

Mercy Health – Western Hills Hospital
Annual Report on 2010 Activities
Non-Hodgkin Lymphoma
Outcomes Study



Cancer Program Summary

The Mercy Health – Western Hills Hospital Cancer Program has maintained approval by the American College of Surgeons since the early 1980's. We have earned the Outstanding Achievement Award for our Cancer Program. In addition to a wide range of diagnostic and treatment services, our hospital offers many programs to provide assistance to both our patients and their families as they cope with a diagnosis of cancer.

To meet the growing and changing needs of the patients and the communities we serve, our Cancer Committee continually strives for Cancer Program excellence by annually reviewing our services, performing patient care studies, and by setting annual goals to improve and enhance our services.

Mercy Health – Western Hills Hospital implemented many patient care improvements, sponsored a large number of patient, community and staff educational offerings and increased our services last year. These included:

- Making available a computerized exercise program for lymphedema patients
- Opening an anticoagulation clinic to improve care to cancer patients
- Improving availability for access to the Flexitouch® system to Medicare patients

Cancer Conferences

Cancer conferences provide a format for multidisciplinary involvement in the planning of care for cancer patients and are an important part of our cancer program. They are integral to improving the care of cancer patients and provide education to physicians and hospital staff. Patient identities are kept confidential

All specialties are invited to attend and physicians from Medical Oncology, Radiation Oncology, Diagnostic Radiology, Pathology, and General Surgery specialties are present to discuss treatment options for the types of cancers presented at the conferences. Treatment based on national guidelines and prognostic indicators, including AJCC stage, is the focus of discussions.

Cancer Registry

The National Cancer Registrars Association provides the following description of the work that Cancer Registrars perform, “Cancer registrars capture a complete summary of the patient’s disease from diagnosis through their lifetime.” The information is not limited to the episodic information contained in the health care facility record. The summary or abstract is an ongoing account of the cancer patient’s history, diagnosis, treatment, and current status.

The cancer programs at Mercy Health make accurate data collection a priority. Cancer Registrar certification (CTR) is required and is maintained by continuing education in cancer data collection standards, cancer program requirements and in the diagnosis and treatment of cancer.

Cancer Committee

The Cancer Committee, a multi-disciplinary team of hospital employees, staff physicians and members from the American Cancer Society, meets quarterly to direct the activities of the Cancer Program by monitoring our performance, reviewing our available services and programs and determining what enhancements are needed to meet the needs of our cancer patients.

Our mission is to ensure that our patients, their families and our communities have access to a full range of medical services, supportive programs and services and community outreach activities that impact quality of life and survival. Our focus is on prevention, screening and early detection programs and quality of life services.

Mercy Health - Western Hills Hospital 2010-2011 Cancer Committee Membership

Physician Members

Priya Rudolph, MD, Chair and Medical Oncology
Kurt Leuenberger, MD - Med. Oncology, Cancer Liaison
Ted Kleimeyer, MD - Diagnostic Radiology
George Wagner, MD - Diagnostic Radiology
Jay Jiang, MD - Pathology
Joann Lohr, MD - Medical Director of Women's Services
Alan Cordell, MD - Urology
Ernest Meese, MD - Thoracic Surgery
Jay Bhaskaran, MD - Medical Oncology

Cancer Program Coordinators

Jay Jiang, MD - Quality of Registry Data
J. Bhaskaran, MD - Cancer Conference
Sue Raterman - Community Outreach
Mary Ann Henghold, RN, CPHQ - Quality Improvement

Allied Health Members

Mary Ann Minges, RN, BSN, OCN - Nursing
Mary Ann Kasselmann, MSED, MPT - Rehabilitation
Debbie Epperson - Cancer Program Administrator - 2010
Mary Ann Hingehold, RN, CP, HQ - Quality
Christine Kirby, Pharm D - Pharmacy
Julie Schermbeck, RD, LD, CNSD - Nutrition
Heleena McKinney - American Cancer Society
Nancy Klusman, RN - Palliative Care
Virginia Bice, CTR - Cancer Registry - 2010
Mary Ann Kasselmann, MSED, MPT - Rehabilitation
Sue Raterman, - Imaging/Women's Center
Elaine Wiseman - Cancer Registry
Cherie Puthoff, RHIA - Cancer Program Administrator

2010 Cancer Data Summary and Comparisons

Top Cancer Sites in 2010

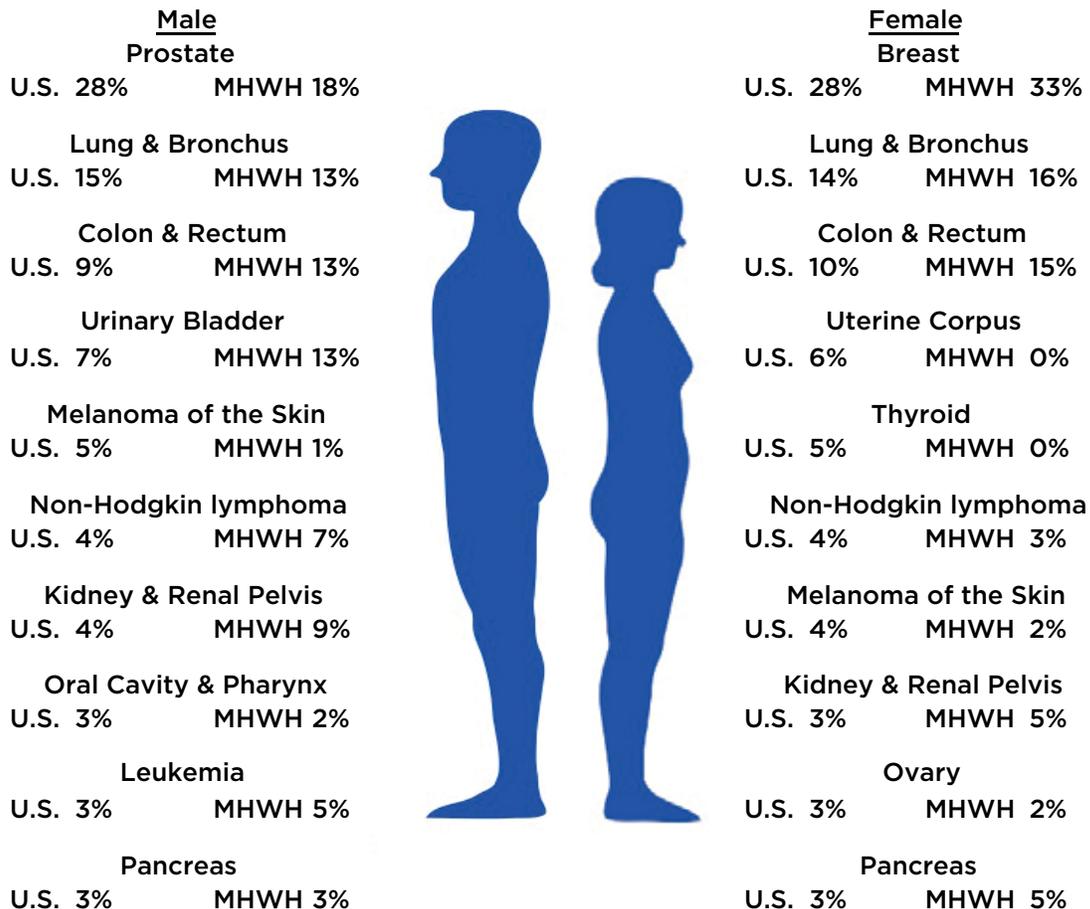
The most frequently seen cancer sites for men at Mercy Health – Western Hills Hospital in 2010 were prostate (18%), lung/bronchus (13%), colorectal (13%), urinary bladder (13%), and kidney/renal pelvis (9%).

For females, the top sites in 2010 at Mercy Health – Western Hills Hospital were breast (33%), lung/bronchus (16%), colorectal (15%), pancreas (5%), and kidney/renal pelvis (5%). Our high percentage of breast cancers (33%) is likely due to a very active breast screening program at our Women’s Center.

Compared with the estimated 2010 national data, distribution of our sites by gender revealed a similar comparison to the U. S., for melanoma and non-Hodgkin lymphoma and for lung, colorectal, kidney/renal pelvis, and pancreas cancers for both sexes as shown in the table at left. Our breast cancer incidence compares favorably to the national percentage.

We saw no female patients with thyroid or corpus uteri cancers. We also saw fewer prostate cancers and slightly more bladder cancers in males at our hospital than the national incidence. Our differences in cancer site comparison are not felt to be entirely reflective of the true incidence of these cancers in our community, but more likely due to the types of services available at our facility.

**2010 Top Cancer Sites by Sex
Mercy Health - Western Hills Hospital**

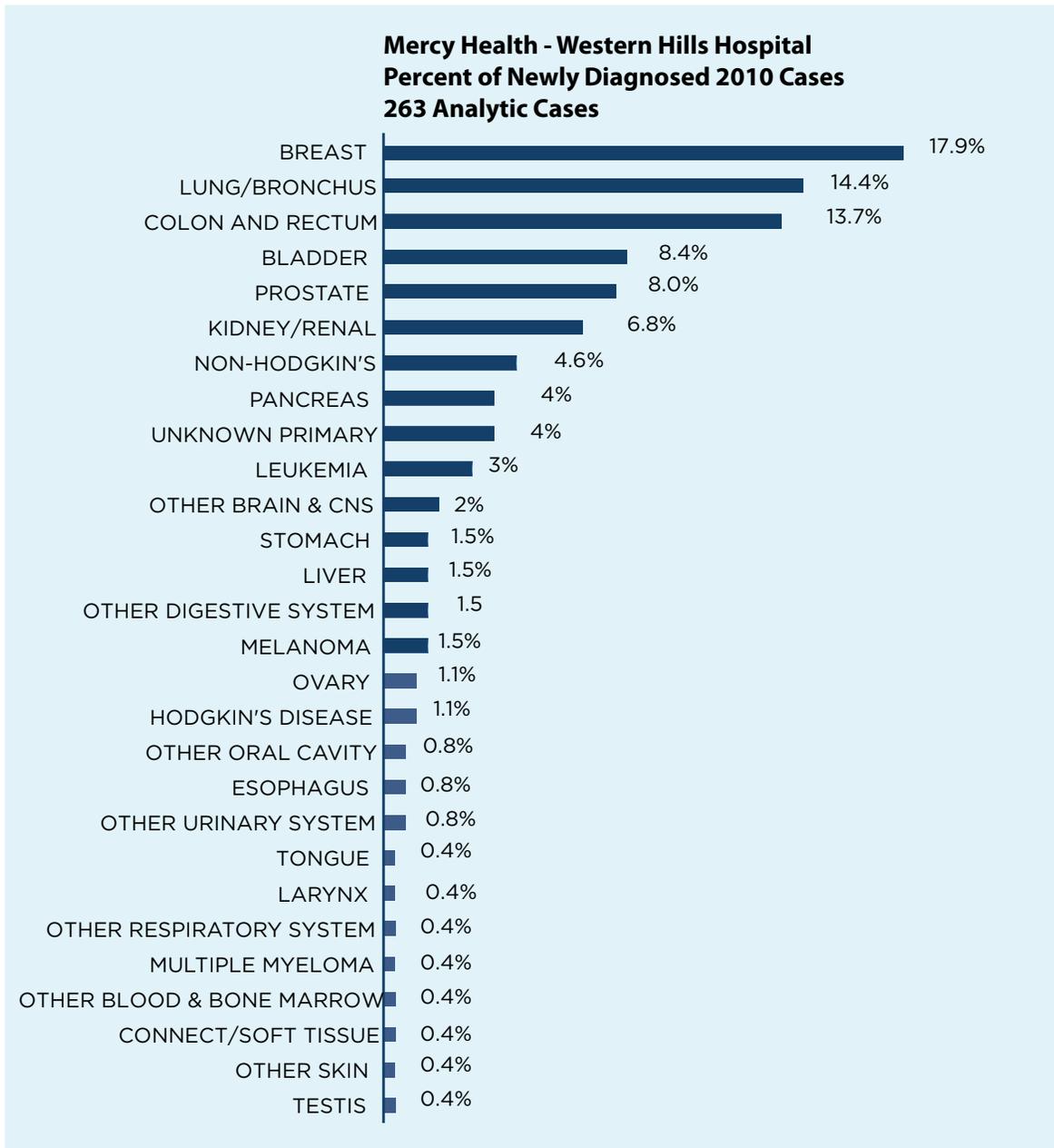


American Cancer Society Inc., Surveillance and Health Policy Research, Facts and Figures, 2010
U.S. figures are estimated for 2010

Distribution of 2010 Cancer Sites

The total number of cases in the Mercy Health – Western Hills Hospital Cancer Registry database since the 2003 reference date is 2,624 cases. 2,463 of these cases are available for analytic studies. During 2010, a total of 269 cases were accessioned into the registry database, 263 analytic (newly diagnosed) cases and 3 non-analytic (recurrent cancer) cases. The statistics contained in this report represent only analytic cancer cases.

The top five sites at Mercy Health – Western Hills Hospital in 2010 were breast, lung/bronchus, colorectal, bladder and prostate.



Outcome Study - Non-Hodgkin Lymphoma

Non-Hodgkin lymphoma (NHL) is a group of more than 20 types of cancers that originate in the lymphocytes (a type of white blood cell) or lymph system. The lymphatic system is part of the immune system. The lymphatic system includes lymph vessels, lymph fluid, lymph nodes, tonsils, thymus and spleen. Usually lymphoma is first found in a lymph node. Non-Hodgkin lymphoma can occur at any age, although it is most commonly diagnosed in the elderly. The different types of non-Hodgkin lymphoma are grouped based on the type of lymphocyte affected. The two types of lymphocytes that can cause lymphoma are B-cells and T-cells. The most common types of lymphoma are diffuse large B-cell and follicular. For treatment and prognostic purposes, non-Hodgkin lymphomas are divided into two groups, aggressive (fast growing) and indolent (slow growing).

NHL Incidence and Mortality in the United States

Incidence - Non-Hodgkin lymphoma is the 6th most common cancer in the United States. The American Cancer Society (ACS) estimates 65,540 new cases of non-Hodgkin lymphoma will be diagnosed in 2010. Studies show that 1 in 44 men and 1 in 52 women will be diagnosed with non-Hodgkin lymphoma during their lifetime. Overall incidence has been stable since 1991 in men but has been increasing by a little over 1% per year in women since 1990. 56% of our NHL cases were male and 44% female.

Mortality - Non-Hodgkin lymphoma is the sixth highest cause of cancer deaths in American women and the eighth most common cause of cancer deaths in American men. The ACS estimates 20,210 non-Hodgkin lymphoma deaths in 2010. Death rates for NHL increased during most of the past 2 decades but have been decreasing by about 3% - 4% since 1997.

Signs and Symptoms

Symptoms include: swollen painless lymph nodes, unexplained weight loss, fever, night sweats, itchy skin, coughing or trouble breathing, along with overall weakness and tiredness.

Risk Factors

Risk factors for non-Hodgkin lymphoma include:

- Weakened immune system
- Infections including:
 - Human immunodeficiency virus (HIV)
 - Epstein-Barr virus (EBV)
 - Helicobacter pylori, H. pylori
 - Human T-cell leukemia/lymphoma virus (HTLV-1)
 - Hepatitis C virus
- Age

Most cases of non-Hodgkin lymphoma occur in people over the age of 60

Researchers are now studying the effects of obesity and work with herbicides to see if these factors increase the risk of non-Hodgkin lymphoma.

Diagnostic Methods

Swollen lymph nodes are the most common symptom. A physical exam is completed along with a complete blood count. Biopsy of an enlarged node is completed for tissue diagnosis.

Factors that Determine Treatment and Prognosis

Histology - Histology refers to the microscopic structure of the tissue in the tumor. There are more than 20 different types of lymphomas and although all are cancers of the lymphocytes, they each behave differently and have different treatment options and outcomes.

According to data in the National Cancer Data Base, 33% of the non-Hodgkin lymphomas in CoC-approved cancer programs were large B-cell diffuse lymphomas with 27% follicular types.

Findings: Our histologies were essentially the same as seen nationally with the exception of a larger percentage of Large B-Cell Diffuse, Follicular and Non-Hodgkin, NOS. Our number of cases for the 6 year study was only 72, however, so it is difficult to identify any true significance to these differences.

Age - Age at diagnosis is an important prognostic indicator. Most non-Hodgkin lymphomas are diagnosed after age 60 when significant and debilitating comorbidities may affect the patient's overall health and ability to withstand the rigors of treatment such as chemotherapy. If a patient cannot be optimally treated, survival and quality of life may be dramatically affected.

Findings: Most of our patients were diagnosed after age 60 which is similar to what is seen nationally.

Blood test results: The serum lactate dehydrogenase (LDH) is an indicator of how much disease there is in the body. The higher the level of LDH, the more disease is present. Those with a lower level of LDH at diagnosis will do better than those with a high level.

Non-Hodgkin Lymphoma - nodal

Diagnosed 2003 - 2008

Lymphoma Histology		MHWH
	%	%
Large B-Cell Diffuse, NOS	33%	18%
Follicular, NOS	11%	24%
Non-Hodgkin, NOS	10%	13%
Other Specified Types	9%	15%
Small B Lymphocytic, NOS	8%	11%
Follicular Grade 1	7%	3%
Malignant Lymphoma, NOS	5%	1%
Follicular Grade 2	5%	3%
Mantle Cell	4%	6%
Follicular Grade 3	4%	4%
Marginal Zone B-Cell	4%	3%

Source: National Cancer Database

Performance status: This is a measurement of how fit and self-sufficient the patient is and whether or not symptoms are present. As with other cancers, patients who are otherwise healthy and fit will do better than those who are weakened or sick. The presence of one or more symptoms, called B-symptoms, (fever for 3 or more days, weight loss exceeding 10% of body weight within 6 months, and drenching night sweats) indicates that the disease may be in more parts of the body than can be identified by the usual tests.

Stage – Stage at diagnosis is an important tool used to plan treatment and predict prognosis. Staging must be completed to determine the extent of the disease. Bone marrow biopsy is completed along with CT scans, MRI scans and PET CT scans to aid in staging.

The AJCC cancer staging schema for lymphoid neoplasms differs from the TNM schemas for other primary sites. Extent of disease is based on the number of lymph node regions involved and whether other sites, such as the spleen, are involved. Stages range from stage 1 (localized) through stage 4 (diffuse or disseminated, including bone marrow involvement). If the lymphoma involves organs outside the lymph system, such as liver, brain or spine, treatment is usually not as successful.

Stage at Diagnosis Comparison

Findings: The percentages of patients in each stage group did not vary greatly. The incidence of early stage at diagnosis, stages 1 and 2 combined, were very similar (33% for the U.S. and 34% for Mercy Health – Western Hills Hospital). The most common stages at diagnosis, Stages 3 and 4, were also very similar with 50% of the patients nationally and 60% of our patients being diagnosed at these stages.

Our lower number of stage unknown (1% compared to 17%) is favorable for our patients, since treatment is more adequately planned when the stage is known.

Treatment Modalities

Treatment is based on many factors, including stage of disease, non-Hodgkin lymphoma histology, patient age and other comorbidities at the time of diagnosis.

Watchful Waiting

If lymphoma is a slow growing (indolent) watchful waiting or active surveillance may be recommended. Patients are closely monitored on a regular basis. No treatment will be given in these cases until symptoms arise.

Chemotherapy

Chemotherapy is the most common form of treatment for non-Hodgkin lymphoma. Two type of drug agents are typically used: alkylating agents (cytotoxic agents that inhibit the cell division by reacting with DNA), and nucleosides (agents that inhibit DNA and RNA replication and prevent cancer cells from growing).

Single drug treatments may be given for indolent NHL, while combination treatments are given for aggressive types or recurring NHL. Examples of chemotherapy agents given singly include Fludaribine, Cladribine, Chlorambucil, and Cyclophosphamide. The combination drugs used frequently include Cyclophosphamide, Hydroxdaunomycin, Vincristine and Prednisone known as CHOP, Cyclophosphamide, Vincristine and Prednisone known as CVP, and Bleomycin, Doxorubicin, Cyclophosphamide, and Vincristine known as BACOD. These regimens may also include the monoclonal antibody Rituximab.

Radiation Therapy

External beam radiation therapy, alone or in combination with chemotherapy, is used less often but can be used for early stage lymphoma to treat a single lymph node chain. Radiation treatments can be given for residual tumor after chemotherapy regimen is completed.

Immunotherapy

Immunotherapy is a process in which the immune system is enhanced, induced or suppressed to maximize the body's ability to remove disease on its own. Monoclonal antibodies work on cancer cells similar to the way natural antibodies work by identifying and binding to the target cells. The most common immunotherapies for NHL are Rituximab (Rituxan) and Alemtuzumab (Campath). These drugs are given for initial treatment and recurrence of some types of NHL.

Radioimmunotherapy combines radiotherapy with monoclonal antibody therapy. Zevalin® has been approved by the FDA as a first-line radioimmunotherapy treatment for certain types of follicular .

Interferons are proteins that help strengthen the immune system and are given alone or along with chemotherapy.

Bone Marrow Transplants

In some cases, a bone marrow or stem cell transplant may offer the best chance for long term survival. There are two types of transplants, (autologous transplant), which uses blood-forming cells collected from the patient and (allogeneic transplant), which uses blood forming cells from a family member or unrelated donor. The goal of a transplant is to destroy cancer cells in marrow, blood, and other parts of the body and then replace the blood stem cells to create healthy bone marrow. Patients receive high dose chemotherapy and or radiation therapy to destroy bone marrow and suppress the immune system before transplant.

Stem Cell Transplant

In this type of autologous transplant, the patient's blood is passed through a machine that removes the stem cells (immature cells from which all blood cells develop). This process is called apheresis and is completed over three to four days. The patient then receives treatment to kill any cancer cells and the stem cells are frozen until they are transplanted back into the patient.

Treatment Comparison to National Cancer Database

Stage 1 – 40% of the cases were treated with chemotherapy alone or in combination with other treatments. 18% had no first course of treatment and 20% of the cases were only treated with surgery.

Stage 2 – 62% of the cases were treated with chemotherapy alone or in combination with other treatments. 11% had no first course of treatment and there were 6% of cases that were only treated with surgery.

Stage 3 – 76% of the cases were treated with chemotherapy alone or in combination with other treatments.

There were 16% of the cases that had no first course of treatment and 4% were treated with surgery only.

Stage 4 – 56% of the cases were treated with chemotherapy alone or in combination with other treatments. 39% had no first course of treatment and none were treated with surgery alone.

Stage unknown – all of these patients were given chemotherapy compared to national treatment for this group.

Stage N/A – We had no patients in this group.

Findings: For all stages, chemotherapy is the most common type of treatment given. The treatment received by our patients is appropriate for each stage.

Non-Hodgkin Lymphoma- Diagnosed 2006 - 2008

Treatment by Stage Comparison

National Cancer Data Base vs Mercy Health – Western Hills Hospital

Treatment Type	NCDB	MHWH	NCDB	MHWH	NCDB	MHWH	NCDB	MHWH	NCDB	MHWH	NCDB	MHWH
	Stage 1		Stage 2		Stage 3		Stage 4		Stage N/A		Stage Unknown	
Surgery Only	15%	20%	8%	6%	7%	0%	5%	0%	12%	0%	10%	0%
Surgery and Chemotherapy	6%	10%	8%	17%	10%	4%	7%	0%	7%	0%	7%	0%
Radiation and Chemotherapy	8%	0%	7%	0%	2%	0%	3%	0%	1%	0%	3%	0%
Chemotherapy only	17%	20%	26%	28%	32%	44%	33%	39%	19%	0%	25%	100%
Surgery, Chemotherapy and Hormone	2%	0%	3%	0%	6%	0%	4%	0%	1%	0%	2%	0%
Chemotherapy and Hormone	4%	10%	11%	17%	13%	28%	13%	17%	4%	0%	5%	0%
Other Specified Therapy	29%	10%	23%	22%	14%	8%	16%	6%	8%	0%	16%	0%
No 1st Course Rx	20%	30%	14%	11%	16%	16%	19%	39%	47%	0%	33%	0%
% of Cases for Stage Group	18%	14%	15%	25%	20%	35%	30%	25%	1%	0%	17%	1%

Source: ©2011 National Cancer Data Base (NCDB) / Commission on Cancer (CoC)

Survival

Survival rates vary among the cell types of NHL and the stage at diagnosis. Overall, the one year survival for NHL is 80%, 5 year survival is 67%, and 10 year survival is only 56% according to American Cancer Society statistics.

Survival by Stage

Comparison of Mercy Health - Western Hills Hospital to National Survival

Findings: Comparison of survival data for our patients diagnosed in 2003 shows that our survival is lower than national survival. The number of patients diagnosed at Mercy Health - Western Hills Hospital in 2003 was just 9, however, and does not give an adequate sample size for comparison.

National Cancer Database

Non-Hodgkin Lymphoma-nodal 5 Year Survival Diagnosed 2003

	Year				
	1	2	3	4	5
Stage 1	87.6%	82.4%	79.0%	75.4%	72.0%
Stage 2	82.4%	74.9%	71.3%	68.3%	64.9%
Stage 3	78.9%	70.3%	65.9%	61.7%	58.0%
Stage 4	68.9%	60.2%	55.3%	51.0%	47.9%
Overall	77.3%	69.6%	65.3%	61.4%	58.1%

Mercy Health - Western Hills Hospital

Non-Hodgkin Lymphoma-nodal 5 Year Survival Diagnosed 2003

	Year				
	1	2	3	4	5
Stage 1	50%	50%	50%	50%	50%
Stage 2	75%	75%	75%	38%	38%
Stage 3	NA	NA	NA	NA	NA
Stage 4	NA	NA	NA	NA	NA
Overall	56%	56%	56%	42%	42%

Summary of Findings and Recommendations:

Histologies: Our histologies show similar percentages of large B-cell diffuse lymphoma (an aggressive histology), a similar percentage of follicular lymphoma (an indolent type), and a much higher small B-cell lymphocytic lymphoma (an indolent type). A larger portion of indolent histologies may provide better outcomes in this patient group.

Age: Our age distribution compares favorably to what was seen nationally.

Stage: The patient's stage at diagnosis at Western Hills showed a high incidence of stage 3 and stage 4 disease. We had 1% of cases that were staged unknown compared to 17% nationally.

Survival: Our survival was lower when compared to the national data. Again, this was a small population of patients diagnosed in 2003.

Recommendations: Continue to capture all treatment information to reflect the accurate and complete cancer data that can be used for cancer control and epidemiological research, public health program planning, benchmarking, and patient care improvements.

Promote early detection to improve outcomes by providing information at community health fairs.

Increase awareness of clinical trials through access to the Mercy Health – Western Hills Hospital Cancer Resource Center to provide information on the latest clinical trials for promising therapies in the treatment of lymphoma.

Present cases for multidisciplinary discussions at cancer conference using the NCCN guidelines for treatment of lymphoma.

Clinical Trials

For information on access to clinical trials in your area:

- Call the American Cancer Society, Clinical Trials Matching Service (a free, confidential program) at 1-800-303-5691 or visit www.cancer.org
- Visit the National Cancer Institute (NCI) website at: www.cancer.gov/clinicaltrials/search
- Visit the Coalition of Cancer Cooperative Groups at: www.cancertrialshelp.org

References

- American Cancer Society, Facts and Figures, 2010
- National Cancer Institute: <http://www.cancer.gov/cancertopics/types/non-hodgkin>
- LymphomaInfo.net: <http://www.lymphomainfo.net/therapy/immunotherapy/index.html>



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