as well as other diseases associated with the osteoclastic bone destruction.

Other approaches for treatment of bone-related complications include vertebroplasty and kyphoplasty. Percutaneous vertebroplasty involves injection of polymethylmethacrylate into vertebral bodies for stabilization or relief of pain. Kyphoplasty is a vertebroplasty technique that involves placement of inflatable bone tamps into the vertebral body. Both procedures result in decreased myeloma-induced bone pain and improvement of functional activity in patients with vertebral compression fractures secondary to bone involvement. Both are very useful in

the management of patients with vertebral fracture and are only applicable at present to vertebral compression fractures and not for other sites of fracture.

The Legacy Experience

At our Legacy Health medical centers, 14 total cases of multiple myeloma were diagnosed in the year 2008, 12 confirmed cases of multiple myeloma and two cases of plasmacytoma. The age range is reflective of the standard multiple myeloma group. There were six males and eight females diagnosed during the year 2008. Treatments were based on standard of care currently available for patients with multiple myeloma, including clinical trials.

In terms of survival, when compared to the NCDB, Legacy had 92 patients diagnosed between 1998 and 2001, compared to the 30,730 in the NCDB database for the same timeframe. The LH survival curve mimics that of NCDB, though the Legacy survival numbers are slightly higher each year out from diagnosis. The overall five-year survival of multiple myeloma patients at Legacy was 37.3 percent compared to the NCDB of 27.7 percent. When we looked at the patients diagnosed at Legacy for the five-year period 1999–2003, there were 131 patients, with a five-year survival slightly improved at 38.5 percent over the previous findings. Though the Legacy numbers are small compared to the NCDB, survival rates for the patients within Legacy are favorable.

Currently, Legacy Cancer Services, in corroboration with an excellent group of oncologists and hematopathologists, strive to further advance and provide state-of-the-art care for our patients diagnosed with multiple myeloma.

The Role of Autologous Hematopoietic Stem Cell Transplantation

By Keith S. Hansen, M.D., FACP, Medical Director, Legacy Autologous Stem Cell Transplant Program

Over the past 15 years, autologous hematopoietic stem cell (HSC) transplantation for patients with responsive, symptomatic multiple myeloma has evolved from an experimental approach to standard of care. One of the first randomized studies, the IFM 90 trial, was recently updated with 7 year follow-up data that showed autologous transplantation was superior to standard dose chemotherapy in terms of event-free survival (16 percent vs. 8 percent) and overall survival (43 percent vs. 25 percent). Similarly, the same authors reported that a tandem, or planned double transplant, improved 7-year event free survival from 10 percent to 20 percent and overall survival from 21 percent to 42 percent. Subset analysis found that the benefit of a tandem transplant was confined to patients who failed to enter complete response after the first transplant. Additionally, studies have demonstrated that autologous transplant improves quality of life for patients with multiple myeloma by improving time without symptoms or treatment toxicity (known as TWISTTs). Autologous

transplantation is a category 1 recommendation by the National Comprehensive Cancer Network (NCCN). Despite the intensity, the treatment is safe, improves response rates, and improves progression-free survival by at least 12 months. Patients should ideally proceed to HSC collection early (once optimal response to induction therapy has been achieved) to maximize the success of collection. Moreover, patients should proceed to autologous transplant within one year of diagnosis, rather than late in the disease course.

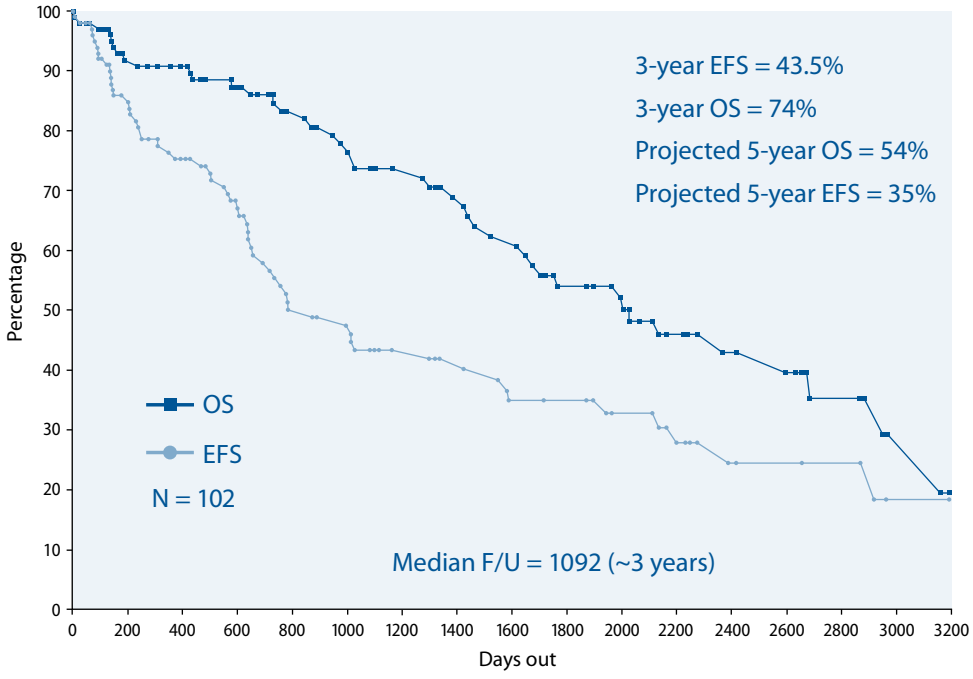
Chemotherapy Regimens*

Regimen	Number of patients
Single high-dose melphalan 200	75 transplants, 71 patients
Single high-dose melphalan 140	13 transplants (2nd transplant in 5 patients)
Busulfan, thiotepa, TBI (OHSU Phase I/II trial)	3 patients
High-dose melphalan 140 and TBI — SWOG 9321	10 patients
Tandem high-dose melphalan 140, high-dose melphalan 200 — SWOG 0204	8 patients
Tandem melphalan 200 (off protocol)	2 patients

**High dose regimens and clinical trials used to treat multiple myeloma at Legacy Good Samaritan Hospital, Apr. 1995–Dec. 2008*

Despite the fact that autologous transplantation does not appear to cure the disease, a second transplant or tandem transplant can be beneficial. Tandem transplants are currently reserved for patients who achieve an improvement in myeloma control but fail to obtain complete remission after the first transplant. A second or sequential transplant performed greater than one year later upon disease progression can produce another durable remission in some patients.

Legacy Good Samaritan multiple myeloma overall and event-free survival post stem cell transplant



Probability of event-free survival (EFS) and overall survival (OS) in 102 patients with symptomatic multiple myeloma undergoing autologous transplantation.

Maintenance therapy post-transplant is under investigation and there is no consensus at this time.

Allogeneic transplantation, while offering the benefits of a tumor-free graft and the graft versus tumor effect, carries a significant transplant-related mortality exceeding 20 percent. Studies are now evaluating reduced-intensity allogeneic transplantation in an effort to reduce morbidity and mortality. Results will be forthcoming in the next few years.

The Legacy Autologous Stem Cell Transplant Program has performed 120 transplants for patients with multiple myeloma. During the 1990s, most patients entered clinical trials that tested various high dose regimens (see Chemotherapy Regimens table). Since mid-1999, the preparative regimen has consisted of high dose melphalan alone. The average hospitalization is 17 days and all patients have fully engrafted with recovery of hematologic parameters. Transplant-related mortality is very low at 2 percent and there have been no transplant-related deaths since total body irradiation-containing regimens were discontinued in 1999. At a median follow-up of three years, the projected event-free survival is 44 percent, and 74 percent of patients are alive (see chart). The median event-free survival is 25 months and median overall survival is five and a half years from transplant day. Importantly, the Legacy outcomes meet or exceed those reported by the Center for International Blood and Marrow Transplant Research (CIBMTR). The science and clinical trials of autologous HSC transplantation in multiple myeloma have advanced rapidly over the past decade. We expect novel agents and targeted therapy to play an increasingly important role in controlling the disease. For patients who are suitable candidates, autologous transplantation provides improved quality of life and survival.

Radiation Therapy in the Multiple Myeloma Patient

By Kathryn Panwala, M.D., Radiation Oncologist

The incidence of plasma cell (antibody-producing B cell) tumors is gradually increasing in the United States. The most common form of plasma cell tumor is multiple myeloma, where these malignant plasma cells are found in the bone marrow. The American Cancer Society estimated the incidence of new multiple myeloma cases diagnosed in 2008 was 19,920 up from 15,270 in 2004. Multiple myeloma represents 1.4 percent of all cancer diagnoses and results in 1.9 percent of all cancer deaths. The cause of the rise in multiple myeloma is unknown, but chronic inflammatory conditions and radiation exposure are thought to contribute to the risk of myeloma development.

Malignant plasma cell tumors can present in many ways, from small, localized lesions of bone or soft tissue to diffuse dissemination with monoclonal protein and immunoglobulin production evident in serum and/or urine. In cases of multiple myeloma, clinical presentation often

includes bony pain, anemia, hypercalcemia, renal impairment and immune deficiency. Factors found to effect prognosis are age, performance status (KPS), serum albumin, beta(2)-microglobulin, lactate dehydrogenase, renal function, genetic factors and serum-free light chains or their ratio.

Unlike a solitary plasmacytoma where the plasma cell tumor is localized to one area, no definite curative therapy is currently available for multiple myeloma where there is dissemination of the malignant plasma cells throughout the bone marrow. While the cornerstone of myeloma treatment is systemic, radiation therapy can be very effective for palliation of certain conditions. Radiation therapy is often employed for treatment of uncontrolled pain, impending pathologic fracture or impending spinal cord or nerve root compression.

Low-dose radiotherapy (10–30 Gy) can be very effective for pain relief with studies demonstrating complete or improved pain response in more than 90 percent of patients treated with palliative radiotherapy. When designing radiation treatment fields, emphasis should be made to maximally preserve bone marrow reserves, allowing for stem cell collection in potential candidates for high-dose therapy and stem cell transplant. In the past, radiation therapy fields for treatment of the extremities included the entire bone. However, Catell et. al. demonstrated excellent palliation with focused fields directed to the symptomatic bone lesion with 1–2 cm margin. They found that symptomatic recurrence outside the radiated field was uncommon and could be targeted with further focused fields reducing irradiation of normal marrow.

Multiple myeloma involvement of the bone reduces its structural integrity due to trabecular disruption and microfractures. Either vertebroplasty or kyphoplasty can help with pain from vertebral compression fracture. In patients without neurologic compromise, the injection of polymethyl methacrylate into the vertebral body reinforces the bone structure and reduces pain. This stabilization of the anterior column may prevent further pathologic fractures. Patients presenting with impending or actual pathologic fracture in weight-bearing bones or vertebral column instability should undergo orthopedic/neurosurgical consultation. After correction of mechanical injury/instability, radiation therapy (either single fraction radiosurgery or fractionated external beam) can be given to reduce risk of local tumor progression.

Patients presenting with spinal cord or nerve root compression secondary to tumor require emergent therapy to prevent worsening neurologic decline and may have potential improvement in function. Patients may present with local or radicular pain, motor weakness, sensory loss and bowel/bladder dysfunction. In patients where spinal cord compression is due to protrusion of bony fragments into the spinal canal, surgical decompression and fusion should be performed if possible to relieve the mechanical pressure. A study by Patchell et al. published in 2005 in The Lancet showed a significant improvement in median survival and ambulatory status with decompressive surgery followed by radiation therapy compared to radiation therapy alone in patients with spinal cord compression. However, this study excluded patients with radiosensitive tumors like myeloma as well as patients with multiple spinal lesions, so the optimal treatment regiment for patients with radiosensitive soft tissue (tumor) compressing the spinal cord is less clear.

In patients not undergoing surgical decompression, prompt administration of corticosteroids and initiation of radiation therapy is essential. Corticosteriods are beneficial in reducing pressure from vasogenic edema and attenuating the inflammatory response. The optimal dose of corticosteroids is a debated matter. Several studies have not shown a clear benefit to high-dose dexamethasone (96 mg/day) compared with lower doses (10–16 mg/day), and higher doses were associated with increased complications.

Unlike most patients with spinal cord compression (SCC) from metastatic disease where survival, depending on tumor histology, may be on the order of a few months, patients with SCC from myeloma often have survivals of several years. A multi-institutional retrospective series of 172 myeloma patients treated for SCC found significant improvement in motor function for patients undergoing long-course radiation therapy (300 cGy × 10; 250 cGy × 15; 200 cGy × 20) compared with short-course radiation therapy (800 cGy × 1 or 400 cGy × 5). In this study, improvement in motor function was seen in 52 percent of patients. The remaining patients had stability of neurologic symptoms in 45 percent, with only 2 percent demonstrating neurologic decline with radiation therapy.

In patients not ambulatory prior to radiation therapy (RT), 52 percent of long-course RT patients and 35 percent of short-course RT patients regained their ability to walk within four months of completing RT. Additionally, local recurrence within the irradiated spine was less for long-course RT (5 percent at 17 months) compared to short-course RT (11 percent at 13 months). A study from Henry Ford Cancer Center showed that radiosurgery utilizing 16 Gy single fraction was feasible and effective for treatment of SCC from myeloma in patients without paralysis, spine instability or lesions extending over more than two adjacent vertebral segments. In the 22 patients treated with radiosurgery, 91 percent achieved complete pain relief, with neurologic improvement occurring in 45 percent of patients. Follow-up radiographic imaging at three months showed complete regression of epidural tumor in 38 percent (5/13) cases.

In patients with known myeloma, it is critical to emphasize the importance of prompt workup of back pain and or any new neurologic symptoms. In a retrospective review by Smith et al. at the University of Calgary, they found that in patients presenting with SCC, 69 percent had bone pain for longer than one month, 62 percent had sensory changes for longer than one month and 39 percent had weakness for longer than two weeks prior to diagnosis. Given that neurologic recovery is unlikely to occur if the spinal cord compression is not relieved within 24–48 hours, prompt treatment is critical to optimize patient outcome and improve quality of life.

The Value of Fluorescence in Situ Hybridization (FISH) Testing in Multiple Myeloma Patients

By Jason K. Hyde, M.D., Hematopathologist

Fluorescence in situ hybridization (FISH) testing clearly identifies the chromosomal abnormalities associated with multiple myeloma, provides critical diagnostic and prognostic information and aids in treatment selection. Chromosomal abnormalities have proven to be among the most crucial prognostic indicators in patients with multiple myeloma. Consequently, FISH testing has moved to the forefront of providing fast, sensitive and reliable results in patients being treated for this disease. Beyond the estimation of outcome, FISH testing provides an essential element in the selection and sequence of treatment, clinical trial evaluation and targeted therapy.

Although conventional cytogenetic testing is crucial in the initial evaluation and evolution of myeloma patients, the need for metaphase cells in classical cytogenetics is hampered by the slow growth of plasma cells in culture, especially in early cases of myeloma. This is likely due to cells in early stage myeloma cases being dependent on their microenvironment for growth. This dependence hinders their growth in culture medium and limits the cells available for metaphase analysis. Routine cytogenetic testing still plays a valuable role, as detection of abnormal metaphase cells indicates stroma independent growth and may be associated with advanced disease states.

The advantage of FISH testing is that genetic abnormalities are detected in both actively dividing cells and interphase nuclei. The most commonly detected abnormalities include deletions of 13q14 and 17p13.1 as well as translocations involving 14q32 [t(4;14)(p16;q32), t(11;14)(q13;q32) and t(14;16)(q32;q23)]. In studies conducted on 351 patients with multiple myeloma, 54.2 percent had 13q14 deletions, 33.1 percent had translocations involving the 14q32 loci and 10.7 percent had deletions of 17p13.1.

Using these data, three distinct prognostic groups were identified. Patients with t(14;16) and/or t(4;14) translocations and patients with 17p13.1 deletions had the shortest median survival time of 24.7 months. Patients with 13q14 deletions (without the above listed 17p13.1 deletion or t(14;16) and/or t(4;14) translocations) had a median survival of 42.3 months. Finally, patients with only t(11;14) translocations, or no detectable abnormalities, had the longest median survival of 51.0 months. The above data is based on patients treated with conventional chemotherapy.

Beyond initial risk stratification, FISH testing has a very important role in ongoing treatment assessment and disease management. In a study evaluating relapsed multiple myeloma, patients found to have a p53 (17p13.1) deletion had a 4.2 month overall survival vs. 37.8 months in patients without a p53 (17p13.1) deletion. Clinical trials have used risk stratification in assessment of various treatment modalities. One study looked at high-risk features, including FISH detected cytogenetic abnormalities, on the

response rates and proportion of patients free of progression while being treated with lenalidomide + dexamethasone.

Today the "gold standard" of myeloma FISH testing requires the isolation/selection of plasma cells prior to FISH testing. This ensures that only plasma cells are being evaluated and not the admixed non-neoplastic cell population. This is of critical importance in patients with low tumor burden or minimal residual disease. A number of methodologies are available to achieve cell selection including CD138 sorting, cytoplasmic immunoglobin (cIg) tagging and morphological selection. Legacy Laboratory Services provides the latter, utilizing a state-of-the-art imaging system to manually select plasma cells based on morphologic characteristics. This has a number of advantages. First, cIg tagging requires the cytoplasm to be intact and is unreliable if only done with nuclei. Second, CD138 sorting does not have the capability of differentiating neoplastic plasma cells from admixed benign plasma cells. Plasma cell sorting using morphologic assessment allows a more refined population for FISH testing as morphologically "atypical" plasma cells can be isolated and utilized.

In 2008, 44 multiple myeloma plasma cell-specific FISH panels were completed by Legacy Laboratory Services. Out of 44 cases, 41 (93 percent) had a confirmed plasma cell dyscrasia based on morphologic, immunohistochemical or flow cytometric findings. Of those 41 cases, 38 had abnormal findings on plasma cell-specific FISH testing. Based on that experience, we conclude that use of plasma cell-specific FISH testing resulted in an abnormality detection rate of 93 percent.

FISH testing will continue to have an evolving role in the treatment of myeloma patients. Comparative genomic hybridization using microarrays (aCGH) and gene expression arrays (GEP) are providing insight into the molecular mechanisms involved in the formation and evolution of neoplastic plasma cells. As aCGH and GEP identify new genetic "targets," the application of FISH probe technology to these targets will provide additional information relating to prognosis and treatment modalities.

Although comparative genomic hybridization and gene expression arrays can be used in multiple myeloma testing, the advantages of FISH over aCGH and GEP include widespread availability, ease of interpretation, suitability for cases of minimal plasmacytosis and number of cases with informative results. Additionally, most insurance companies recognize the value of FISH technology and typically provide coverage for this testing.

Emerging markers include deletions and amplifications of the 1q locus, 16q deletion, 12p deletion and 5q amplification. As studies progress, the incorporation of any or all of these targets into the FISH laboratory will continue to provide valuable information in the diagnosis and treatment of patients with multiple myeloma.

Keeping the Quality Momentum and Ensuring Clinical Relevance

By Katherine Morris, M.D., FACS, Chair, Cancer Quality Council, and Bethany Carey, MPH, Quality Consultant

Legacy Cancer Services participates in multiple quality initiatives to meet the needs of our patients and provide the highest level of care. Our commitment to ongoing quality care requires us to continuously monitor our programs through focused auditing and satisfaction surveys to assess what we can do to keep improving our practices and obtain the best patient outcomes. This process has allowed us to uncover several areas in which we can and have improved upon in 2008. We are very excited about our ongoing efforts to find and implement best practices based on the needs of our patient population as they move through the continuum of cancer care.

In 2008, we added a valuable new member to the Legacy Good Samaritan team of Oncology Nurse Navigators. Dan Osborn joined us as the American Cancer Society Patient Care Navigator to bring social work expertise to the team. He assists patients in finding affordable transportation, lodging, funding for health care expenses throughout treatment and other psychosocial needs. Legacy Meridian Park also identified the need to establish a Breast Health Nurse Navigator for patients. Meridian Park has modeled their program and measures of success after those at Legacy Good Samaritan.

Legacy Good Samaritan has also been busy this year improving our Cancer Care Unit. We began implementing hourly rounding: a team approach to visiting each patient every hour with a focus on pain management, safety and activities of daily living. As a result of more frequent visits to each patient, we have seen our HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) satisfaction scores improve in the categories of pain management and responsiveness of staff. Additionally, we identified a need for a home-like environment for patients and families at the end of life when palliative care is needed yet transferring to a hospice service is not feasible. Using a generous donation from the Good Samaritan Foundation, we began planning the Good Samaritan comfort care suites to provide our dying patients and their families more privacy and comfort during this transition. The grand opening occurred in the spring of 2009.

Our radiation oncology team evaluated the benefit of receiving a 15-minute seated massage to reduce cancer-related symptoms for radiation oncology patients. Over a course of 110 massages, we found that patients demonstrated immediate improvement in symptom scores with an overall 48 percent reduction in anxiety, 25 percent reduction in fatigue and a 20 percent reduction in pain. As a result, complimentary 15-minute seated massages will be offered onsite to any patient undergoing cancer treatment at Good Samaritan.

Another improvement in our radiation oncology team occurred at Legacy Mount Hood Radiation Oncology with the purchase of a new state-of-the-art CT scanner in 2008.

Cancer Rehabilitation at Legacy Salmon Creek initiated development of a protocol for head and neck cancer patients to ensure

optimal levels of function while in treatment, survivorship or palliative care. Speech-language pathologists (SLP), physical therapists and nurses specially trained in oncology care have designed individualized treatment programs based on each patient's unique needs, including stage of disease, prognosis, extent of treatment, previous health issues and coping skills. The final SLP acute care protocol for head and neck cancer patients was approved as a system-wide protocol to ensure the same quality care for all head and neck cancer patients.

These highlights are in addition to our participation in multiple local, regional and national quality initiatives. As a member of the American College of Surgeons, we provide information to the National Cancer Database (NCDB) and are able to benchmark our performance in the care and management of our cancer patients. This includes a systematic review of Cancer Program Practice Profile Reports (CP3R), which allows us to measure our adherence to current treatment guidelines for breast and colon cancer. Additionally, we participate in the Surgical Care Improvement Project (SCIP) to track and improve the surgical care that we provide.

One area of focus for 2008 was ensuring the use of appropriately chosen and administered peri-operative antibiotics. By increasing our focus on this issue, we have been able to give optimal care in this area greater than 90 percent of the time.

We at Legacy Health are very proud of the dedication of our cancer care staff to quality improvement and hard work at all of our sites.

Cancer Clinical Research

By Alayne Lehman, Manager

Medicine is making great strides in discovering new ways to treat and prevent cancer through research. These advances are possible due to the volunteers who participate in clinical research trials. A clinical trial is a research study involving human volunteers who answer specific health questions, such as is one therapy better than another or to determine if a new drug or device is safe and effective. Clinical research trials follow very specific guidelines, which are approved by the Food and Drug Administration (FDA), as well as an ethics committee known as an Institutional Review Board (IRB) to assure the clinical research trial is ethical and the rights of the volunteers are protected.

Individuals may benefit from participation in a research trial by gaining potential access to new treatments that are not available outside of a research trial. Additionally, research subjects often receive more intense monitoring of their condition while on a clinical trial. Finally, research subjects are also able to help others by contributing to medical research, which helps in the discovery of new therapies of tomorrow. Despite these benefits, fewer than 5 percent of patients who are eligible for participation in a research trial actually enroll.

Legacy Health is proud to offer our patients access to the most innovative clinical research trials available through the National Institute of Health (NIH), which are made

available by the following research bases.

Front, from left: Fernando Carrillo, Clinical Research Nurse Coordinator; Crystal Hazen, CRC-II; Alayne Lehman, Manager; Samantha Hancock, Clinical Research Nurse Coordinator. Back, from left: Amy McDonald, Pediatric Coordinator; Aaron White, CRC-II; Leslie Sorenson, Supervisor; Armando Martinez, Pediatric Coordinator; Jeremy Douglas, CRC-I.

- Southwest Oncology Group (SWOG) conducts trials treating breast, gastrointestinal, genitourinary, gynecologic and lung cancers, as well as melanoma, myeloma, leukemia and lymphoma. More than 7,000 patients with cancer or who are healthy are enrolled each year in SWOG research studies. Over the past 25 years, more than 170,000 research subjects have participated in these research studies, while millions more have received improved care as SWOG develops new standards of treatment or prevention.
- The National Surgical Adjuvant Breast and Bowel Project (NSABP) has been active for more than 50 years. The research conducted through NSABP has changed the way breast cancer is treated and, more recently, prevented. NSABP breast cancer studies led to the establishment of lumpectomy plus radiation over radical mastectomy as the standard surgical treatment for breast cancer. Their research also demonstrated that adjuvant therapy could change the natural history of breast cancer, resulting in increased survival rates.
- Radiation Therapy Oncology Group (RTOG) is a recognized leader in working to increase survival and improve the quality of life for those with cancer. RTOG maintains a roster of 40 active studies devoted to primary disease sites: central nervous system, head and neck, lung, gastrointestinal (esophagus, stomach, pancreas, anal canal and rectum), genitourinary (bladder and prostate), breast and cervix. Since its inception, RTOG has activated 460 protocols and enrolled approximately 90,000 research subjects in these trials. RTOG provides an infrastructure for clinical investigators from the United States, Canada and international sites to seek more effective treatments for cancer.
- The purpose of Gynecologic Oncology Group (GOG) is to promote excellence in the quality and integrity of clinical and basic scientific research in the field of gynecologic malignancies. Approximately 45 individual clinical trials are active at any one time within GOG for patients with a variety of gynecologic malignancies, including cancers that arise from the ovaries, uterus, cervix, vagina and vulva.
- Group B (CALGB) has been conducting cancer treatment studies including leukemia and lymphoma trials.
- Eastern Cooperative Oncology Group (ECOG) does clinical trials for all types of adult malignancies.
- North Central Cancer Treatment Group (NCCTG) conducts cancer treatment, prevention and symptom management trials.

Legacy is also proud to offer patients additional opportunities to participate in research trials via our investigator-initiated and indus-

try-sponsored research studies. By actively participating in all types of clinical and basic research we are able to provide access to the most advanced and innovative therapies and technologies to our physicians. This ultimately translates into providing the best treatment options for each individual patient afflicted with cancer.

If you would like additional information about research trials or would like to participate in one of our studies, please call our oncology research department at 503-413-8199 or visit www.legacyhealth.org/research.

Legacy Cancer Programs: Fostering Patient Care, Research, Teaching and Service

By R. Bryan Bell, M.D., DDS, FACS, Cancer Liaison Physician, Attending Head and Neck Surgeon, Legacy Health

The Cancer Liaison Program of the American College of Surgeons Commission on Cancer (CoC) was established in 1963 and developed as a grassroots network of physician volunteers who were willing to manage clinically related cancer activities in their local institutions and surrounding communities. It has since evolved to include a diverse group of physicians that is charged with providing the leadership and direction to establish, maintain and support the cancer program at their facility.

Legacy Health has developed a robust comprehensive cancer program that is modeled according to guidelines established by the American College of Surgeons, and is committed to providing the Northwest United States with contemporary, state-of-the-art oncologic services across all disciplines. Legacy Cancer Services (LCS) was the first cancer program in the United States to receive Network Cancer Program approval from the CoC and is still the only approved network cancer program in Oregon. LCS further differentiates itself from many community-based cancer programs by nurturing the academic ideals of patient care, research, teaching and service. Fostering these ideals in a network of hospitals with hundreds of independent physicians, multiple third-party payers, and a rising population of uninsured or under-insured patients is challenging. Legacy is well poised to meet these challenges, however, by the development of organized oncology programs with strong directorial leadership; through support of multidisciplinary tumor boards; through investment into new technological advancements; and by a commitment on part of the Legacy Health administration to fulfill its mission of service to the community regardless of the patient's economic means.

Program development is an important factor in the development of any cancer service, particularly in a multi-hospital environment with independent cancer care providers. LCS currently recognizes six multidisciplinary programs dedicated to site-specific oncologic treatment (hepatobiliary and pancreatic can-

cer, colorectal cancer, breast cancer, prostate cancer, hematogenous cancers and pediatric cancers) and is in the process of organizing two others (head, neck and oral cancer and neurological cancers).

The Hepatobiliary and Pancreatic Program, under the directorship of Kate Morris, M.D., shepherded the care for 93 patients in 2008. Based at Legacy Good Samaritan , the program includes a prospective patient database for clinical outcome measurements, educational/professional outreach, loco-regional treatments including liver-directed therapies, interventional radiology, and consensus treatment algorithms. Its participating physicians are active in clinical research and have contributed to the development of a molecular research laboratory, directed by Dr. Morris and Dr. Juhua Chen, focusing on the mechanisms of angiogenesis and apoptosis as they apply to malignancy. This novel research is made possible, in part, by the development of an NIH-funded Tumor Bank, which stores human tissue samples obtained from cancer patients treated within the program.

The Colorectal Cancer Center of Excellence involves numerous physicians, nurses and other health care providers who managed just fewer than 200 patients in 2008. The program is highlighted by Legacy's web-based information resources that include screening recommendations and treatment guidelines, educational/professional outreach, community education and screening activities, oncology nurse navigation, genetic counseling and monitoring of national quality outcome measures. Like all of the Legacy cancer programs, its members are active in teaching students and are an integral part of the clinical education of students and residents of Oregon Health & Science University.

The Breast Health Centers at Legacy Good Samaritan, Legacy Meridian Park and Legacy Salmon Creek combined to treat 513 cases in 2008. Under the leadership of Nathalie Johnson, M.D., breast cancer care at Legacy Health is second to none.

Highlights of the program include breast-specific gamma imaging (BSGI) for inconclusive mammograms and treatment with accelerated partial breast irradiation (APBI) for minimizing radiation toxicity. LHS participates in numerous National Cancer Institute (NCI) clinical trials and conducts its own clinical trials through the Legacy Research Program. Daniel Zegzula, M.D., and other plastic surgeons are available to provide contemporary breast reconstruction that is tailored to the patient's wishes. A committed support staff that includes nurse navigators, massage therapists and lymphedema specialists further enhance the Breast Cancer Program.

The most recently formed cancer program is the Prostate Cancer Center, led by Bruce Lowe. M.D. Modern robotic-assisted, nerve-sparing prostatectomy has become a primary surgical treatment mode, and technologically advanced radiation delivery has contributed to Legacy's regional preeminence in prostate cancer treatment. These leading-edge treatments are partly responsible for attracting 513 patients to the program in 2008. Another highlight of the program is the availability of oncology nurse navigators to assist and support these patients.

The Autologous Stem Cell Transplant Program, led by medical director Keith Hansen, M.D., makes Legacy Good Samaritan the only site between Tacoma and San Francisco for collecting peripheral blood stem cells and bone marrow for the National Marrow

Donor Program. In 1996, Legacy Health and Oregon Health & Science University joined their clinical and research activities related to blood and bone marrow transplant to form the Northwest Marrow Transplant Program, thus centralizing clinical data and outcome studies, and sponsoring joint educational efforts and conferences.

The Children's Cancer and Blood Disorders Program is under the leadership of medical director Janice Olson, M.D., a board-certified pediatric oncologist. This program, located at The Children's Hospital at Legacy Emanuel, is a technically sophisticated children's oncology program providing care to children in Oregon and southwestern Washington. Focusing on the impact of childhood cancer on the family as a whole, the inpatient and outpatient staffs provide family-centered care. The program is an active member of the Children's Oncology Group, and most patients are enrolled onto clinical trials to have access to the latest treatment protocols.

The multidisciplinary team includes board-certified pediatric oncologists, surgeons, radiation oncologists, case managers, dietitian, social worker, research staff, specially trained registered nurses and therapists.

A twice-monthly tumor board allows for comprehensive interdisciplinary planning for all pediatric cancer patients. During 2008, plans moved forward for the remodeling and consolidation of the Day Treatment Unit and Outpatient Pediatric Oncology Clinic, as well as plans for integrating pediatric oncology into Legacy's new electronic medical record system.

Two additional programs are currently being developed, both of which evolved from committed group practices that have been de facto centers of excellence for more than two decades.

Legacy Emanuel is the site of a Head and Neck/Cranio-Maxillofacial Surgery Service that provides contemporary oncologic care for patients with head, neck and oral cancer. Fellowship-trained oncologic surgeons, reconstructive microvascular surgeons, radiation oncologists and medical oncologists work with a team of speech/swallow therapists, physical therapists and other dedicated staff members that specialize in managing complex head and neck tumors and serve as a resource for other subspecialists throughout the northwest United States.

The committed, multidisciplinary approach, bi-weekly tumor boards, clinical research, community service, and head and neck fellowship training have laid the foundation for a vertically integrated program in the near future.

Complementing the Head and Neck Service is the development of a Brain and Spinal Cord Tumor Program, also based at Legacy Emanuel.

These programs are both integrated into the trauma and critical care programs that exist at Emanuel, which is necessary to provide the high-acuity clinical resources necessary to care for complex patients.

Legacy Cancer Services has a rich tradition of quality patient care, research, teaching and service. It will continue to be challenged, however, by an uncertain political and economic future. Significant changes in health care delivery that are currently being debated in the U.S. Congress could affect health systems as well as private practitioners. As a loosely connected, often disconnected group of health care providers, with varying degrees of allegiance to Legacy Health, the physicians who drive the cancer programs are challenged by continuity and commitment.

Of the 2,629 abstracted cancer cases treated within the five-hospital system, only 963 (37 percent) were presented to a multidisciplinary tumor board. That means 63 percent of cancer patients treated within the system are not formally discussed by a multidisciplinary group of specialists. In this age of multimodal therapy for most cancer sites in general, and advanced stage disease in particular, heightened regulatory requirements and increased scrutiny by governmental and third-party payers, all physicians directly managing cancer patients are encouraged to present their cases — particularly those patients with advanced-stage disease — to a multidisciplinary tumor board.

Two of the goals for the Cancer Services program are that physician participation in tumor boards be increased during the next calendar year and that a greater percentage of patients with advanced-stage disease are submitted to multidisciplinary review.

Dedicated cancer programs within Legacy Cancer Services will continue to thrive, expand, improve and evolve. They are designed to be inclusive, not exclusive, and to be a resource for the community, not in competition with the community. Legacy Cancer Services will ultimately navigate the current uncertain economic and political waters through continued program development and investment, expanded physician involvement in site-specific tumor boards, and the further maturation of clinical services, scientific investigation, educational resources, and community service. It is hoped that these endeavors will ultimately propel Legacy Cancer Services into the upper echelon of cancer programs nationally and, more importantly, improve the outcomes for the patients whom it is our privilege to serve.

The Role of the Autologous Transplant Coordinator

By Lisa Hansen, R.N., M.S., AOCN

When patients are referred for consideration of hematopoietic stem cell (HSC) transplantation, the complexity of the process and the multiple steps to transplant can be overwhelming. There are so many things to consider: Will I qualify for the transplant? Will my insurance company cover it? How long will I be unable to work? What are the long-term complications?

The transplant coordinator serves as a "navigator" of sorts for patients as they proceed from initial referral to post-transplant follow-up. The initial visit with patient and family focuses on general transplant education. The Autologous Stem Cell Transplant Program has developed a detailed Guide for Patient and Family that describes the entire process of undergoing transplantation at Legacy Good Samaritan. This guide is provided to the patient early in the referral process. In addition, the transplant coordinator teaches patient and family what to expect from the pre-transplant work-up, through HSC mobilization and collection, the transplant hospitalization and post-transplant follow-up care. This education emphasizes

self-care, infection control and the expectations of caregivers during post-transplant recovery.

Transplant coordinators work with many internal departments and external organizations/companies to guide the patient to transplant with minimal delay. Once insurance benefits are determined, the patient undergoes a thorough medical evaluation. This information is required to assess the patient's suitability for autologous transplantation as well as to obtain a medical necessity determination from the patient's insurance plan. After these tasks are accomplished, the transplant coordinator works with the transplant physician to develop an HSC mobilization plan. During mobilization, patients are followed closely to assure that their symptoms are well controlled, and they undergo HSC collection at the optimal time during mobilization. During this phase, the transplant coordinator is the point person for the patient, physician and all departments involved in the collection of HSCs.

The patient's transplant admission is the culmination of months of preparation. Patients are admitted to the Cancer Care Unit to begin a high-dose chemotherapy regimen specific to their disease. Upon admission, the transplant coordinator reinforces the treatment plan with the patient and family. The potential side effects, symptom management plan, self-care, precautions and usual recovery trajectory are reviewed in detail. During the patient's hospitalization, the transplant coordinator monitors the patient's progress and serves as a resource to the patient, family and all members of the transplant team. When the patient is recovering and hospital discharge draws near, a formal discharge teaching session is held with the patient and their designated caregiver(s). Infection control, nutrition and gradual return to pre-transplant activities are emphasized. The potential late effects of high-dose chemotherapy are reviewed, and the patient receives detailed information on serious symptoms that require immediate medical attention.

From left: Lisa Hansen, R.N., M.S., AOCN; Patricia Smythe, R.N., BSN, OCN; Amy Douglas, B.S., CRC-II.

The transplant coordinator continues to serve as a resource to the patient and family after discharge. Patients can seek advice regarding their recovery from high-dose therapy, resuming activities, travel, pets and transplant-related insurance questions. Moreover, the transplant coordinator is a resource for physicians and staff on regulatory issues, clinical research, symptom management, insurance approval and policies related to HSC transplantation.

Integrative Cancer Care and Support Services

By Selma Annala, R.T., CLC, Supervisor, Integrative Cancer Care

Integrative therapies address the physical symptoms of cancer and cancer treatments as well as the distress, anxiety and emotions, which can be present when cancer is diagnosed. Employing an evidence-based model to determine integrative services offered to Legacy Health cancer patients and families, the wide range of services outlined below are available to our patients throughout the continuum of their care. The focus of integrative cancer care is on improvement of the quality and balance of life for the patient and family through the course of their cancer experience.

In 2008, Legacy Cancer Services was funded to expand its program of integrative cancer care. The nurse practitioner model was adopted, based on the review of successful cancer models across the country, which coordinate the patient's health care options to include integrative cancer care. The role of the nurse practitioner is to assess patients and interface with community providers and health care providers, with the patient and family at the center of care. Referral to the array of integrative modalities available through Legacy Cancer Services, as well as in the community, provide an opportunity for the patient/family to receive a coordinated, appropriate plan to meet each individual's needs. The nurse practitioner has the benefit of the medical model and the knowledge and expertise found in integrative cancer care. Development of a survivorship program with detailed survivor care plans is the additional component rounding out a truly integrative care model during and beyond acute cancer treatment.

Acupuncture — Currently available for breast cancer patients at Legacy through participation in a clinical trial.

Expressive therapies — Offer a variety of modalities to process the issues brought up through the cancer experience. Art, writing, and movement all offer ways to express and process the feeling of fear and anxiety commonly faced. Children are able to process their fears without the encumbrance of words.

Art therapy helps with this aspect of healthy expression and healing. Both individual and class options are available at Legacy Good Samaritan.

Healing gardens — Award winning therapeutic gardens provide a place of peace and comfort for both patients and families at Legacy Good Samaritan, Legacy Emanuel, Legacy Meridian Park and Legacy Salmon Creek.

Healthy nutrition — Our registered dietitian provides individualized nutritional plan to improve overall health and for specific dietary needs during and after cancer treatment, as well as classes on nutrition and cancer at all Legacy sites.

Massage — Applies individualized range of treatments, including manual massage therapy, to positively affect the individual's health and well-being.

A pilot project providing 15-minute chair massage in the Legacy Good Samartian radiation oncology outpatient setting was undertaken in the first quarter of 2008. The pilot project was based on a study at Memorial Sloan Kettering Cancer Center, which

addressed the effect of massage on cancer patient's perception of anxiety, fatigue and pain. Patients scored these symptoms both prior and post massage. Results mirrored those of the Sloan Kettering study with a marked decrease in all three symptoms.

Front, from left: Barbara Meyer, Ph.D.; Kathleen Perkins, RYT; Wendy Garrean M.A.; Sharilyn Cohn, CM-Th. Back, from left: Kate Leonard Ph.D.; Reza Antoszewska, MSNP; Wendy Talbot, LCSW; Barbara Cabot, CM-Th; Eileen Dolan, B.S. LMT; Selma Annala R.T. CLC; Marci Reed R.D., L.D.

Chair massage for patients in the Good Samaritan radiation oncology setting continues with expansion of service to caregivers and family members.

Music as a therapeutic tool — Music can become part of a plan of care as an aid to symptom reduction and well-being through the course of treatment and survivorship. This includes strategies for bringing recorded music into one's life in therapeutic ways, engaging in music activities or hearing live music in waiting areas at Legacy Good Samaritan.

Music thantology — A prescriptive music practice, providing harp and vocal music to ease the transition of families and patient at end of life.

NIA mind/body movement — A low-impact aerobic practice which develops awareness, focus, flexibility, balance, confidence, strength, energy, playfulness and connectedness to facilitate a positive change in one's life. Offered at Legacy Good Samaritan.

Psychosocial counseling — Medical social workers and counseling services are available to meet the specific needs of the cancer patient and family. Assessments provide the opportunity to tailor counseling to each individual's or family's needs.

Support groups — A wide array of support and education groups offer the opportunity for patients and families to interact with others on the cancer journey. These groups are facilitated by cancer professionals.

Stress management — Offers a wide range of skills that can help the patient and family cope with symptoms of cancer and treatment and assist in creating life plans to promote balance while living with a cancer diagnosis.

T'ai chi — Often referred to as "meditation in motion." A series of gentle moves to increase physical balance, flexibility and strength, as well as improved mental alertness and sense of peace. Offered at Legacy Good Samaritan.

Yoga — Increases mobility, flexibility and endurance while providing support and enhanced quality of life. This is offered at Legacy Good Samaritan.

Integrative practitioners work closely with the nurse navigator, physician, rehabilitation

therapists and the remainder of the oncology team to ensure that patient care is a truly integrated healing experience.

Integrative services are available throughout the course of treatment, recovery and beyond. Most services are available to family members and caregivers as well. Call 503-413-7284 or 800-220-4937 or visit www.legacyhealth.org/cancer.

The Role of Occupational Therapy and Physical Therapy with Multiple Myeloma Patients

Inpatient acute care with hematopoietic stem cell transplantation patients

Patients with a variety of cancer diagnoses, including multiple myeloma, are treated with high-dose chemotherapy followed by hematopoietic stem cell (HSC) transplantation. Since multiple myeloma is a progressive disease characterized by uncontrolled growth of plasma cells in the bone marrow, it compromises the growth of healthy blood cells. Anemia is common in these patients, causing weakness and fatigue. Decreased platelet formation can cause blood-clotting problems, and neutropenia further affects a patient's ability to fight infection. In the hospital setting, each HSC transplant patient is followed by a multidisciplinary team including a physician, nurse, transplant coordinator, social worker, chaplain, occupational therapist and physical therapist. The treatment team meets weekly and collaborates on the patient's care throughout their hospitalization.

From left: Sandy Kirchner, P.T., CLT-LANA; Sarah LaVenture, OT/L, CLT-LANA; Laura Evans, P.T., CLT-LANA; Karen Garrett, P.T., CLT-LANA.

Hematopoietic stem cell transplant patients often have changes in blood counts, heart rate and activity tolerance. Occupational therapists and physical therapists evaluate the patient's strength, mobility, self-care status and activity tolerance. A treatment plan is designed specific to the individual patient's health care needs and therapy goals. These patients are seen by occupational therapy and physical therapy throughout their hospital stay. Therapists monitor blood counts and heart rate to adjust activity and exercise accordingly. Patients are taught specific activity guidelines, how to monitor their own heart rate and how to adjust their activity and exercise. When appropriate, patients are instructed in adaptive self-care and energy conservation. The overall goal is to keep patients active and independent. In preparation for discharge from the hospital, therapists make recommendations for self-care at home and instruct in a home exercise program and safe progression of activity tolerance.

Bone metastases and spinal cord compression

Multiple myeloma can also damage any bone where marrow is producing blood cells, leading

to a variety of musculoskeletal complications. Bone pain is a common complication of multiple myeloma. It occurs especially in the thoracic and lumbar vertebrae, pelvis and ribs, increasing the risk for pathologic fractures and spinal cord compression.

Early on patients may have few symptoms. However, as the disease progresses, weakness, fatigue, bone pain and/or fractures, kidney damage causing lower extremity swelling and hypercalcemia leading to lethargy and dizziness, are all causes of disability. Physical therapists and occupational therapists at Legacy Health are trained both in the inpatient and outpatient setting to develop and provide safe, appropriate and realistic functional goals based on a patient's stage of tumor, current symptoms, anticipated progression of disease and side effects of medical treatment.

Treatment considerations for multiple myeloma factor in the patient's age, overall health, medical history and extent of disease.

Possible side effects of treatment for multiple myeloma — from chemotherapy, HSC transplantation, biologic therapy and/or radiation therapy — include generalized fatigue and shortness of breath, skeletal muscle wasting, weakness in transfers and self-care, imbalance with walking, bone pain and fall risk, all of which impair quality of life. These multiple factors can challenge the multiple myeloma patient's ability to participate in exercise and functional mobility. Cancer rehabilitation professionals can provide tailored exercises and functional training and monitoring for cancer and treatment side effects, to help patients stay as active as possible throughout the course of their disease, thus enhancing their quality of life.

Publications

Chen CY, Hansen KS, Hansen LK. Rhizobium radiobacter as an opportunistic pathogen in central venous catheter-associated bloodstream infection: case report and review. *J Hosp Infect*. 2008 68: 203-207.

Denk, P, Swanström, LL, Whiteford, MH. Transanal endoscopic microsurgical platform for natural orifice surgery. *Gastrointestinal Endoscopy.* 2008 68(5): 954-959.

Edlich RF, Cross CL, Wack CA, Chase ME, Lin KY, Long WB 3rd. Breast cancer and ovarian cancer genetics: an update. *J Environ Pathol Toxicol Oncol*. 2008 27(4): 245-56.

Morris KT, Brady MS. Sentinel Lymph Node Mapping in Melanoma. *Ann Surg Oncol*. 2008 15(9): 2627.

Morris KT, Brennan MF. "Prognosis in Advanced Sarcoma." In Glare P, Christakis N. (eds.) *Prognosis in Advanced Cancer*, 2008.

Nikolarakos D, Bell RB. Management of the node-positive neck in oral cancer. *Oral Maxillofac Surg Clin North Am*. 2008 20(3): 499-511.

White, J, Hammond, L. Delirium Assessment Tool for End of Life: CHIMBOP. *Journal of Palliative Medicine.* 2008 11(8): 1069.

White, J, Kendall, AR. Finding a Good Night's Sleep: Understanding Insomnia. *Journal of Palliative Medicine.* 2008 11(5): 805-806.

Zhou M, Johnson N, Blanchard D, Bryn S, Nelson J. Real-world application of breast-specific gamma imaging, initial experience at a community breast center and its potential impact on clinical care. *Am J Surg*. 2008 195(5): 631-5.

Community Involvement 2008

Participation in Community Events

March — Breast Cancer Issues
June–July — Relay for Life (American Cancer Society)
September
— Celebration of Courage (Children's Cancer Association)
— Race for the Cure and Komen Expo
October
— "Light the Night" Walk (Leukemia & Lymphoma Society)
— Saks Fifth Avenue Key to the Cure

Public Education Talks and Activities

Monthly — Nutrition, Exercise and Cancer (all sites)
February — Young Women Breast Cancer Survivors (GS)
March — Colorectal Cancer: Preventable, Treatable, Beatable! (GS)
April
— Prostate Cancer: Latest Treatment Options (GS)
— What's in *Your* Mouth? Oral Cancer Awareness and Treatment (EH)
May — Breast Health Center Education Event (GS)
June — Cancer Survivors' Day (GS)
September — Colorectal Cancer: Prevention, Early Detection, Latest Treatment Options (SC)
October
— Reducing Your Risk for Cancer (MH)
— New Frontiers in Prostate Cancer Therapy (SC)
— Issues Surrounding Prostate Cancer (SW Portland)
— Breast Health: What You Need to Know (MP)
November
— Expressive Arts and Movement for Cancer Patients (GS)
— Colorectal Cancer: Preventable, Treatable, Beatable! (MP)

With the initiation of the Prostate Cancer Center at GS, multiple community outreach talks were presented to groups in Portland and throughout Oregon, focusing on prostate cancer screening and treatment options.

Screening Events

February — Men's Wellness & Screening Event: Prostate, Heart Health and Stroke Risk (EH)
May — Skin Cancer Screening (with Providence and OHSU)
August — Women's Wellness & Screening Event: Heart, Stroke, Breast Cancer and Colorectal Cancer (N. Portland)
Ongoing — Low-cost screening mammograms, in conjunction with the Komen Foundation, at Good Samaritan, Emanuel, Mount Hood and Meridian Park and Legacy Clinic St. Helens

Support, Education and Movement Groups and Classes

- Art/expressive arts therapy for children of parents with cancer
- Bereavement groups
- Brain tumor support group
- Breast cancer support groups
- Gynecological cancer support group
- Head and neck cancer support group
- Lymphedema support group
- NIA mind/body exercise classes for individuals with cancer
- Yoga for individuals with cancer
- Nutrition, Exercise and Cancer
- Prostate cancer support group
- Surviving Cancer Together support groups

Oregon Partnership for Cancer Control

The Oregon Partnership for Cancer Control is a statewide collaboration of individuals and organizations with a commitment to reducing the burden of cancer in our state. Legacy Cancer Services has been involved with the Partnership since 2004 when it began to develop an Oregon Cancer Plan. In 2008, Legacy continued to be represented by Selma Annala, member of the Coordinating Committee and Chair of the Treatment and Quality of Life Workgroup; Terry Wagie, member of the Treatment and Quality Workgroup; and Charlyn Wilson, member of the Prevention and Early Detection Workgroup and Co-chair of the Colorectal Health Task Force.

Professional Education Activities

Conferences/Courses

ONS Chemotherapy and Biotherapy Course — 13.5 hours, 23 participants, two local speakers

25th Annual Seminar for Radiation Oncology Professionals — 6 hours, 82 attendees, six local speakers

2nd Annual GI Conference: Controversies in Gastrointestinal Malignancies — 4.5 hours, 68 attendees, four national and one local speaker

Stanwood Rehabilitation Conference: Integrative Healing in Cancer Care — 7.5 hours, 81 attendees, two national and four local speakers

4th Annual Pacific NW Excellence in Breast Care — 5 hours, 142 attendees, three national and two local speakers

Lunch & Learn Presentations

Colorectal Cancer Center of Excellence and Oncology Nurse Navigator — Presented at three Legacy clinics

New Treatment Options for Primary and Secondary Hepatobiliary Malignancies — Presented in Hermiston, Ore.

Overview of Hereditary Breast Cancer and Genetic Counseling — Presented for staff at Legacy Meridian Park

Updates in the Treatment of Colorectal Cancer — Presented in Astoria, Ore.

Management of Prostate Cancer through Diagnosis and Treatment — Presented at four Legacy clinics

Oncology Grand Rounds

Good Samaritan

Lymph Node Guidelines in Colorectal Cancer

Radiation: Annual Exposure in Perspective

Evolving Role of Targeted Therapy: Head and Neck Cancer

New Adjuncts in the Aggressive Care of Brain Tumor Patients

Update on Chronic Myelogenous Leukemia

Endoscopic Ablation Therapy for Dysplastic Barrett's Esophagus and Early Esophageal Cancer

Breast Cancer Highlights from ASCO 2008

Current Controversies in the Management of Advanced Ovarian Cancer

Postmastectomy Radiation Therapy (PMRT): Current Controversies

Tumor Bank Research: Dendritic Cells & Cancer Gene Therapy; Individualized Cancer Therapy

Urinary Diversion Following Radical Cystectomy

High Dose Chemotherapy for Multiple Myeloma in the Modern Era

Meridian Park

New Treatment Options for Hepatocellular Carcinoma

Breast Cancer Highlights from the ASCO Conference

Non-Prostate Robotics in Urology

Mount Hood

Understanding Palliative Care

Salmon Creek

New Treatment Options for Hepatocellular Carcinoma (at Medical Grand Rounds)

Cancer Data Management Overview

By Leah Kiesow, CTR, and Hollis Brown, Manager

The Legacy Health Cancer Data Management Department is a key component of the cancer program and continues with excellent performance. Data on all Legacy patients, either initially diagnosed in a Legacy facility and/or receiving initial treatment for that diagnosis, is entered in the registry. The information that the cancer registrars collect captures a complete summary of the patient's disease from initial diagnosis through their lifetime. The cancer registrars attend educational conferences and webinars to keep current on the strict guidelines for data entry prescribed by the Commission on Cancer (CoC) and the North American Association of Central Cancer Registries (NAACCR).

Cancer Data Management (CDM) collects over 200 data fields on every cancer patient identified as an eligible case seen within Legacy. In addition, to maintain Legacy's approved Network Cancer Program status, Cancer Data Management is responsible for:

- Case identification
- Data collection systems
- Lifetime follow-up of cancer patients
- Submission of data to:
  - National Cancer Database
  - Oregon State Cancer Registry
  - Washington State Cancer Registry
- Supporting Legacy tumor conferences
- Quality monitoring of registry data
- Responding to data requests
- Representation on the Network Cancer Committee and Quality Assurance Committee
- Providing data for the Cancer Services Annual Report
- Preparations and ongoing discussion with the American College of Surgeons regarding survey expectations

Data Report

The registry data is collected from several Legacy information systems as well as from information provided by physician practices. There are more than 29,199 cases in the database since its reference (start) date of 1997.

The data from 2008 demonstrated 18 percent of the new cases were patients who had had a previous cancer diagnosis. Over one-half (64 percent) of the patients in the database are still alive and followed annually. Our patient population covers the entire state of Oregon and some Washington residents.

There was a growth of 8.6 percent in analytic cases in 2008 from the previous year — with the growth seen in the area of prostate cancer, gynecologic malignancies and lung cancer.

Data Requests

The Cancer Registry responded to 86 data requests in 2008, which include requests from administration for planning, from physicians for planning and requests needing data for research.

Accomplishments

- Verified registry data for the Cancer Program Practice Profile Reports (CP3R) and the Electronic Quality Improvement Packets (e-QuIP)
- Implemented changes for physician

abstract review for inclusion of CoC collaborative staging accuracy

- Supported the pursuit by the neurosurgeons to become a Neuroscience Institute by collecting data on brain surgeries when an "Awake Craniotomy" is performed
- Assisted in the development of a urology database by evaluating the collection of specific data elements related to robot-assisted prostatectomy
- Assisted in further comparison of lymph node final pathology by collecting the intraoperative lymph node status during breast surgery
- Provided continued data capture for the Hepatobiliary Program and the Tumor Bank
- Provided externship hours for Portland Community College student
- Continued with a home-based workstation for one registrar
- Provided representation on Oregon State Cancer Registry Advisory Committee
- Provided representation on the Oregon Cancer Registrars Association Executive Committee
- Supported attendance for two CTRs at the National Cancer Registrars Association conference in Minneapolis, Minnesota
- Supported attendance at state conferences
- Continued to use an online registrar trainee program to prepare new staff for the Certified Tumor Registrar exam and certification
- Provided coordination and support of 204 cancer conferences, where 983 patients were presented system-wide in 2008:
  - 32 breast care conferences
  - 11 central nervous system conferences
  - 23 gastrointestinal conferences
  - 64 general cancer conferences
  - 13 head and neck conferences
  - 4 leukemia and lymphoma conferences
  - 24 pediatric conferences
  - 30 thoracic conferences
  - 3 urology conferences
- Entered 2,659 new cancer cases into the database
- Followed over 25,595 patients during the year and maintained a 90 percent follow-up rate
- Completed review of 260 abstracts for quality and accuracy through physician review

From left: Leah Kiesow, CTR Supervisor; Kathy Mayer; Janel McNally, CTR; Lorraine Colwell; Hollis Brown, Manager; Donna Gilbo, CTR, RHIT; Catherine Telford, CTR; Elly Hayes, CTR; Dawn Cox.

Legacy Cancer Data Management staff

Hollis Brown, RHIT, manager
Leah Kiesow, CTR, supervisor, Good Samaritan
Marcia Williams, CTR, Good Samaritan
Laura Wallace, CTR, RHIT, lead registrar, Good Samaritan
Dawn Cox, Good Samaritan
Gail Coleman, CTR, RHIT, lead registrar, Meridian Park
Kathy Mayer, Meridian Park
Donna Gilbo, CTR, RHIT, Emanuel
Catherine Telford, Emanuel
Elly Hayes, CTR, Mount Hood
Janel McNally, CTR, Salmon Creek
Lorraine Colwell, Salmon Creek
Ileana Craig and Sandi Potrue, support staff

Legacy Health 2008 Network Cancer Committee Members

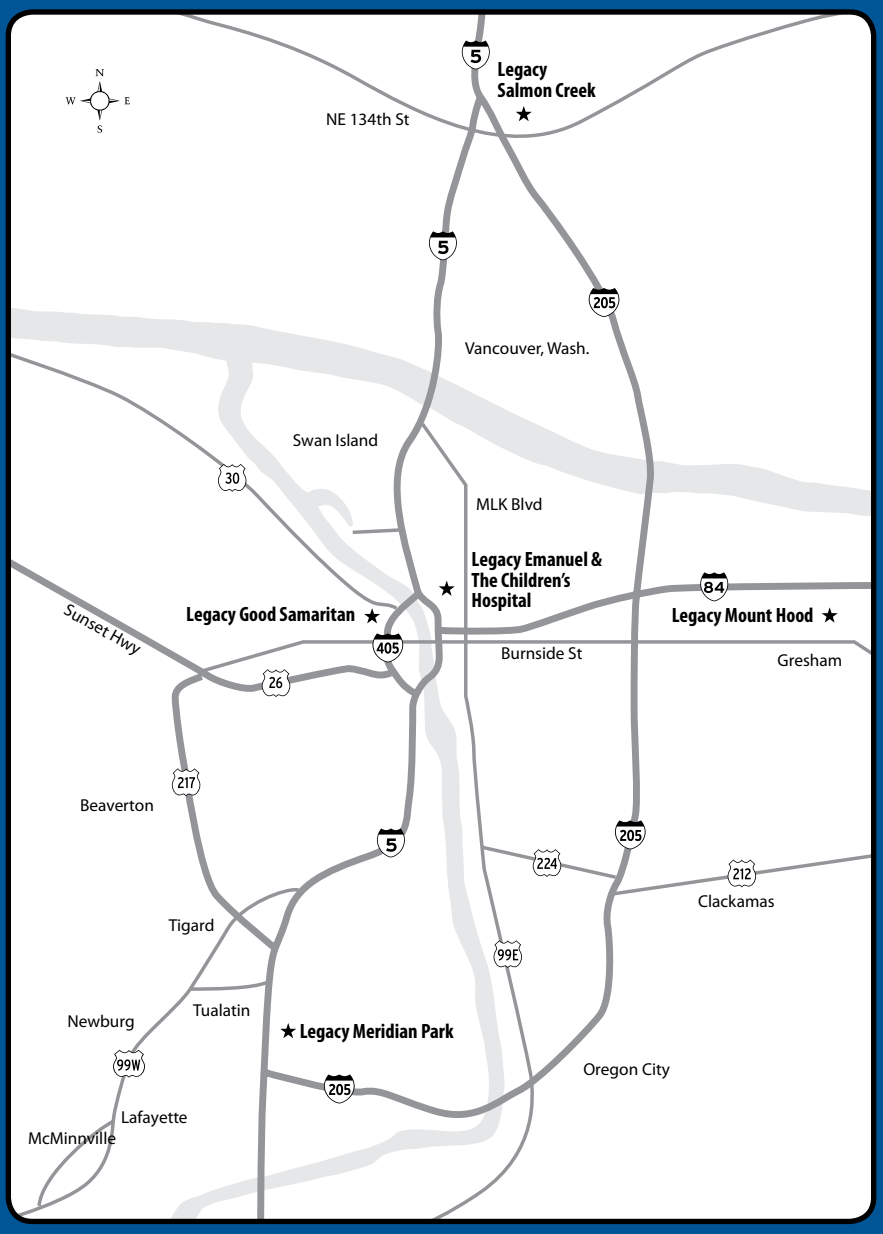
Selma Annala, R.T., CLC, Supervisor, Integrative Medicine
R. Bryan Bell, M.D., DDS, FACS, Head & Neck Surgery and Cancer Liaison Physician
Jason Bauer, M.D., Diagnostic Radiology
Hollis Brown, Manger, Cancer Data Management
Diane Buelt, Director SC Clinical and Support Services
Bethany Carey, MPH, Quality Consultant
Jefferson Chen, M.D., FACS, Neurosurgeon
Leslie Dhone, Research Supervisor
Kelly Doherty, Manager, EH/GS Radiation Oncology
Barbara Farmer, Manager, Hospice Services
Joseph Frankhouse, M.D., FACS, Colorectal Surgeon
Sue Frieberg, R.N., ANP, Legacy Hospice/Hopewell House
Julie Goodwin, Director, LMP Clinical and Support Services
Leah Grotzinger, PharmD, EH/GS Pharmacy
Keith Hansen, M.D., FACP, Medical Director, Autologous Stem Cell Transplant Program; Cancer Committee Chair
Lisa Hansen, R.N., AOCN, Coordinator, Autologous Stem Cell Transplant Program
Kate Jaramillo, Chaplain
Kathleen Johnson, Manager, MH Rehabilitation and Radiation Oncology
Nathalie Johnson, M.D., FACS, General Surgeon; Medical Director, Legacy Cancer Services and Breast Health Centers
Michael Kaempf, M.D., FACS, Urology
Laurie Kennedy, Manager, SC Rehabilitation and Radiation Oncology
Leah Kiesow, CTR, Supervisor
Pamela Kilmurray, Director, Legacy Cancer, Rehabilitation, Imaging, Stroke and Hospice Services
Misa Lee, M.D., Radiation Oncology
Alayne Lehman, Manager, Clinical Research
Katherine Leonard, Ph.D, Psychology
Richard Lex, R.N., Manager, LGS Cancer Services
Bruce Lowe, M.D., Urologist
Anthony Melaragno, M.D., LGS Chief Administrative Officer
Katherine Morris, M.D., FACS, Medical Director, Cancer Research and Hepatic, Biliary & Pancreatic Program
Dane Moseson, M.D., FACS, General Surgeon
Joanne Nelson, M.D., FACS, General Surgeon
Janice Olson, M.D., Medical Director, Children's Cancer and Blood Disorders Program

Legacy Health 2008 Network Cancer Committee Members, *continued*

Marci Reed, Dietitian, Cancer Services
Kelly Rice, Pharmacist
Mark Schray, M.D., Medical Director, Legacy Radiation Oncology
Anne Smith-Sehdev, M.D., Pathologist
Susan Swanson, LCSW, LGS Social Services
Derek Taylor, M.D., NW Gastroenterology
Terry Wagie, R.N., M.S., Clinical Nurse Specialist, Legacy Cancer Services
Laura Wallace, RHIT, CTR Lead Registrar
Gail Weisgerber, Manager, GS Rehabilitation Services
Robin Weisshaar, Manager, LGS and LMP Social Services
Jocelyn White, M.D., FACP, Medical Director, Legacy Palliative Care and Hospice Program
Mark Whiteford, M.D., FACS, Colorectal Surgeon
Charlyn Wilson, R.N., Clinical Coordinator, Legacy Cancer Services
Vina Winters, R.N., Supervisor, LGS Day Treatment Unit

Subcommittees of the Network Cancer Committee

- Cancer Data Management Quality Council
- Cancer Services Quality Advisory Council
- Colorectal Cancer Center of Excellence Committee
- Hepatobiliary/Pancreatic Progam
- Intergrative Cancer Care Advisory Committee
- IV Standards Committee
- MPH New Breast Center Model
- Prostate Program Development
- Public/Professional Education Council
- Radiation Oncology Quality Council



For more information about Legacy Cancer Services,
please call 503-413-8050.

www.legacyhealth.org/cancer

LEGACY
HEALTH