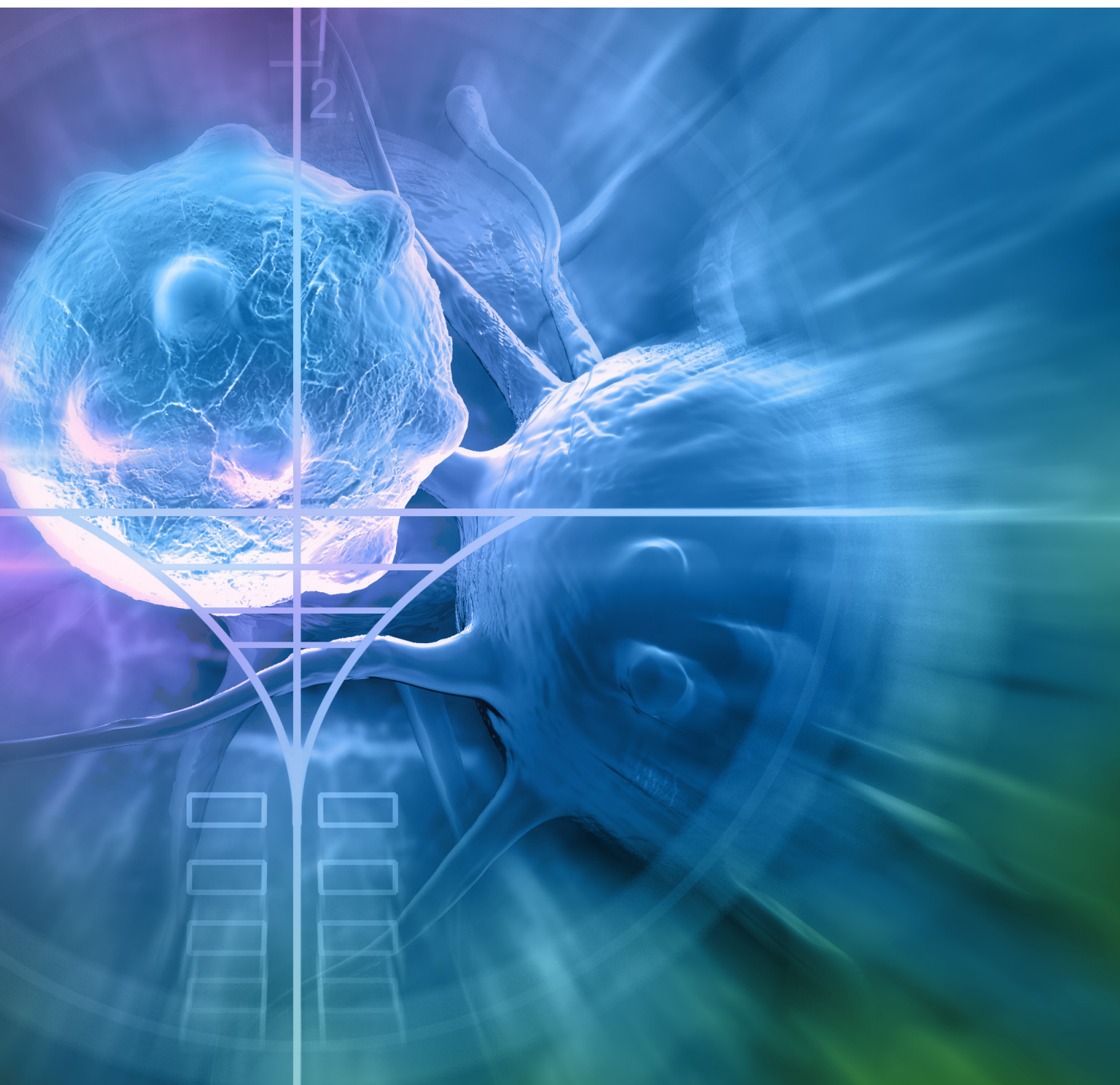


STATISTICAL REPORT

2018



WELCOME

Welcome to Lehigh Valley Cancer Institute's 2018 annual report, which features 2017 statistics and information about our oncology program and services. Lehigh Valley Cancer Institute includes services related to prevention, detection, diagnosis, genetics, patient navigation, oncology nutritional services, multidisciplinary cancer clinics, social and psychological support, rehabilitation, clinical trials, oncologic surgery, radiation, chemotherapy/infusion, integrated medicine, hemophilia care, survivorship, palliative care, and hospice care.

LEHIGH VALLEY CANCER INSTITUTE

While cancer care has been a core service since Lehigh Valley Hospital (LVH) opened its doors, the Lehigh Valley Cancer Institute structure was introduced in September 2016, affording us the opportunity to provide a better patient experience, better outcomes and the highest standards of care for these specialized services.

We collaboratively provide patient care, conduct research and provide clinical education at the highest level to better predict, prevent and combat cancer. We have the infrastructure, programs and partnerships in place to help our communities stay healthy and to provide the most advanced treatment.

Our institute model benefits our patients through teamwork, leading-edge treatment, education, research/clinical trials, and access to services, resources and expertise in a warm and compassionate environment.

People who receive cancer care at Lehigh Valley Cancer Institute can have confidence knowing they have access to hundreds of lifesaving breakthrough clinical trials through our Memorial Sloan Kettering (MSK) Cancer Alliance membership and other clinical research relationships. Our cancer team also offers comprehensive, collaborative expertise through our multidisciplinary clinics (MDC). MDC visits are available for patients who have any of the following types of cancer: skin and soft tissue, upper gastrointestinal (GI), breast, lung, prostate, or head

and neck cancer. At an MDC visit, patients receive comprehensive cancer assessment from all providers who may need to be involved in their long-term plan of care, and a single, cohesive treatment plan recommendation from a team of cancer specialists. Our strong leadership and relentless pursuit of innovation coupled with the adoption of an institute structure deliver true clinical value to our community. We hope to instill confidence that Lehigh Valley Health Network has a sharp focus on our community's greatest needs and provides unparalleled compassionate and convenient care close to home.

OUR CANCER INSTITUTE MISSION

We ease our community's cancer burden by preventing cancer, by finding cancer early, by providing comprehensive diagnostic, consultative, treatment, support and survivorship services, and by educating health care professionals and residents of the communities we serve about advances in cancer care.



MEMORIAL SLOAN KETTERING ALLIANCE IN 2018

Lehigh Valley Health Network continues to have a robust relationship with Memorial Sloan Kettering (MSK) Cancer Center, as one of three MSK Cancer Alliance partners in the nation. This relationship gives us ready access to precision medicine testing, expanded leading-edge clinical trials, collaboration on patient management strategies, rapid research-to-clinical practice, standards of care changes, and facilitates patient appointments for second opinions or collaborative management. Meetings are held weekly to discuss potential or new clinical trials to open access. Joint tumor conferences allow for patient case presentations and discussions related to the plan of care among multiple experts in the field.

Our partnership provides for multiple joint committees including education, clinical outcomes, quality improvement, research and informatics. At these committees, we identify the structure for sharing information, comparing clinical outcomes, and facilitating collaboration on research initiatives as well as standards of care across the Alliance.

The groundwork for bringing Phase 1 trials (the earliest of clinical trials) to Lehigh Valley Cancer Institute patients has been developed this year through significant investments in infrastructure.

This year, monthly nursing conferences and collaborations on pain initiatives and palliative care have been added to the ongoing physician collaborative opportunities.

Repeat assessment of our alignment with MSK Standards of Care was conducted this year to ensure the same quality of care is provided to our patients year after year. Five disease sites of breast, colon, lung, endometrial and melanoma are being reassessed, and all results to date confirm high alignment with MSK Standards of Care.

Disease management teams (DMT) meet monthly to monitor and discuss patterns of care, discuss new care paradigms, and establish advanced care standards for our patients.

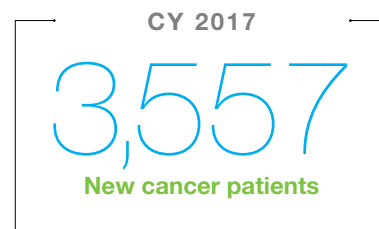


Memorial Sloan Kettering
Cancer Alliance
MEMBER

LEHIGH VALLEY CANCER INSTITUTE CASE INFORMATION

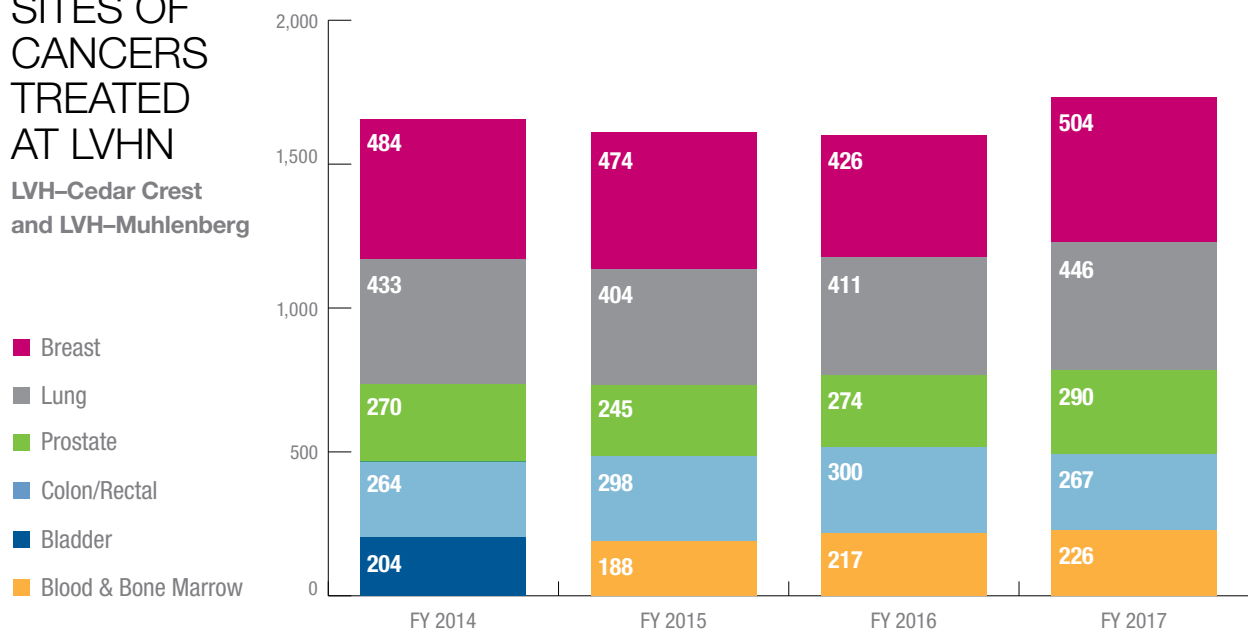
Lehigh Valley Cancer Institute offers a range of cancer services in convenient, patient-focused locations, including the John and Dorothy Morgan Cancer Center at Lehigh Valley Hospital (LVH)–Cedar Crest, the Cancer Center at LVH–Muhlenberg and the Health Center at Bangor. Patient care also is provided through Lehigh Valley Physician Group practice offices in Allentown, Bethlehem, Hazleton, Bangor and Lehighton. Breast Health Services is offered in 15 locations throughout the region, and now through mobile mammography.

The faculty of Lehigh Valley Cancer Institute is composed of physicians who are cancer care specialists and board-certified in their fields. In calendar year 2017, the cancer program saw more than 3,500 new cancer patients.



TOP FIVE MOST PREVALENT SITES OF CANCERS TREATED AT LVHN

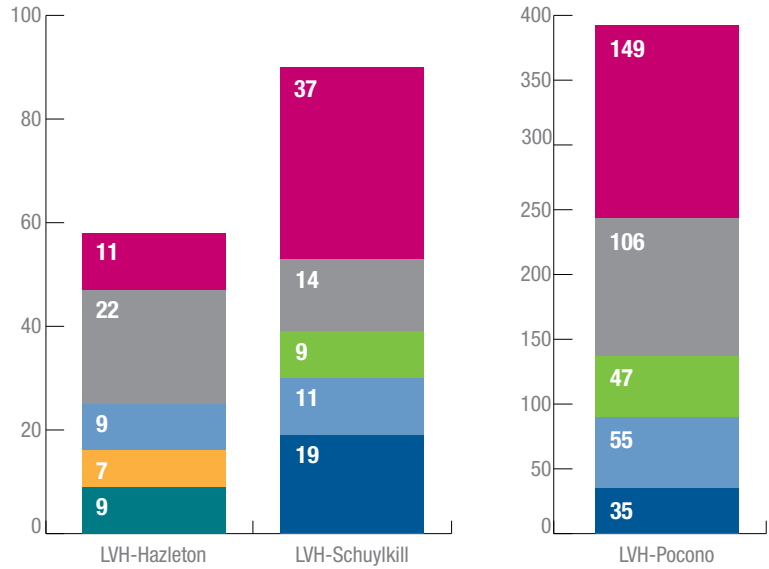
LVH–Cedar Crest and LVH–Muhlenberg



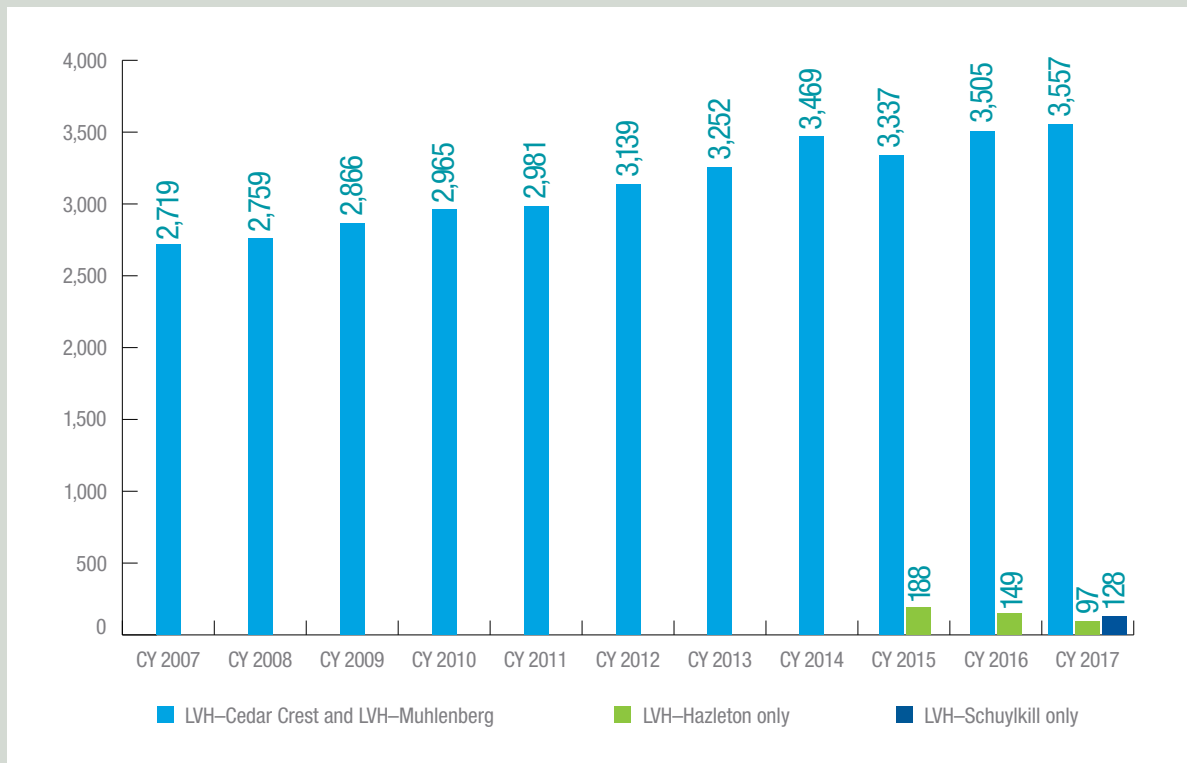
TOP FIVE MOST PREVALENT SITES OF CANCERS TREATED AT LVHN REGIONAL CENTERS IN CY 2017

LVH-Hazleton, LVH-Pocono and LVH-Schuylkill

- Breast
- Lung
- Bladder
- Prostate
- Blood & Bone Marrow
- Lymph Nodes
- Colon/Rectal



TOTAL ANNUAL ANALYTIC CASES

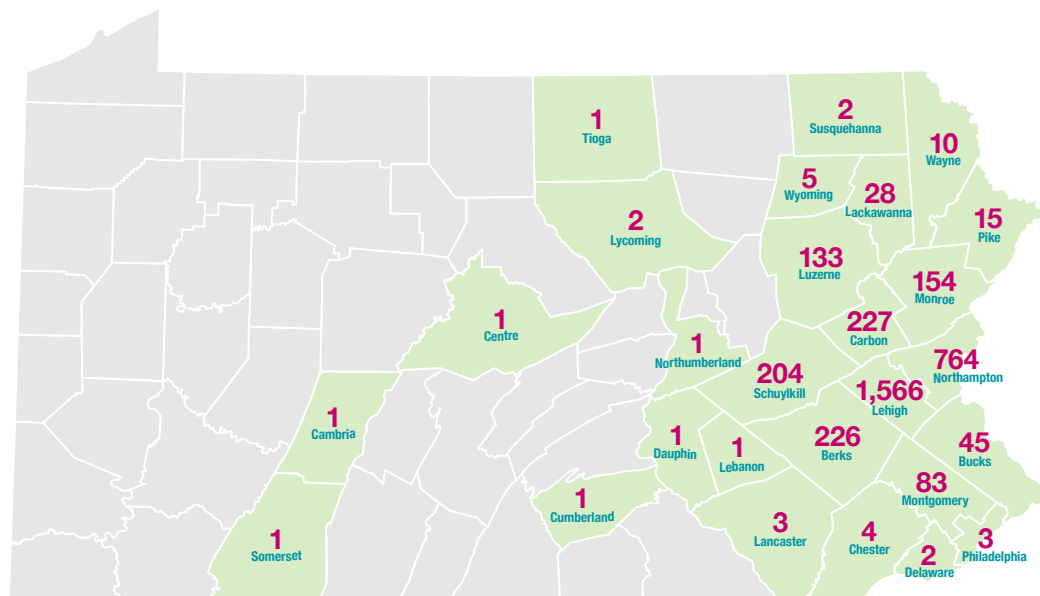


ANALYTIC CASE INCIDENCE BY COUNTY OF RESIDENCE

Lehigh Valley Health Network provides cancer care for patients in our community and serves as a tertiary referral center. In 2017 alone, we provided diagnostic care, second opinion recommendations and treatment to more than 3,500 patients from 27 Pennsylvania counties. In addition, 73 patients came to our cancer program from communities across the United States.

COUNTY OF RESIDENCE	2015	2016	2017
BERKS	245	222	226
BLAIR	1	0	0
BRADFORD	3	1	0
BUCKS	43	58	45
CAMBRIA	0	1	1
CARBON	190	210	227
CENTRE	0	0	1
CHESTER	2	2	4
CLINTON	0	1	0
COLUMBIA	0	4	0
CUMBERLAND	0	0	1
DAUPHIN	0	0	1
DELAWARE	0	0	2
FRANKLIN	0	1	0
HUNTINGDON	1	0	0
LACKAWANNA	29	29	28
LANCASTER	0	5	3
LEBANON	2	1	1
LEHIGH	1,549	1,513	1,566

COUNTY OF RESIDENCE	2015	2016	2017
LUZERNE	153	144	133
LYCOMING	6	4	2
MONROE	156	166	154
MONTGOMERY	68	89	83
MONTOUR	1	2	0
NORTHAMPTON	652	768	764
NORTHUMBERLAND	0	0	1
PHILADELPHIA	4	4	3
PIKE	8	13	15
SCHUYLKILL	161	191	204
SNYDER	1	0	0
SOMERSET	0	0	1
SULLIVAN	0	1	0
SUSQUEHANNA	1	3	2
TIOGA	4	0	1
UNION	2	0	0
WAYNE	11	2	10
WYOMING	2	4	5
OUT OF STATE	42	66	73
TOTAL	3,337	3,505	3,557



2017 ANALYTIC CASES BY PRIMARY BODY SITE

CHART NOTES THE PRIMARY BODY SITE INVOLVED IN EACH PATIENT'S CANCER DIAGNOSIS.

LVH-CEDAR CREST AND LVH-MUHLENBERG CASES

PRIMARY SITE	TOTAL
HEAD AND NECK	96
DIGESTIVE ORGANS	621
ESOPHAGUS	35
STOMACH	44
SMALL INTESTINE	22
COLON	196
RECTOSIGMOID JUNCTION	15
RECTUM	79
ANUS AND ANAL CANAL	8
LIVER AND BILE DUCTS	68
GALLBLADDER	10
OTHER BILIARY TRACT	12
PANCREAS	125
OTHER DIGESTIVE ORGANS	7
THORAX	459
BRONCHUS AND LUNG	446
THYMUS	5
HEART MEDIASTINUM PLEURA	8
MUSCULOSKELETAL/SOFT TISSUE SITES	12
BLOOD AND BONE MARROW	226
SKIN	148
BREAST	504
FEMALE GENITAL ORGANS	352
VULVA	17
VAGINA	6
CERVIX UTERI	26
CORPUS UTERI	206
UTERUS NOS	5

PRIMARY SITE	TOTAL
OVARY	76
OTHER FEMALE GENITAL ORGANS	15
PLACENTA	1
MALE GENITAL ORGANS	281
PENIS	3
PROSTATE GLAND	267
TESTIS	10
OTHER & UNSPECIFIED MALE GENITAL ORGANS	1
URINARY TRACT ORGANS	314
KIDNEY	133
KIDNEY, RENAL PELVIS	18
URETER	4
URINARY BLADDER	157
OTHER AND UNSPECIFIED URINARY ORGANS	2
CENTRAL NERVOUS SYSTEM	206
MENINGES	114
BRAIN	78
OTHER NERVOUS SYSTEM	14
ENDOCRINE GLANDS	128
THYROID GLAND	104
ADRENAL GLAND	2
OTHER ENDOCRINE GLANDS	22
OTHER	9
RETROPERITONEUM AND PERITONEUM	7
OTHER ILL-DEFINED SITES	2
LYMPH NODES	152
UNKNOWN PRIMARY	49
TOTAL ANALYTIC CASES	3,557

*LVH-HAZLETON CASES

PRIMARY SITE	TOTAL
HEAD AND NECK	4
DIGESTIVE ORGANS	13
BRONCHUS AND LUNG	22
CONNECTIVE AND SUBCUTANEOUS AND SOFT TISSUE	2
BLOOD AND BONE MARROW	7
SKIN	3
BREAST	11

PRIMARY SITE	TOTAL
FEMALE GENITAL ORGANS	9
MALE GENITAL ORGANS	2
URINARY TRACT ORGANS	4
CENTRAL NERVOUS SYSTEM	5
ENDOCRINE GLANDS	3
LYMPH NODES	9
UNKNOWN PRIMARY	3
TOTAL ANALYTIC CASES	97

*This reflects patients who received services solely at LVH-Hazleton. Patients who received a portion of services at LVH-Cedar Crest and/or LVH-Muhlenberg in addition to LVH-Hazleton are counted in both LVH-Cedar Crest and LVH-Muhlenberg numbers for purposes of this report.

PRIMARY BODY SITES: **FIVE** MOST FREQUENTLY TREATED AT LVHN

1 BREAST CANCER

INCIDENCE OF BREAST CANCER BY AGE AT DIAGNOSIS LVHN 2017

AGE AT DIAGNOSIS	0-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	TOTAL
(N)	2	15	70	111	152	113	37	4	504

BREAST CANCER TREATMENT BY STAGE AT DIAGNOSIS

FIRST COURSE	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage UNK	TOTAL	%
SURGERY ONLY	26	23	13	7	0	0	69	14.7%
CHEMOTHERAPY ONLY	0	0	5	2	0	0	7	1.5%
SURGERY AND RADIATION	9	11	2	0	0	1	23	4.9%
SURGERY AND CHEMOTHERAPY	0	7	12	12	0	1	32	6.8%
SURGERY, RADIATION AND CHEMOTHERAPY	0	7	14	1	0	0	22	4.7%
SURGERY, RADIATION AND HORMONE THERAPY	25	118	23	0	0	0	166	35.3%
SURGERY AND HORMONE THERAPY	7	24	10	3	0	0	44	9.4%
SURGERY, RADIATION, CHEMOTHERAPY AND HORMONE THERAPY	0	3	13	3	0	0	19	4.0%
SURGERY, RADIATION, CHEMOTHERAPY AND IMMUNOTHERAPY	1	7	5	1	0	0	14	3.0%
SURGERY, RADIATION, CHEMOTHERAPY, HORMONE THERAPY AND IMMUNOTHERAPY	0	3	4	0	0	0	7	1.5%
SURGERY, CHEMOTHERAPY AND HORMONE THERAPY	0	2	6	3	0	0	11	2.3%
SURGERY, CHEMOTHERAPY AND IMMUNOTHERAPY	0	4	0	2	0	0	6	1.3%
SURGERY, CHEMOTHERAPY, HORMONE THERAPY AND IMMUNOTHERAPY	0	2	2	0	0	1	5	1.1%
OTHER SPECIFIED THERAPY	1	2	5	1	25	0	34	7.2%
NO FIRST COURSE TREATMENT	1	3	1	1	5	0	11	2.3%
TOTAL	70	216	115	36	30	3	470	100%

Note: 34 cases excluded due to AJCC stage classification performed during or after initial multimodality therapy.

2 LUNG CANCER

INCIDENCE OF LUNG CANCER BY AGE AT DIAGNOSIS LVHN 2017

AGE AT DIAGNOSIS	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	TOTAL
(N)	1	0	3	10	57	137	140	86	12	446

LUNG CANCER TREATMENT BY *AJCC STAGE AT DIAGNOSIS

FIRST COURSE	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage UNK	TOTAL	%
SURGERY ONLY	0	35	10	3	1	5	54	12.2%
RADIATION ONLY	1	54	6	7	30	0	98	22.1%
SURGERY AND CHEMOTHERAPY	0	1	8	3	0	0	12	2.7%
RADIATION AND CHEMOTHERAPY	0	6	8	43	28	1	86	19.4%
CHEMOTHERAPY ONLY	0	3	1	5	34	0	43	9.7%
SURGERY, RADIATION AND CHEMOTHERAPY	0	0	0	4	2	0	6	1.4%
IMMUNOTHERAPY	0	1	0	4	8	0	13	2.9%
RADIATION AND IMMUNOTHERAPY	0	0	0	0	12	0	12	2.7%
OTHER SPECIFIED THERAPY	0	0	0	2	9	0	11	2.5%
NO FIRST COURSE TREATMENT	0	20	4	14	65	5	108	24.4%
TOTAL	1	120	37	85	189	11	443	100%

*Note: 3 cases excluded: 2 due to AJCC stage classification performed during or after initial multimodality therapy; 1 occult stage.

3 PROSTATE CANCER

INCIDENCE OF PROSTATE CANCER BY AGE AT DIAGNOSIS LVHN 2017

AGE AT DIAGNOSIS (N)	0-39	40-49	50-59	60-69	70-79	80-89	90-100	TOTAL
	0	2	42	126	76	19	2	267

PROSTATE CANCER TREATMENT BY *AJCC STAGE AT DIAGNOSIS

FIRST COURSE	Stage 1	Stage 2	Stage 3	Stage 4	Stage UNK	TOTAL	%
SURGERY ONLY	13	65	18	0	10	106	39.8%
RADIATION ONLY	2	9	0	0	2	13	5.0%
SURGERY AND HORMONE THERAPY	0	2	5	4	0	11	3.0%
SURGERY, RADIATION AND HORMONE THERAPY	0	1	1	1	0	3	1.3%
RADIATION AND HORMONE THERAPY	1	47	2	3	2	55	17.7%
SURGERY AND RADIATION	0	1	4	0	0	5	0.3%
HORMONE THERAPY ONLY	1	6	1	12	1	21	6.0%
OTHER SPECIFIED THERAPY	0	0	0	4	0	4	4.3%
NO FIRST COURSE TREATMENT	33	12	0	1	3	49	22.4%
TOTAL	50	143	31	25	18	267	100%

4 COLON CANCER

INCIDENCE OF COLON CANCER BY AGE AT DIAGNOSIS LVHN 2017

AGE AT DIAGNOSIS (N)	0-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	TOTAL
	2	4	20	29	48	46	43	4	196

COLON CANCER TREATMENT BY *AJCC STAGE AT DIAGNOSIS

FIRST COURSE	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage UNK	TOTAL	%
SURGERY ONLY	7	31	33	19	3	3	96	52.4%
SURGERY AND CHEMOTHERAPY	0	1	10	37	8	0	56	27.2%
SURGERY, CHEMOTHERAPY AND IMMUNOTHERAPY	0	0	0	2	3	1	6	4.9%
CHEMOTHERAPY ONLY	0	0	0	1	6	2	9	2.9%
CHEMOTHERAPY AND IMMUNOTHERAPY	0	0	0	0	9	0	9	3.9%
SURGERY, RADIATION AND CHEMOTHERAPY	1	0	0	0	0	0	1	0.5%
OTHER SPECIFIED THERAPY	0	0	0	0	2	1	3	1.5%
NO FIRST COURSE TREATMENT	0	0	0	2	5	8	15	6.8%
TOTAL	8	32	43	61	36	15	195	100%

*Note: 1 case excluded due to AJCC stage classification performed during or after initial multimodality therapy.

PRIMARY BODY SITES: **FIVE** MOST FREQUENTLY TREATED AT LVHN

4 RECTAL CANCER

INCIDENCE OF RECTAL CANCER BY AGE AT DIAGNOSIS LVHN 2017

AGE AT DIAGNOSIS	0-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	TOTAL
(N)	0	1	10	23	20	19	6	0	79

RECTAL CANCER TREATMENT BY *AJCC STAGE AT DIAGNOSIS

FIRST COURSE	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage UNK	TOTAL	%
SURGERY ONLY	3	8	2	0	0	5	18	22.8%
SURGERY AND CHEMOTHERAPY	0	0	3	2	0	0	5	6.3%
SURGERY AND RADIATION THERAPY	0	0	0	0	0	1	1	1.3%
CHEMOTHERAPY AND RADIATION THERAPY	0	0	4	8	6	0	18	22.8%
CHEMOTHERAPY AND IMMUNOTHERAPY	0	0	0	0	4	0	4	5.1%
CHEMOTHERAPY ONLY	0	0	3	0	4	0	7	8.9%
SURGERY, CHEMOTHERAPY AND RADIATION THERAPY	0	0	3	13	4	0	20	25.3%
RADIATION THERAPY ONLY	0	0	0	0	0	1	1	1.3%
NO FIRST COURSE TREATMENT	0	0	1	1	2	1	5	6.3%
TOTAL	3	8	16	24	20	8	79	100%

5 BLOOD AND BONE MARROW CANCER

INCIDENCE OF BLOOD AND BONE MARROW CANCER BY AGE AT DIAGNOSIS LVHN 2017

AGE AT DIAGNOSIS	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-100	TOTAL
(N)	7	4	3	2	18	26	57	58	43	8	226

BLOOD AND BONE MARROW CANCER TREATMENT BY STAGE AT DIAGNOSIS

FIRST COURSE	TOTAL	%
CHEMOTHERAPY ONLY	61	27.0%
CHEMOTHERAPY AND HORMONE THERAPY	4	1.8%
CHEMOTHERAPY, HORMONE THERAPY AND IMMUNOTHERAPY	9	4.0%
CHEMOTHERAPY AND STEM CELL TRANSPLANT	9	4.0%
CHEMOTHERAPY, HORMONE THERAPY, IMMUNOTHERAPY AND STEM CELL TRANSPLANT	4	1.8%
CHEMOTHERAPY AND RADIATION	4	1.8%
CHEMOTHERAPY, RADIATION AND HORMONE THERAPY	2	0.9%
CHEMOTHERAPY, RADIATION, HORMONE THERAPY AND IMMUNOTHERAPY	2	0.9%
HORMONE AND IMMUNOTHERAPY	3	1.3%
RADIATION THERAPY ONLY	1	0.4%
IMMUNOTHERAPY ONLY	5	2.2%
CHEMOTHERAPY AND IMMUNOTHERAPY	2	0.9%
OTHER SPECIFIED THERAPY	15	6.6%
NO FIRST COURSE TREATMENT	105	46.5%
TOTAL	226	100%

EVIDENCE-BASED STUDY

In accordance with our accreditation requirements, our providers conduct annual studies to ensure adherence to national evidence-based guidelines. This year, our providers conducted a retrospective review of patients with limited brain metastases. Studies show that whole brain radiotherapy (WBRT) leads to the decline of declarative memory by damaging neural stem cells. An alternate treatment option is stereotactic radiosurgery (SRS), such as Gamma Knife®. According to National Comprehensive Cancer Network (NCCN) guidelines, limited brain metastases defines a group of patients for whom SRS can be offered, is equally effective, and offers significant cognitive protection compared with WBRT. It usually involves up to four brain metastases. After review of qualifying cases of limited brain metastases presenting between 2014 and 2016, 100 percent were found to be treated in accordance with NCCN guidelines and offered SRS.

**Commission on
Cancer Standard 4.6
Evidence-Based Study
was a retrospective
review of outcomes
for patients with limited
brain metastases treated
with Gamma Knife®
radiotherapy at Lehigh
Valley Cancer Institute
between 2014 and 2016.**

LEHIGH VALLEY CANCER INSTITUTE INNOVATIONS AND IMPACT

CLINICAL TRIALS

Offering our patients excellence in cancer care and access to the latest and most promising therapies is the mission of Lehigh Valley Health Network’s clinical trials program. Our dedicated clinical trials staff helps ensure we follow the strictest of clinical trial protocols and deliver clear results, while providing compassionate care for our patients. LVHN was invited to join the Memorial Sloan Kettering (MSK) Cancer Alliance. Started in 2016, LVHN cancer patients work with their LVHN provider to determine if an early-phase MSK cancer clinical trial is right for them. In addition to potentially improving lifespan or quality of life, the LVHN/MSK clinical trials collaboration will help advance cancer treatment knowledge to benefit all patients.



ACTIVELY ACCRUING TRIALS



CLINICAL TRIALS (con't)

Lehigh Valley Cancer Institute has a collaborative agreement with the Michigan Cancer Research Consortium (MCRC) – one of only 46 National Cancer Institute Community Oncology Research Programs (NCORP). At the end of 2016, LVHN joined NCORP under the MCRC, allowing us access to more than 120 National Cancer Institute (NCI) clinical trials. Greater involvement in NCI trials opens the door to increasingly exciting science and expansion into cancer control studies, positioning LVHN as a leader not only in providing the highest-quality cancer care but also in the way of the future.

In addition to participating in clinical trials through our alliance with MSK and under NCORP, LVHN continues to support a strong portfolio of pharmaceutical clinical trials. Our pharmaceutical clinical trials are provided from Bristol Myers Squibb (BMS), Merck, Pfizer and Novartis. We are proud of our relationship with Memorial Sloan Kettering, and are equally pleased to continue National Cancer Institute-sponsored clinical trials and innovative immunotherapy trials.

CANCER MOONSHOT Elite Cancer Trials

Targeted Agent and Profiling Utilization Registry (TAPUR): The TAPUR study provides eligible patients with medication not yet approved by the FDA for their particular cancer type and collects data on the clinical response. Lehigh Valley Health Network (LVHN) is one of only three TAPUR sites in Pennsylvania.

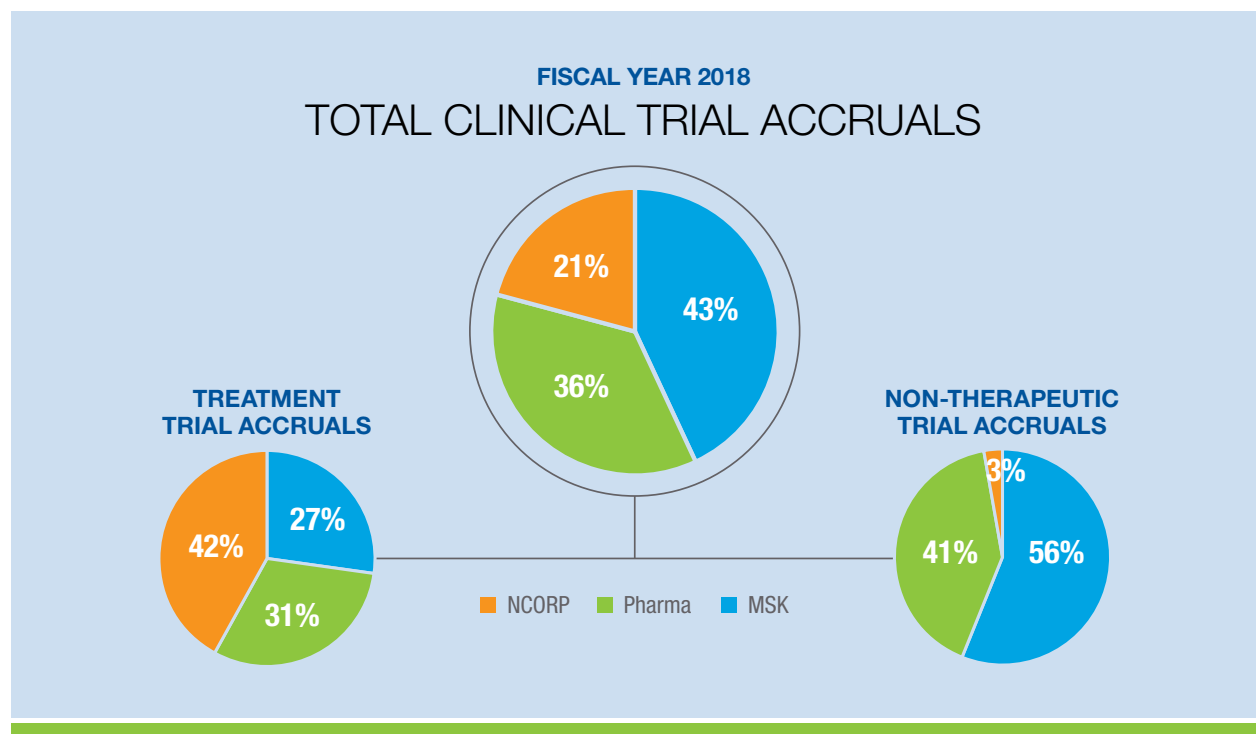
Affiliated with the federal government's Cancer Moonshot program to accelerate cancer research, TAPUR will help realize the promise of genomic-targeted therapies.

If the genetic profile of a patient's tumor indicates actionable mutations, physicians can consult TAPUR to see if there is a match between the patient's tumor mutations and a medication being investigated. A molecular tumor board will help guide a patient's eligibility for the registry.

To date, LVHN has enrolled 48 patients in the TAPUR clinical trial, thereby making LVHN the highest-enrolling institution in Pennsylvania and one of the top five highest-enrolling institutions in the nation.

48

Patients enrolled in the
TAPUR clinical trial



GROUNDBREAKING TREATMENTS FOR MELANOMA

Only at Lehigh Valley Cancer Institute

The incidence of melanoma – potentially the deadliest form of skin cancer – has been rising for the past 30 years, according to the American Cancer Society. It has been a dreaded diagnosis, but new treatment options offer hope. Lehigh Valley Cancer Institute offers the most advanced treatments in the U.S. by using Memorial Sloan Kettering (MSK) standards of care offering the best, evidence-based treatments for all stages of melanoma.

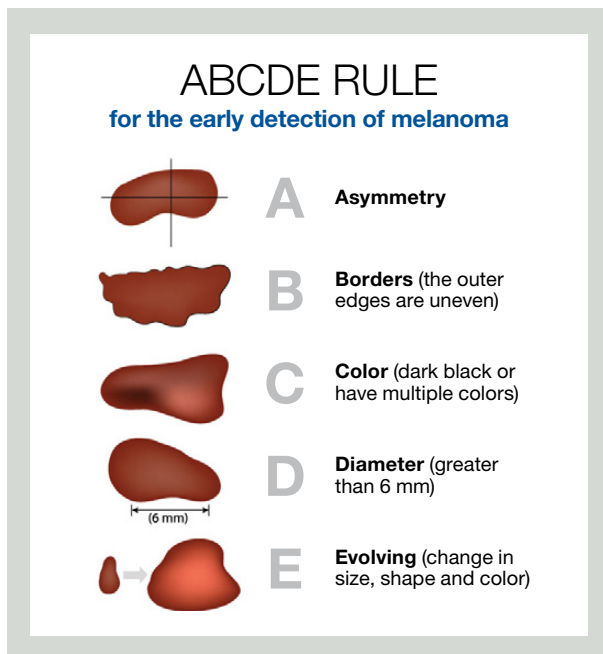
Surgical treatment

Lehigh Valley Cancer Institute is leading the way for patients with melanomas who require surgery. Complete lymph node dissection has been the standard of care for all patients with stage 3 nodal metastases.

Groundbreaking clinical trials

Patients, especially those with advanced metastatic melanoma, gain the benefit of being among the first to receive groundbreaking immunotherapy medications, such as nivolumab and ipilimumab, which are proving to be lifesaving.

Research is ongoing, and Lehigh Valley Cancer Institute is the only site in the region to offer a new clinical trial for patients with stage 4 melanoma that is resistant to all standard available treatments. It combines nivolumab plus anti-LAG-3, an immunotherapy that provides a booster of dendritic cells.



NEW KIDNEY CANCER CLINICAL TRIALS at Lehigh Valley Cancer Institute

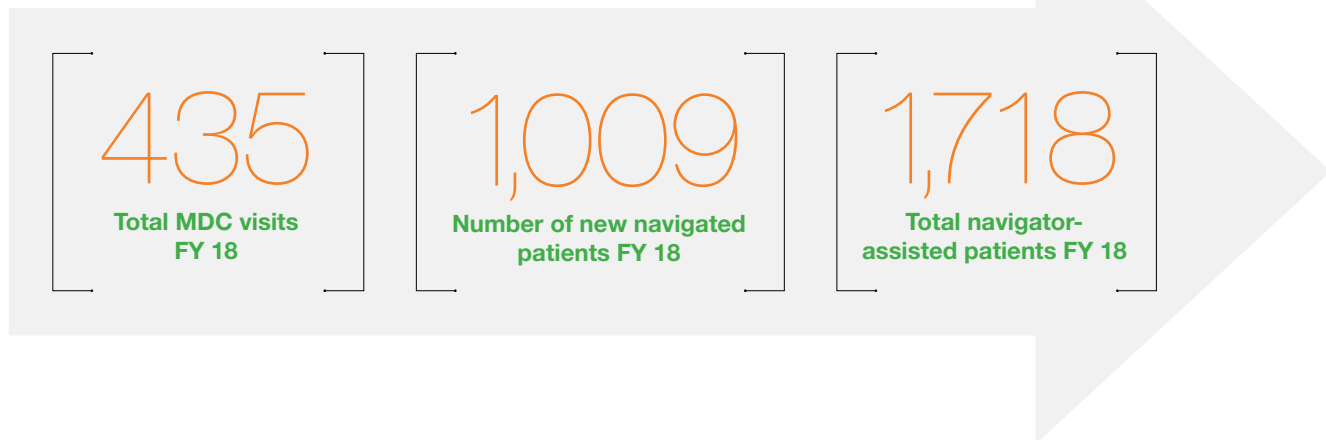
Studies focus on immunotherapy, genomics

New clinical trials for kidney cancer are available at Lehigh Valley Cancer Institute through partnerships with Memorial Sloan Kettering (MSK) Cancer Center and Lehigh University. The studies seek to determine whether immune checkpoint inhibitors targeting PD-1 and CTLA-4 receptors may improve outcomes, as well as whether use of a device to catch and release circulating tumor cells could lead to earlier detection of metastasized tumors and greater effectiveness in gene therapy.

Immunotherapy trials:

- ▶ Phase 3 study of immunotherapy versus placebo in patients with localized kidney cancer at high risk for relapse after cancer surgery (MSK 17-411) – The standard treatment for early-stage renal cell carcinoma is surgery to remove part or all of the affected kidney, yet patients with some cancers, such as those with stage 2 and 3 tumors, may still have a high risk for the cancer returning. This study examines whether giving immunotherapy drugs nivolumab and ipilimumab after kidney cancer surgery is effective for reducing the risk for relapse in these patients. Patients will be randomly assigned to receive nivolumab and ipilimumab intravenously, or a placebo.
- ▶ Phase 3 study comparing nivolumab immunotherapy plus cabozantinib and sunitinib alone for patients with untreated advanced kidney cancer (MSK 17-520) – The purpose of this study is to compare three different regimens of therapy for inoperable or metastatic renal cell carcinoma (kidney cancer) that has not yet been treated with medication. Patients will be randomly assigned to receive one of the following treatments:
 - Nivolumab immunotherapy plus cabozantinib
 - Sunitinib aloneNivolumab and ipilimumab work by taking the brakes off the immune response, while cabozantinib and sunitinib both inhibit the development of blood vessels that tumors need to grow and spread.

MULTIDISCIPLINARY CARE



MDCs

Multidisciplinary clinics (MDC) offer patients an opportunity to have their diagnosis and care options assessed and explained by a team of clinicians representing medical, surgical and radiation oncology, along with advocacy and support from an oncology nurse navigator, and support staff including social workers, counselors, rehabilitation, dietitians and genetic counselors as needed for each individual patient. MDCs are available for patients with the following types of cancer: skin and soft tissue, upper gastrointestinal (GI), breast, lung, prostate, or head and neck cancer.

BREAST MULTIDISCIPLINARY CLINIC OPENS AT LVH-MUHLENBERG

Women diagnosed with breast cancer now have access to comprehensive, coordinated and personalized treatment through the new Breast Multidisciplinary Clinic (MDC) at our Lehigh Valley Hospital (LVH)–Muhlenberg campus. The Breast MDC, which started at LVH–Cedar Crest, allows patients to meet with a full complement of specialists in a single afternoon to receive diagnoses, and comprehensive treatment recommendations and treatment plans.

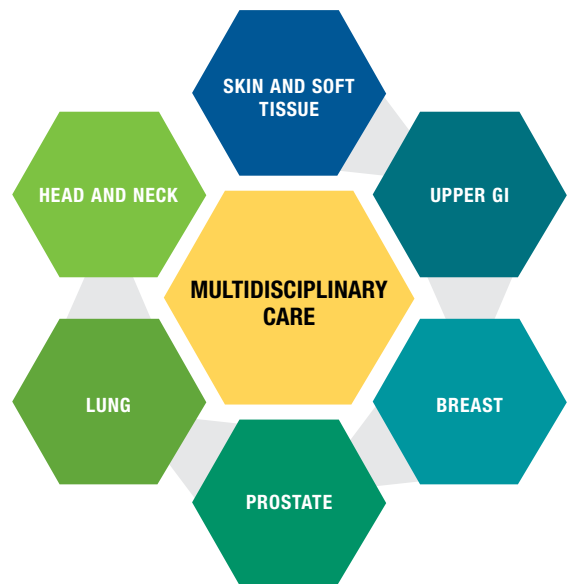
ONE-VISIT ACCESS

Patients participating in the LVH–Muhlenberg Breast MDC meet with medical, radiation and surgical oncology teams at the same time. An assigned nurse navigator stays in regular contact and connects patients with social workers, financial coordinators, genetic counselors and other members of the cancer support team as they are needed. In addition, patients receive information about their eligibility for clinical trials.

The extensive coordination in the MDCs extends to referring physicians, who receive detailed summaries of all options presented, recommended course of treatment and the patient's next steps.

DMTs

Disease management teams (DMTs) promote state-of-the-art care through expertise across multiple specialties. DMTs include representatives from all specialties involved in the treatment of specific sites of cancer such as medical oncologists, radiation oncologists, surgeons, pathologists, radiologists, nurses and more. Teams review the latest scientific literature for that cancer and evaluate protocols and procedures monthly. DMTs provide comprehensive, collaborative care evaluation at a very granular level and ensure that leading-edge innovation is practiced universally across all sites and disciplines. By examining and validating procedures with MSK, LVHN physicians evaluate the very latest standards of care with rapid cycle implementation.

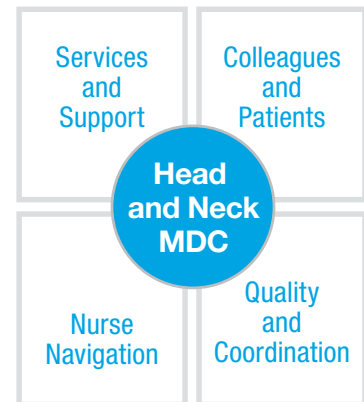


One example of a performance improvement outcome from our GYN oncology DMT was the development and implementation of a Tandem and Ovoid protocol to include utilization of ultrasound in the operating room for device placement, and development of treatment plan timing schedule. The protocol was implemented with improved patient outcomes, and a new scheduling procedure was implemented to shorten the duration from diagnosis to treatment completion. Additionally we have hardwired ER/PR testing on all endometrial cancer, and our prostate DMT affirmed a clinical practice standard of no oral contrast for prostate imaging.



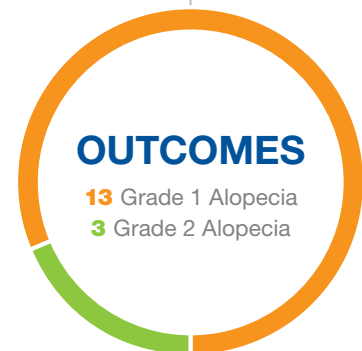
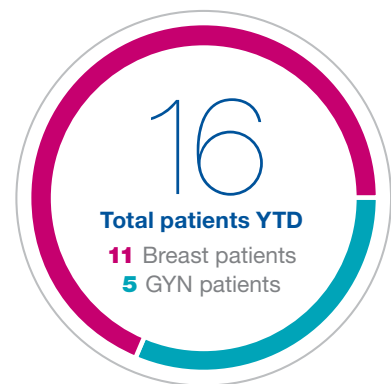
CANCER PROGRAM ANNUAL GOALS

The Commission on Cancer Standard 1.5 requires the cancer committee to establish, implement and monitor the clinical and programmatic goals for each calendar year. This year, the committee found it imperative to elevate our coordinated care services for patients with head and neck (H&N) cancers to a full service MDC. Treatment for head and neck cancers typically requires coordination of care between surgical, radiation and medical oncology providers as well as dental, nutrition, speech therapy, and many other supportive services. Having a dedicated nurse navigator and full-service MDC offers patients with one of the most complex cancers a critical level of support to ease the cancer journey. The committee worked together to secure resources such as ENT scopes, develop policies and procedures, and secure Department of Health approvals. In June, all of the infrastructure and approvals were in place to begin offering this service to patients.



IMPROVING CARE FOR SPECIAL POPULATIONS – Acute Lymphoblastic Leukemia (ALL) in Adolescent and Young Adults (AYA)

Adolescent and young adult cancer patients have unique and special needs. To better care for this group, we formed a leukemia workgroup that developed and implemented an algorithm to better meet the needs of this special group. The algorithm uses evidence-based guidelines for the medical management of acute lymphoblastic leukemia in the adolescent and young adult (AYA) patient population. It includes multidisciplinary collaboration between pediatric and adult practitioners, incorporates the use of fitness trackers to maintain wellness during long hospital stays, has early integration of support services, clinical trial evaluation, cytogenetic testing and fertility preservation guidance. A grant was obtained to incorporate rehabilitation services and fitness trackers. Digital devices are a great tool for patient engagement in the AYA population. All patients diagnosed at LVHN are being treated in accordance with this new algorithm.



- 2 Hypersensitivity Reaction Completed Treatment
- 8 Completed Therapy to Date No Discontinuation of Treatment



Kelly Rodamich wore her cooling cap 30 minutes before starting a chemotherapy infusion, all during and 90 minutes after. Rodamich noticed some thinning after her first chemotherapy session. In about two weeks it stalled, and after that the loss was so minimal that people who do not know her would have no idea she had cancer.

NEW THERAPY CAN PREVENT HAIR LOSS DURING CHEMOTHERAPY

Our clinical goal for 2018 was to establish, implement and monitor a Scalp Cooling Program.

Scalp cooling makes hair follicles less vulnerable to toxic side effects of chemotherapy. A cancer diagnosis often sends patients reeling, but thoughts and anxieties aren't limited to the medical realities of facing a potentially life-threatening disease.

Now Lehigh Valley Cancer Institute offers an innovative solution through a therapy newly approved by the Food and Drug Administration (FDA). Called the Paxman Scalp Cooling System, the therapy minimizes chemotherapy-induced hair loss by cooling the scalp.

REDUCING BLOOD FLOW

The system consists of a close-fitting headpiece resembling a swimming cap that is connected to a compact refrigeration unit. Scalp cooling is achieved as the refrigeration unit circulates a coolant through the specially designed cap. The cold causes vasoconstriction in the treated area and reduces blood flow to hair follicles, allowing hair to maintain viability. The Paxman system in effect reduces chemotherapy's cytotoxicity in hair follicle cells. Preserving hair can't be guaranteed. About half of patients who receive the therapy maintain their hair.

Treatment is indicated for solid tumors such as breast cancer and gynecologic cancers, including those of the ovaries, uterus and cervix – but not for cancers such as leukemia or lymphoma. Therapy is not currently covered by insurance, so patients are responsible for the cost of Paxman scalp cooling therapy.



PUBLIC REPORTING OF OUTCOMES

PENNSYLVANIA HEALTH CARE QUALITY ALLIANCE DATA (PHCQA)

Hospital Quality Cancer Care Report: LVHN 2015 Data

PROCESS MEASURES	LVH- CEDAR CREST	LVH- MUHLENBERG	PA RATE BENCHMARK	US RATE	CoC STANDARD
Radiation therapy is administered within one year for women receiving breast-conserving surgery for breast cancer.	94.7%	92.9%	94.7%	92.4%	90.0%
Combination chemotherapy is considered or administered within four months of diagnosis for women with hormone-receptor negative breast cancer.	95.8%	100.0%	94.6%	93.3%	90.0%
Tamoxifen (or equivalent drug therapy) is considered or administered within one year for women with hormone-receptor positive breast cancer.	99.2%	100.0%	96.3%	93.2%	90.0%
At least 12 regional lymph nodes are removed and examined for colon cancer patients who have had colon surgery.	98.6%	100.0%	92.6%	92.2%	80.0%
Chemotherapy is considered or administered within four months of diagnosis for patients with (lymph node positive) colon cancer.	100.0%	100.0%	91.1%	89.3%	90.0%



SAVING HEART:

Reducing Cardiotoxicity for Cancer Patients and Survivors



Only program of its kind in the Lehigh Valley

While cancer survival rates have steadily improved over the past two decades, cardiotoxicity associated with chemotherapy and radiation may leave patients at higher risk for cardiovascular disease. A multidisciplinary team of specialists at Lehigh Valley Cancer Institute assesses and closely monitors oncology patients throughout all stages of cancer therapy and the survivorship period to reduce cardiac morbidity and mortality.

A new subspecialty, cardio-oncology recognizes the complexity of treating cancer patients with cardiac conditions as well as the cardiotoxic effects of targeted radiation and chemotherapy agents such as anthracyclines, trastuzumab and tyrosine kinase inhibitors. Cardiac toxicity is the second most common cause of morbidity and mortality in cancer survivors, with rates of cardiotoxicity potentially exceeding 30 percent.

ASSESSING RISK

Lehigh Valley Cancer Institute's Cardio-Oncology Program, the only one of its kind in the Lehigh Valley, assesses the risk for cardiotoxicity in oncology patients before the start of chemotherapy or radiation. The assessment focuses both on risk associated with specific chemotherapy and/or radiation treatment and risk related to coexisting cardiac risk factors, age and sex. Therapeutics-related cardiac dysfunction includes

heart failure, coronary artery disease, peripheral vascular disease, thromboembolism, pericardial disease and valvular heart disease. More than 100 patients have been managed since the program's inception two years ago.

REDUCING CARDIOVASCULAR DYSFUNCTION

Cardiologists on the Cardio-Oncology Program team also counsel patients receiving potentially cardiotoxic therapy regarding benefits of reducing cardiac risk factors by maintaining optimal blood pressure, lipids and blood sugar levels, quitting smoking, and adhering to dietary and exercise recommendations.

Great progress also has been made in the field of radiation oncology aimed at reducing the risk for late cardiac toxicity from the treatment of left-sided breast cancers. Techniques such as prone breast radiotherapy and deep inspiratory breath hold allow for maximal sparing of cardiac structures while still ensuring comprehensive coverage of all at-risk volumes.

The Cardio-Oncology Program recently expanded from Lehigh Valley Hospital (LVH)—Muhlenberg to LVH—Cedar Crest to provide greater access for oncology patients.

RADIATION ONCOLOGY

Radiation therapy plays a crucial role in cancer care. The department of radiation oncology offers patients access to the finest state-of-the-art technology and techniques in a warm and caring environment.

Facilities at Lehigh Valley Hospital–Cedar Crest and Lehigh Valley Hospital–Muhlenberg offer:

- ▶ Six linear accelerators
- ▶ Stereotactic body radiotherapy (SBRT)
- ▶ Stereotactic radiotherapy (SRT)
- ▶ Gamma Knife® Icon™ radiosurgery
- ▶ Intensity-modulated radiation therapy (IMRT)
- ▶ Two large-bore, 16-slice CT simulators with latest technology including metal artifact reduction (MAR) software
- ▶ Brachytherapy – high dose and low dose
- ▶ 3D treatment planning
- ▶ Image-guided radiation therapy (IGRT)
- ▶ Respiratory gating
- ▶ RapidArc® technology
- ▶ Optical surface monitoring system (OSMS) allowing for monitoring patient positioning during radiation treatment
- ▶ Prone breast radiation therapy that allows breast to fall away from chest wall, reducing radiation doses to heart and lungs
- ▶ Dose painting technique to highly customize treatment area allowing for “boosted” dose of radiation to focused area (tumor) while remaining target area receives lower dose
- ▶ Pediatric radiation oncology
- ▶ Prostate stereotactic body radiotherapy (SBRT) with SpaceOAR®: A temporary hydrogel spacer is implanted between prostate and rectum prior to receiving radiation therapy to protect rectum. Goal is to maximize radiation to prostate and avoid irradiating surrounding normal tissue. This allows us to treat appropriate patients with hypo-fractionated treatments. With prostate stereotactic body radiotherapy (SBRT), patients received five fractions of high-dose radiation opposed to several weeks of treatment.

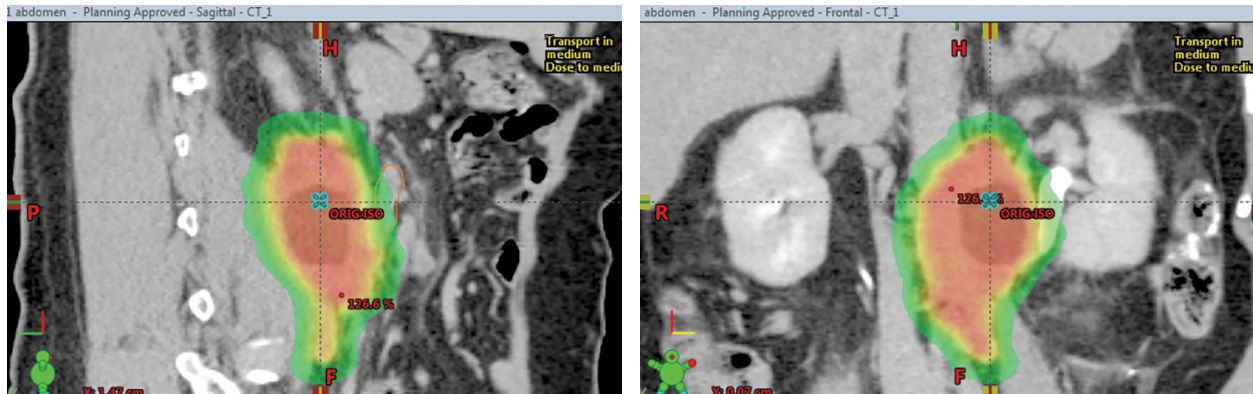
NEW IMPROVEMENTS:

- ▶ Real-time imaging (Advanced Imaging) – We use this advanced imaging when treating prostate SBRT cases. When treating with Rapid Arc IMRT, the machine will stop periodically and image. This confirms positioning and allows for adjustments to be made if the patient has moved.
- ▶ Varian Edge with 6° of freedom tabletop – Varian Edge has the most advanced stereotactic radiosurgery delivery system. Part of that system is a tabletop that can be moved in six directions, reducing patient set-up errors and improving target positioning for high-dose stereotactic treatments and intensity-modulated radiotherapy (IMRT). This allows for a higher level of accuracy and reproducibility.
- ▶ Calypso – This technology is used on the Varian Edge. A transponder is implanted in or near the treatment target/tumor. The Calypso system is a localization system designed for use during radiation therapy that provides accurate and continuous target localization for patient alignment and target position monitoring during treatment delivery.
- ▶ Varian Edge micro multi-leaf collimators (MLCs) – This machine has smaller leaflets in comparison to the standard linear accelerator, allowing for improved planning conformity and sparing of surrounding normal tissue.
- ▶ Optical surface monitoring system (OSMS) – OSMS allows for motion tracking throughout the treatment delivery. It continuously updates the tracking display to show motion.
- ▶ Hypo-fractionation, higher doses of radiation in fewer numbers of treatments, has been identified as equally effective for some treatment sites. ASTRO’s Choose Wisely initiative recommends reducing bone metastasis treatment fractions to less than 10. In FY18, we achieved a 97.9 percent rate of patients with bone metastasis receiving 10 fractions or less. Of the 3 percent who received more, all of them were due to the allowed clinical exceptions for situations of cord compression or radicular pain, placing us in 100 percent alignment.



LEHIGH VALLEY CANCER INSTITUTE OFFERS RADIATION IMMUNOTHERAPY COMBINATION

Unique radiation 'dose painting' enhances immune system response



To treat oligometastasis – a type of metastasis in which cells from original tumor spread to one to three sites – Lehigh Valley Cancer Institute is developing a new area of excellence: stereotactic body radiation therapy (SBRT) in combination with nivolumab (Opdivo®), a targeted immunotherapy.

TARGETING SPECIFIC CANCER CELLS

SBRT – focused high-dose radiation – with nivolumab activates the body's antitumor immune response and creates a target for the immune system while minimizing side effects.

When nivolumab is given within a few weeks of SBRT treatment, the immune system is upregulated. It can recognize the target, the antigen. The upshot? The immune system is in hyperdrive to attack tumor-specific cancer cells for a more durable response.

The innovative treatment approach holds promise for patients with metastatic melanoma and rare types of carcinomas, such as lung, sarcoma, gastrointestinal stromal tumor, sarcomatoid renal cell and sarcomatoid variant kidney cancer.

DELIVERING PRECISE TREATMENTS

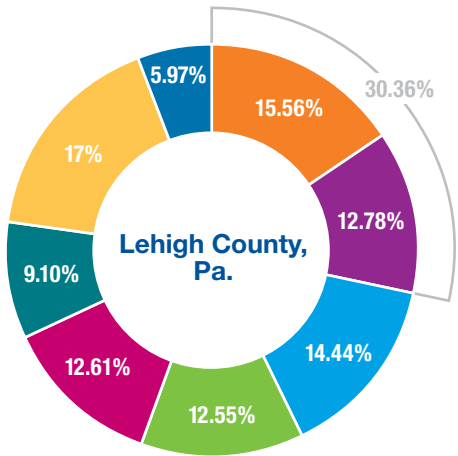
This innovative therapy approach is the result of our physicians' breadth of experience with immunotherapy research being conducted through Lehigh Valley Cancer Institute's alliance with Memorial Sloan Kettering (MSK) Cancer Center and advanced technologies, such as SBRT.

To deliver the most precise SBRT treatments, the Edge radiosurgery system, a linear accelerator specifically designed to deliver SBRT, is used. To further target the radiation, physicians developed a novel radiation delivery approach, known as dose painting: radiation dose at the center of a tumor is higher than dose at the periphery, which is touching healthy organs, to reduce risk for side effects.

COMMUNITY HEALTH NEEDS ASSESSMENT

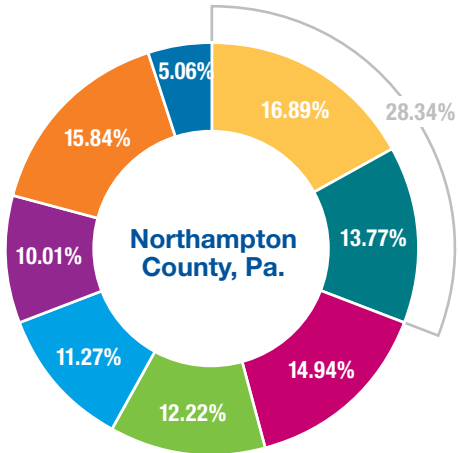
TRIENNIAL CHNA

In accordance with accreditation requirements, Lehigh Valley Cancer Institute conducts a triennial community needs assessment. The assessment includes a review of the community demographics, existing services, gaps in services, measurement of factors that cause cancer (e.g., smoking rates), as well as factors that help prevent or catch cancer at an earlier stage (e.g., colonoscopy screening rates). In addition, Lehigh Valley Cancer Institute feels it is critical to hear the voices of patients and community members. We obtain input from our Patient and Family Advisory Council as well as conduct a community-wide survey. We partner with community agencies and use the power of social media to gather a large representative response to the survey. Information from the survey helps to identify where gaps may exist and informs planning of future services to close those gaps.



TOTAL POPULATION BY AGE

The largest age groups within Lehigh and Northampton counties are those ages 65 and older and those between ages 5 and 17, followed by those between ages 45 and 54. According to National Cancer Institute (NCI), advancing age is the most important overall cancer risk factor. Approximately 30 percent of county population falls into a risk for developing cancer based on age alone.



PATIENT AND FAMILY ADVISORY COUNCIL

The Lehigh Valley Cancer Institute Patient and Family Advisory Council (PFAC) held its inaugural meeting in December 2017. The group is composed of patients, family members of cancer patients, Cancer Institute staff and physicians. All patient and family members of the council are required to meet qualifications of LVHN Volunteer Services. The group meets monthly and has received orientation regarding leadership and priorities for the Cancer Institute. They have had input into our community needs assessment, renovation of the radiation oncology department, and issues faced by the adolescent and young adult population.

- Age 0-4
- Age 5-17
- Age 18-24
- Age 25-34
- Age 35-44
- Age 45-54
- Age 55-64
- Age 65+
- Advanced Age Risk

CANCER DATA MANAGEMENT

TUMOR REGISTRY

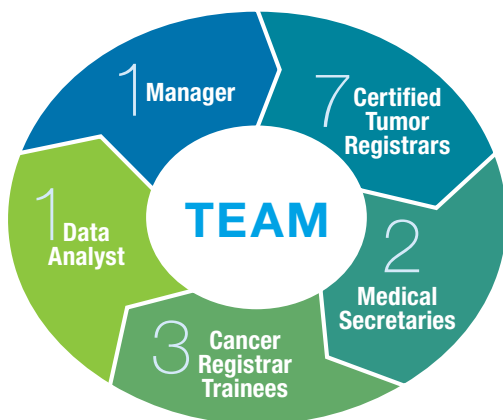
The cancer data management department of Lehigh Valley Cancer Institute captures a complete summary of patient demographics, history, diagnosis and treatment for every cancer patient seen. These important data are abstracted and stored in a secure cancer registry, an information software system designed for collection, management and analysis of data on persons with a diagnosis of malignant neoplastic disease.

In turn, these data are used by medical providers, as well as local, state and national agencies [i.e., Pennsylvania Cancer Registry (PCR) and National Cancer Database (NCDB)] to make important decisions including:

- ▶ Evaluate patient outcome, quality of life and implement procedures for improvement
- ▶ Provide follow-up information for cancer surveillance
- ▶ Provide information for cancer program activities
- ▶ Allocate resources at the health care facility, community, region or state level
- ▶ Develop educational programs for health care providers, patients and the public
- ▶ Report cancer incidence
- ▶ Evaluate efficacy of treatment modalities

Aside from case abstracting, the department performs a variety of additional functions: case finding of cancer cases, lifetime patient follow-up, organizes cancer conferences, multidisciplinary tumor boards wherein treatment and management of cancer cases are discussed, facilitated Cancer Committee, and complete required reporting to local, state and national agencies.

In 2018, the department embarked on a training program designed to train future certified tumor registrars in-house. Certified tumor registrars (CTRs) are data management experts who abstract cases in the Cancer Registry. The demand for their services exceeds the number of program graduates. This training program shows the commitment and dedication of Lehigh Valley Cancer Institute to ensuring the commitment to developing and retaining highly qualified and highly trained certified tumor registrars, and ensuring the integrity of high-quality data and analytics for cancer care improvements.



INFUSION SERVICES

Patients who require intravenous (IV) therapy for oncology or non-oncology disorders may receive their care at one of our three convenient and comfortable hospital infusion locations:

- ▶ Health Center at Bangor infusion services
- ▶ Multipurpose area infusion services at the John and Dorothy Morgan Cancer Center at Lehigh Valley Hospital (LVH)–Cedar Crest
- ▶ Multipurpose satellite infusion services at Lehigh Valley Hospital–Muhlenberg

12

Infusion bays at
Health Center at Bangor

24

Infusion bays at
LVH– Muhlenberg

38

Infusion bays at
LVH– Cedar Crest

44,165

Infusion encounters in FY 18

14

Mammography units and growing

1

Mobile 3D mammography coach

6

Dedicated breast ultrasound/biopsy units

2

Stereotactic biopsy units

1

Breast MRI magnet

FY 2018

21,641

Total 3D mammograms

51,586

Total mammograms

BREAST HEALTH SERVICES

Certified technologists perform both 2D and 3D scans, advanced technologies that provide images for screening and diagnosis. Because 3D mammography obtains multiple layered images to view the breast in greater detail, it can be particularly useful for women who have dense breast tissue or are otherwise at increased risk for breast cancer. No prescription is needed for women who are age 40 and older and have not had a screening mammogram in the last 365 days.

SAVI SCOUT® Wire-free localization technology for breast cancer

SAVI SCOUT® is an innovative wire-free radar localization technology that will help reduce stress for women in treatment for breast cancer. SCOUT utilizes a small reflector – smaller than a grain of rice – that is placed at the tumor site at any time during breast cancer diagnosis or treatment. SCOUT is an option instead of the thin wire that is commonly inserted to mark abnormal breast tissue.

During surgery, the surgeon uses a hand-held guide with a unique radar signal to detect the location of the reflector at the tumor site. By knowing precisely where the reflector is located (within 1 millimeter), the surgery can be more successful and optimize breast conservation.



There is no restriction on how long the SCOUT reflector remains in the breast, which gives clinicians maximum flexibility to use it throughout the patient's care. This includes the option of placing the reflector at the time of biopsy, prior to chemotherapy or prior to surgery. The SCOUT reflector will not interfere with magnetic resonance imaging (MRI) studies, meaning there is no restriction on the type of imaging that can be used effectively throughout a patient's treatment. SAVI SCOUT reflector was given FDA clearance in 2017 for use as a long-term implant.

ACCESS

BHS identified a need for additional patient access in accordance with a network-wide initiative to achieve at least a 70 percent mammogram screening rate. They added 60 additional appointment slots at our Trexlertown campus, and 84 additional exams at LVH–Muhlenberg. They also trialed patient self-scheduling via the portal and physician office direct scheduling. This resulted in 1,137 directly scheduled exams. These efforts ensured success in achieving a 70 percent screening goal for LVHN patients, exceeding national averages.

LEHIGH VALLEY CANCER INSTITUTE MOBILE MAMMOGRAPHY COACH



Lehigh Valley Cancer Institute is putting the power of preventive cancer screening into motion with the mobile mammography coach. This specially designed vehicle has the same breast imaging technology as offered by Breast Health Services, but in this case the imaging technology is placed inside a state-of-the-art mobile unit. The mobile mammography coach is providing a convenient way for women to have 3D screening mammograms at scheduled events hosted by workplaces and community organizations throughout our region.

The mammography coach is available to visit communities served by LVHN, and beyond. The goal of the coach is to increase access to this important screening technology, especially in underserved areas of our community.

Lehigh Valley Cancer Institute is reaching out to area businesses with information about hosting a mobile mammography screening event. Prescheduled appointments will be requested to ensure adequate time to screen patients at each location. Within the first 11 business days of launch, the mobile mammography team was able to screen 124 patients. Of those, 44 had a mammogram one year ago, 38 had a mammogram within two to three years, 25 had not had a mammogram in more than four years, and 13 had their first mammogram ever (ages spanned 41-60).

CANCER SUPPORT SERVICES

CANCER CHIMES

Patients are marking an end to their cancer treatment by celebrating with a little music – Vivaldi’s “Four Seasons.” Each time patients complete chemotherapy, immunotherapy, radiation, the entire cancer journey or just reach a personal milestone, they are invited to sound our cancer chimes throughout the campus of LVH–Cedar Crest or LVH–Muhlenberg.

COUNSELING SERVICES

A cancer diagnosis can create strong feelings of grief, sadness, anger or fear. Our licensed counselors with expertise in cancer care are available to help patients, their families and caregivers cope with the diagnosis to help feel less distressed. Counselors can make visits to the doctor’s office or treatment areas. A bilingual (Spanish/English) counselor with a Master of Social Work (MSW) degree was added to the team in FY 17 as our support group facilitator.

- ▶ 941 cancer patients counseling visits with licensed counselors
- ▶ 30 percent increase in visits over previous year
- ▶ 183 support group attendance
- ▶ 1,239 encounters with patients in non-counseling cancer support activities

FINANCIAL COORDINATION

Lehigh Valley Cancer Institute provides eight financial coordinators to assist patients in reducing financial barriers to care. They answer questions related to precertification requirements, health insurance and medical bills, and

generally help them navigate the complex waters of insurance and community resources.

Financial coordinators also connect patients with support agencies to assist them in receiving free or reduced-cost services and medical supplies if they qualify.

- ▶ Financial coordinators assisted 296 patients in obtaining \$5.1 million in free or reduced-cost oral medications in fiscal year 2018.
- ▶ Assisted over 800 patients with other services, related to receiving or reducing financial barriers to care.

PALLIATIVE CARE

Palliative care is appropriate at any age and at any stage in a serious illness and can be provided together with curative treatment. Lehigh Valley Health Network’s palliative medicine program, Optimizing Advanced Complex Illness Support, referred to as OACIS, provides assistance with managing difficult symptoms, making house calls, and can help facilitate conversations with family members or other health professionals involved in your care. If you require hospitalization, we can be there to make sure all your doctors know what kind of care you want.

Palliative care is not the same as hospice care. Hospice provides services for people at the end of life. Palliative care helps you at any point in your complex illness, including end of life. OACIS can assist you or a loved one with completing advance directives and will work closely with hospice as needed. The OACIS team also can help you through the difficult decisions on whether to focus on curing your illness or managing your pain and symptoms for the best quality of life.

	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18
Oral Medication Assistance obtained	\$3,590,246	\$4,366,205	\$3,388,420	\$3,058,370	\$4,38,076	\$5,419,690	\$5,114,294
Patients helped	257	202	152	109	155	176	296
FAP patients helped	666	749	725	655	590	577	615
PATHS patients referred	294	294	247	221	223	220	214

CANCER REHABILITATION

LVHN Rehabilitation Services provides care for patients in our community affected by cancer. With 45 convenient locations across the region, trained therapists can help address functional activities of daily living that are affected by the cancer experience. Individualized treatment programs are designed to enable the patient to resume normal activities. LVHN Rehabilitation Services help patients suffering from fatigue, weakness, balance problems, lymphedema or other symptoms.

Physical Therapy

- ▶ Lymphedema
- ▶ Pain management
- ▶ Physical impairments and disabilities
- ▶ Cancer-related fatigue
- ▶ Cancer-related peripheral neuropathy
- ▶ Pelvic floor therapy

Speech Therapy

- ▶ Head and neck cancer
- ▶ Video swallowing studies
- ▶ Cognition
- ▶ Voice disorders

Occupational Therapy

- ▶ Lymphedema
- ▶ Activity of daily living assessments
- ▶ Custom bracing and splinting of upper extremities
- ▶ Vision rehabilitation
- ▶ Custom wheelchair fitting and mobility clinic

LVHN Fitness and Massage

- ▶ Massage therapy
- ▶ Lifestyle and weight management
- ▶ Assist to Fit (grant-funded fitness membership for cancer survivors)
- ▶ Community-based fitness facilities

NUTRITION COUNSELING

Three board-certified specialists in oncology nutrition are available to meet with patients and families before, during and after treatments to assess nutritional needs and determine appropriate goals, and strategies to reach those goals. Our registered dietitians also offer their expertise to the community through our community outreach programs including presentations, cooking demonstrations and participation in health fairs. In FY 18, the dietitians saw 875 new patients and 1,491 patients for follow-up appointments, resulting in an increase of 3.7 percent from FY 17.

HACKERMAN-PATZ HOUSE

Hackerman-Patz House is located on the campus of Lehigh Valley Hospital–Cedar Crest. It provides peaceful and affordable lodging. For seven years it has been a “home away from home” for families who wish to remain close to a hospitalized loved one.

- ▶ Available to individuals who wish to stay the night before a surgical procedure or doctor appointment, and for patients undergoing certain outpatient treatments (with provider’s consent).
- ▶ No distance requirement. If people wish to stay close to a hospitalized loved one, they are welcome meeting eligibility criteria.
- ▶ Rates are very reasonable. It’s only \$45 per night, or \$35 per night if the guest or patient is a veteran, on active U.S. military duty, or if guests have a loved one in our Regional Burn Center.
- ▶ Financial assistance is available for those who qualify.



The staff provides a supportive environment, comfortable accommodations and eases the burden of traveling back and forth, which enables the family to spend more time together.

The family lodging is conveniently available 24 hours a day, seven days a week.

GENETIC COUNSELING AND ASSESSMENT

► The Gregory and Loraine Harper Cancer Risk and Genetic Assessment Program is staffed by three full-time, certified licensed genetic counselors and a part-time genetics nurse navigator. Nicholas Lamparella, DO, serves as medical director. While the majority of cancer is sporadic, approximately 10 percent of cancer has a hereditary cause. Understanding if there is a hereditary contribution to cancer can aid in treatment, surveillance and risk-reducing options for individuals and their families. Additionally, we are learning that testing cancer for somatic mutations not only can help dictate treatment decisions, but also can help identify families with hereditary cancer syndromes.

► This team meets with individuals who are interested in cancer risk assessment and genetic testing for hereditary cancer syndromes. An appointment consists of in-depth counseling and education regarding personal and family history of cancer, cancer risk assessment and discussion of medical management guidelines to reduce/prevent cancer. If genetic testing is warranted, a discussion between patient and provider determines the most appropriate type of testing (single gene vs. multi-gene panels). Genetic test results as well as personal and family risk factors help clinicians personalize a medical management and surveillance plan. Patients who test positive are invited to

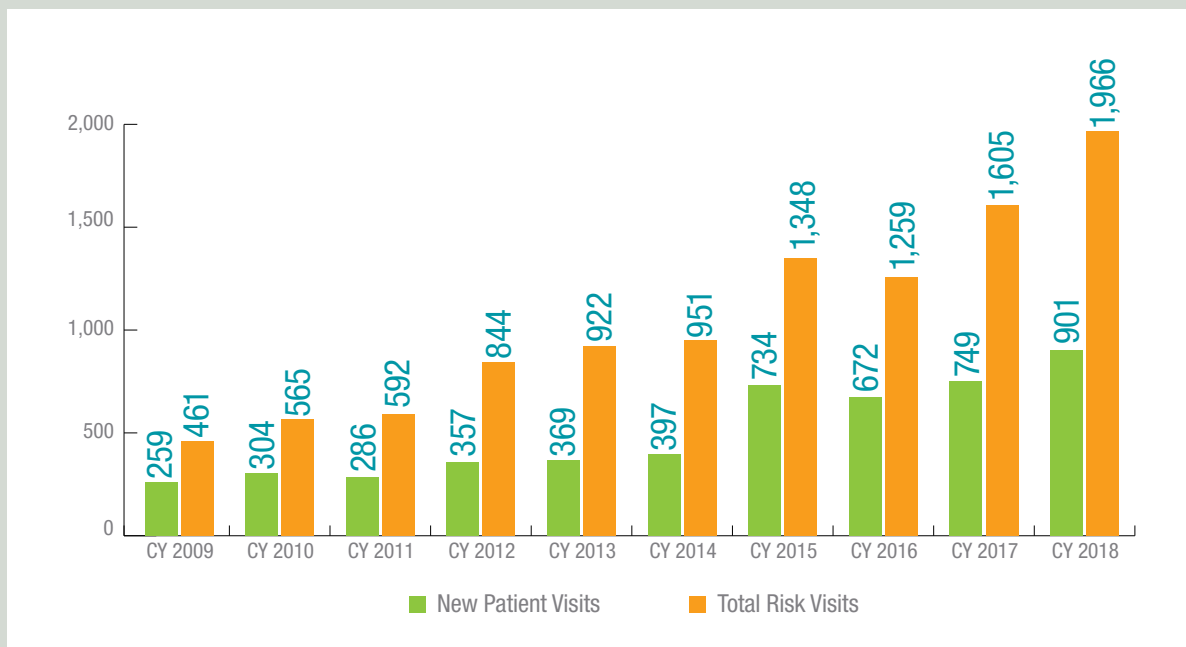
attend the Genetics Multidisciplinary Clinic where an annual appointment continues to offer recommendations for cancer risk reduction. The Cancer Risk and Genetic Assessment Program also helps facilitate entry into clinical or research studies when appropriate.

► We continue to see substantial growth in our program. Given the new advances in treatment for cancer, patients who carry certain genetic alterations can be treated with targeted therapies. Therefore, we are now seeing more patients who will use genetic test results to determine treatment strategies.

1,966
Total visits

901
FY18 New genetic counselor visits

CANCER RISK ASSESSMENT PROGRAM GROWTH



ONCOLOGY THERAPEUTICS COMMITTEE

HELPING PREVENT “FINANCIAL TOXICITY” FOR PATIENTS

Lehigh Valley Cancer Institute is committed to being a value-driven organization and a good fiscal steward. Toward that end, we have formed a pharmacist-led multidisciplinary oncology therapeutics committee that evaluates all new oncology medication requests. The team is comprised of physicians, pharmacists, nurses and financial navigators. The committee reviews the requests for agents to determine if they have greater clinical effectiveness, lesser side effect risks, and if they are a better value (lower cost) to our patients when compared to existing medications on the formulary. As pharmaceutical companies continue to market newer, more expensive medications that do not offer a better clinical benefit or fewer side effects, we must be vigilant to ensure appropriate value to patients and help avoid financial toxicity. We also must rapidly improve new innovations that provide the best outcomes for our patients.

OUR LOCATIONS

Lehigh Valley Cancer Institute offers a range of services in convenient, patient-focused locations. Our Lehigh Valley Physician Group practices provide service in Allentown, Bangor, Bethlehem, Hazleton, Lehigh and Schuylkill.

LEHIGH VALLEY CANCER INSTITUTE

- ▶ John and Dorothy Morgan Cancer Center at Lehigh Valley Hospital–Cedar Crest
- ▶ LVHN Cancer Center at Lehigh Valley Hospital–Muhlenberg
- ▶ LVHN Cancer Center–Hazleton
- ▶ LVHN Cancer Center–Schuylkill
- ▶ Dale and Frances Hughes Cancer Center at Lehigh Valley Hospital–Pocono
- ▶ Health Center at Bangor

Breast Health Services

- ▶ Breast Health Services – Lehigh Valley Hospital (LVH)–17th Street, Allentown
- ▶ Breast Health Services – LVH–Cedar Crest, Allentown
- ▶ Breast Health Services – LVH–Muhlenberg, Bethlehem
- ▶ Health Center at Bangor
- ▶ Health Center at Bath
- ▶ Health Center at Bethlehem Township
- ▶ Health Center at Moselem Springs
- ▶ Health Center at Mountain Top
- ▶ Health Center at Trexlertown
- ▶ Check locations online for 3D Mobile Mammography Coach

PUBLICATIONS, PRESENTATIONS AND POSTERS AUTHORED BY OUR ONCOLOGY TEAM

Recurrence patterns and associated factors of locoregional failure following neoadjuvant chemoradiation and surgery for esophageal cancer. *J Surg Oncol.* 2018;117:150–159. <https://doi.org/10.1002/jso.24808>

Blackham AU, Naqvi SMH, Schell MJ, et al.

“Benefits of Multidisciplinary Survivor Clinic in Addressing Quality of Life After Cancer Treatment,” poster presentation at 9th Annual Navigation & Survivorship Conference, Academy of Oncology Nurse Navigators, Dallas, Nov. 2018

Zubia, J., RN, OCN

Copresentation of common variable immune deficiency and Sweet syndrome. *Cutis.* 2018 Jun;101(6):E24-E26.

Kotkiewicz A1, Saraceni C2, Bellucci K3, Gupta R1.

“Cultivating Change: A Disease-Specific, Team-Based Approach to Improving Oncology Clinical Trials,” podium presentation at Association of Community Cancer Centers (ACCC) National Oncology Conference, Phoenix, Oct. 2018

Horton, M., BSN, RN, CCRC; Derr, M., MSN, RN, CMSRN, AOCNS

“Creating a ‘Healthier Us’ in the Workplace: Promoting a Healthy Lifestyle Through Evidence-Based Nutrition Education,” poster presentation at Research Day, Lehigh Valley Health Network, Allentown, Pa., Oct. 2017

Brennan, J., RD, CSO, LDN; Gilboy, J., RD, CSO, LDN; Levine, E., RD, CSO, LDN

“Developing Multidisciplinary Algorithm for AML in Elderly Benefits Nurses,” presentation at 43rd ONS Congress, Washington, D.C., June 2018

Colabroy, D., MSN, RN, CCM, AOCNS

“Dramatic Response to Concurrent Anti-PD-1 Therapy and Radiation in Resistant Tumors With Sarcomatoid Differentiation,” *The Oncologist*, Aug. 2018

Departments of Hematology and Oncology and Radiation Oncology, Lehigh Valley Health Network, Allentown, Pa.; University of Texas MD Anderson Cancer Center, Houston

Tolay, S., MD; Nair, R, MD; McIntosh, A., MD; Sopka, D., MD; Nair, S., MD

“Increasing Oncology Clinical Trial Accrual Through the Implementation of Disease Management Teams,” poster presentation at ACCC National Oncology Conference, Phoenix, Oct. 2018

Horton, M, BSN, RN, CCRC; Derr, M., MSN, RN, CMSRN, AOCNS

“Inpatient Oncology Nurses Are Key Facilitators in Adolescent/Young Adult Acute Lymphoblastic Leukemia Algorithm Implementation,” clinical practice abstract submission for 44th Oncology Nursing Society (ONS) Congress, April 2019

Berg, S., RN, OCN; Colabroy, D., MSN, RN, AOCNS

Manejo Multidisciplinario Del Cancer (Multidisciplinary Cancer Management Course), presentation at Oncology Nursing Society Conference, Lima, Peru, Aug. 2018

Roman, R., RN, BSN, OCN

“MEK Inhibitors for the Treatment of NRAS Mutant Melanoma,” abstract in *Drug Design Development and Therapy*, Volume 12, June 2018

Sarkisian, S., M.D., MHA, Hematology/Oncology Fellow, PGY4; Davar, D., M.D., Assistant Professor, Division of Hematology/Oncology, Hillman Cancer Center, University of Pittsburgh Cancer Institute

“Tumor Mutational Burden, Clinical Features, and Outcomes to PD-1 Mono- and Combination Therapy in Patients With Cutaneous and Unknown Primary Melanoma,”

Nair, S., MD.; Derr, M., MSN, RN, CMSRN, AOCNS

Isolated Left Ventricular Metastasis from Renal Cell Carcinoma: Diagnostic and Therapeutic Dilemma. *Case Rep Oncol.* 2018;11(2):365-371. Published 2018 Jun 7. doi:10.1159/000489770

Abdullah A, Lekkala M, Wolfe Z, et al.

Safety and tolerability of adjuvant enzalutamide for the treatment of early stage androgen receptor positive (AR+) triple negative breast cancer.

Presented Saturday, June 2, 2018 (ASCO)

Tomas Lyons, Ayca Gucalp, Artavazd Arumov, Sujata Patil, Marcia Edelweiss, Mila Gorsky, Tiffany A. Troso-Sandoval, Jacqueline Bromberg, Rachel Ann Sanford, Neil M. Iyengar, Shanu Modi, Ranju Gupta, Tiffany A. Traina; Memorial Sloan Kettering Cancer Center, New York, NY; Memorial Sloan Kettering Cancer Center, Basking Ridge, NJ; Memorial Sloan Kettering Cancer Center, New York City, NY; Lehigh Valley Health Network, Bethlehem, Pa

Genome-wide association with survival in stage II-III colon cancer clinical trials (NCCTG N0147, Alliance for Clinical Trials in Oncology; NSABP C-08, NRG Oncology).

Presented Sunday, June 3, 2018 (ASCO)

Kathryn Penney, Barbara L. Banbury, Qian Shi, Carmen Joseph Allegra, Steven R. Alberts, Ulrike Peters, Greg Yothers, Frank A. Sinicrope, Wei Sun, Suresh Nair, Tabitha A. Harrison, Richard M. Goldberg, Peter C. Lucas, Linda H. Colangelo, James Norman Atkins, Polly A. Newcomb, Andrew T. Chan; Harvard T.H. Chan School of Public Health, Boston, MA; Fred Hutchinson Cancer Research Center, Seattle, WA; Mayo Clinic, Rochester, MN; NSABP Foundation, and The University of Florida, Gainesville, FL; University of Pittsburgh, Pittsburgh, PA; University of Washington, Seattle, WA; Lehigh Valley Health Network, Allentown, PA; Ohio State University Comprehensive Cancer Center, Columbus, OH; NSABP/NRG Oncology, and The University of Pittsburgh School of Medicine, Pittsburgh, PA; National Surgical Adjuvant Breast and Bowel Project Biostatistical Center and University of Pittsburgh Graduate School of Public Health, Pittsburgh, PA; Southeast Clinical Oncology Research Consortium, Goldsboro, NC; Massachusetts General Hospital/Harvard Medical School, Boston, MA

Immunoscore to provide prognostic information in low- (T1-3N1) and high-risk (T4 or N2) subsets of stage III colon carcinoma patients treated with adjuvant FOLFOX in a phase III trial (NCCTG N0147; Alliance).

Presented Saturday, January 20, 2018 (GI ASCO)

Frank A. Sinicrope, Qian Shi, Fabienne Hermitte, Erica N Heying, Al Bowen Benson, Sharlene Gill, Richard Goldberg, Morton S. Kahlenberg, Suresh Nair, Anthony Frank Shields, Daniel J. Sargent, Jerome Galon, Steven R. Alberts; Mayo Clinic, Rochester, MN; Mayo Clinic/ Alliance Statistics and Data Center, Rochester, MN; HaliDx, Marseille, France; Northwestern University, Chicago, IL; BC Cancer Agency, Vancouver, BC, Canada; Ohio State University Comprehensive Cancer Center, Columbus, OH; Surgical Oncology Associates of South Texas, San Antonio, TX; Lehigh Valley Health Network, Allentown, PA; Karmanos Cancer Institute, Wayne State University, Detroit, MI; Laboratory of Integrative Cancer Immunology, INSERM, Paris, France

LBA18_PR - Durable clinical benefit with nivolumab (NIVO) plus low-dose ipilimumab (IPI) as first-line therapy in microsatellite instability-high/mismatch repair deficient (MSI-H/dMMR) metastatic colorectal cancer (mCRC). Presented Oct 22, 2018 (ESMO).

H-J.J. Lenz¹, E. Van Cutsem², M.L. Limon³, K.Y. Wong⁴, A. Hendlisz⁵, M. Aglietta⁶, P. Garcia-Alfonso⁷, B. Neyns⁸, G. Luppi⁹, D. Cardin¹⁰, T. Dragovich¹¹, U. Shah¹², A. Atasoy¹³, R. Postema¹⁴, Z. Boyd¹⁵, J-M. Ledezne¹⁶, M. Overman¹⁷, S. Lonardi¹⁸

¹Medical Oncology, University of Southern California Norris Comprehensive Cancer Center, Los Angeles, CA, USA, ²Digestive Oncology, University Hospitals Gasthuisberg/Leuven and KU Leuven, Leuven, Belgium, ³Medical Oncology, Hospital Universitario Virgen del Rocío, Seville, Spain, ⁴Medical Oncology, Westmead Hospital, Sydney, Australia, ⁵Internal Medicine, Institut Jules Bordet, Brussels, Belgium, ⁶Medical Oncology, Candiolo Cancer Institute and University of Torino Medical School, Candiolo, Italy, ⁷Medical Oncology, Hospital Gral Universitario Gregorio Marañón, Madrid, Spain, ⁸Medical Oncology, University Hospital Brussels, Brussels, Belgium, ⁹Oncology and Hematology, University Hospital of Modena, Modena, Italy, ¹⁰Department of Medicine, Vanderbilt – Ingram Cancer Center, Nashville, TN, USA, ¹¹Medical Oncology and Hematology, Banner MD Anderson, Gilbert, AZ, USA, ¹²Hematology-Medical Oncology, Lehigh Valley Hospital, Allentown, PA, USA, ¹³R&D Oncology Clinical Development, Bristol-Myers Squibb Company, Princeton, NJ, USA, ¹⁴HEOR, Bristol-Myers Squibb Company, London, UK, ¹⁵Oncology Translational Medicine, Bristol-Myers Squibb Company, Princeton, NJ, USA, ¹⁶Biostatistics, Bristol-Myers Squibb Company, Princeton, NJ, USA, ¹⁷Gastrointestinal Medical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA, ¹⁸Medical Oncology, Istituto Oncologico Vento IOV-IRCSS, Padua, Italy

OUR AWARDS, CERTIFICATIONS AND ACCREDITATIONS

American College of Radiology (ACR) Seal of Accreditation



Lehigh Valley Hospital—Cedar Crest and Lehigh Valley Hospital—Muhlenberg have been awarded the ACR and the American Society for Radiation Oncology (ASTRO) seal of accreditation.

American College of Radiology (ACR) for Breast Mammography



Lehigh Valley Health Network has earned accreditation from the American College of Radiology (ACR) for breast mammography.

American College of Radiology (ACR) Breast Imaging Center of Excellence (BICOE)



LVHN Breast Health Services is also designated as a Breast Imaging Center of Excellence by the ACR.

American College of Radiology (ACR) Lung Cancer Screening Center



ACR Lung Cancer Screening Center program, recognizes facilities committed to providing quality screening care to patients at the highest risk for lung cancer.

American Society of Clinical Oncology (ASCO) QOPI® Certification



Program (QCP™) Hematology-Oncology Associates of Allentown, Bethlehem and Bangor, a practice of Lehigh Valley Physician Group, actively participates in the American Society of Clinical Oncology (ASCO) QOPI® Certification Program (QCP™) and has been continuously certified since 2011.

COEMIG™ designation



A number of our physicians also have earned COEMIG™ designation from the AAGL (American Association of Gynecologic Laparoscopists), whose mission is advancing minimally invasive gynecology worldwide.

Commission on Cancer



Continuously since 2005, Lehigh Valley Health Network has been an accredited cancer program through the American College of Surgeons Commission on Cancer® (CoC), a designation only granted when a facility voluntarily commits to provide the best in cancer diagnosis and treatment, while also complying with standards established by the CoC.

Accreditation Program for Breast Centers (NAPBC)



LVHN Breast Health Services is accredited by the National Accreditation Program for Breast Centers (NAPBC).

The Joint Commission (TJC)



The Joint Commission accreditation and certification is recognized nationwide as a symbol of quality that reflects an organization's commitment to meeting safe and effective care of the highest quality and value.

Lehigh Valley Cancer Institute and Memorial Sloan Kettering (MSK) Cancer Alliance



The Lehigh Valley Cancer Institute is a formal member of the Memorial Sloan Kettering (MSK) Cancer Alliance, a transformative initiative to improve the quality of care and outcomes for people with cancer in community health care settings, including access to key clinical trials.

Magnet designation



Four consecutive Magnet® designations LVH—Cedar Crest, LVH—17th Street, LVH—Muhlenberg, LVHN—Tilghman, Home Health and Hospice Services in the Lehigh Valley have earned Magnet® designation from the American Nurses Credentialing Center (ANCC), the most prestigious recognition for nursing excellence in the country. Magnet hospitals attract and retain the best nurses because of their reputation for nursing excellence.

Michigan Cancer Research Consortium (MCRC) WCI Community Oncology Research Program (NCORP)



NCORP is a national network of investigators, cancer care providers, academic institutions and other organizations with a mission to conduct multi-site cancer clinical trials and studies in diverse populations in community-based healthcare systems across the United States. For patients, this means Lehigh Valley Cancer Institute's commitment to leading-edge oncology clinical trial access and advances in evidence-based practices remains as strong as before.

National Quality Measures for Breast Centers



LVHN Breast Health Services is a certified quality breast center with the National Quality Measures for Breast Centers™ Program (NQMBC™) administered by the National Consortium of Breast Centers Inc. NQMBC is a voluntary participation program focused on the tracking and sharing of quality measures, such as patient satisfaction, timeliness of care for imaging, biopsies and surgery, as well as complication rates. The primary focus is on providing each patient with the highest quality of care through shared learning.

U.S. News & World Report



Each year, U.S. News & World Report ranks hospitals according to patient satisfaction, patient outcome and access to leading-edge care across many specialties. U.S. News & World Report guide to America's Best Hospitals ranks LVH—Cedar Crest among Top 5 in Pa. for five straight years.