

The Jewish Hospital – Mercy Health
Annual Report on 2010 Activities
Non-Hodgkin Lymphoma
Outcomes Study

Cancer Program Summary

The Jewish Hospital Cancer Program has maintained accreditation by the American College of Surgeons since the early 1980's, Commission on Cancer and Foundation for the Accreditation of Cellular Therapy for our Blood and Marrow Transplant Center. In addition to a wide range of diagnostic and treatment services, The Jewish Hospital offers a bevy of programs to provide assistance to both our patients and their families as they cope with a diagnosis of cancer. Our support services include nutritional support, spiritual support, rehabilitation, palliative care, educational programs for our patients and the community, information on access to clinical trials and cancer support groups and programs, many of which are provided through participation with the American Cancer Society.

To meet the growing and changing needs of the patients and the communities we serve, our Surgical Oncology Quality Committee and the Blood and Marrow Transplant Center Special Quality Committee continually strive for Cancer Program excellence by quarterly reviewing our services, performing patient care studies, and by setting annual goals to improve and enhance our services.

The Blood and Marrow Transplant Program's affiliation with the National Marrow Donor Program (NMDP) and the Center for International Blood and Marrow Transplant Research (CIBMTR) allows patients access to national and international research protocols and increases their opportunity for participation in cutting edge oncology clinical trials.

The Jewish Hospital has implemented several patient care improvements, sponsored a large number of patient, community and staff educational offerings, and improved our services last year. These included:

- Piloted distress screening tool for blood and marrow transplant patients.
- Implementation of central line bundle and refinement of evidenced based standards in the field of Oncology and Bone Marrow Transplant.
- Improved safety and accuracy of medication administration on the Bone Marrow Transplant Unit.
- Reduced the risk of patient harm resulting from falls.
- Developed a strategic plan for Breast Center Accreditation by NAPBC.
- Purchased the Da Vinci Skills Simulator to aid in teaching robotic surgery.
- Entered into the American Cancer Society Collaborative Agreement.

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 essential 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, Thoracic Surgery, Breast Surgery, 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. National Comprehensive Cancer Network (NCCN) Practice Guidelines in Oncology, information on open clinical trials, National Cancer Data Base (NCDB) and cancer registry data are provided for the cancer sites presented.

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 The Jewish Hospital 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.

The Jewish Hospital - Mercy Health | 2010-2011 Cancer Committee Membership

Physician Members

Elliott Fegelman, MD - Co-Chair, General Surgery
Elizabeth Weaver, MD - Co-Chair, Cancer Liaison Physician, Radiology
James Essell, MD - Medical Oncology
Kevin Monroe, MD - Pathology
William Gluntz, MD - Internal Medicine
Peter Fried, MD - Radiation Oncology

Allied Health Members

Teresa Schleimer, MSN, CNP - Cancer Program Administrator
Elena Stein, MAHL, BCC - Pastoral Care
Kathy Smith, RN, MSN - Patient Services
Jenny Martin, RN, MSN - Quality Management
Carolyn Green, RT, (R) (M) - ARDS Radiology
Chris Warders, RD, LD - Nutrition
Patricia Holland, RHIT, CTR - Cancer Registry
Robin Hite, R.T. (R) (T) - Radiation Oncology
Dianne Mahaffey, MSN, CNS, CNP - Pain Management
Michael DeVoe, Pharm.D - Pharmacy
Laura Metzler - American Cancer Society
Lyn Sontag, Psy.d, ABPP - Clinical Psychologist
Annette Shepherd, R.T. (R) (T) - Community Member
Jenny Martin, RN, MSN - Performance Improvement
Beverly Weinstein, RTRM - Mammography
Vickie Estridge, BSN, RN, OCN - Clinical manager, BMTU
Pam VanSant, BS, MBA, VP - Administration
Linda Miller, RN, MSN, VP - Patient Services
Karen Hess, MSN, MBA, CNP - Blood and Marrow Transplant Center
Debra Steinbauch, MA, CCC-SLP - Rehabilitation Services
Susan Colding, RN, OCN - Research Nurse
Mary Hill, MSW, LISW - Social Services
Yvonne Duhart, RHIT - Cancer Registry
Angela Price, RHIA - Medical Records

Cancer Program Coordinators

Kevin Monroe, MD - Quality of Registry Data
Patricia Holland, RHIT, CTR - Cancer Conference
Elizabeth Weaver, MD - Community Outreach
Jenny Martin, RN, MSN - Quality Improvement

2010 Cancer Data Summary and Comparisons

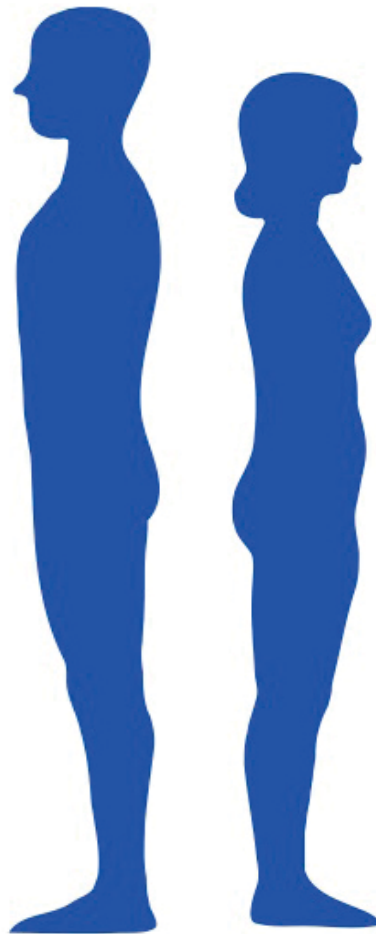
Top Cancer Sites in 2010

The top five sites at The Jewish Hospital in 2010 were breast, lung/bronchus, melanoma, leukemia, non-Hodgkin lymphoma.

Distribution of our sites by sex revealed we have fewer prostate and uterine cancers compared to the U.S., but more breast cancers diagnosed. This difference in breast cancer could be due to the availability, at The Jewish Hospital of stereotactic and ultrasound guided needle biopsies. Additional diagnostic studies provided by the hospital are digital and mobile mammography and breast MRI.

2010 Top Cancer Sites by Sex The Jewish Hospital - Mercy Health

<u>Male</u>	
Prostate	
U.S. 28%	TJH 12%
Lung & Bronchus	
U.S. 15%	TJH 13%
Colon & Rectum	
U.S. 9%	TJH 5%
Urinary Bladder	
U.S. 7%	TJH 7%
Melanoma of the Skin	
U.S. 5%	TJH 15%
Non-Hodgkin lymphoma	
U.S. 4%	TJH 7%
Kidney & Renal Pelvis	
U.S. 4%	TJH 4%
Oral Cavity & Pharynx	
U.S. 3%	TJH 1%
Leukemia	
U.S. 3%	TJH 9%
Pancreas	
U.S. 3%	TJH 5%

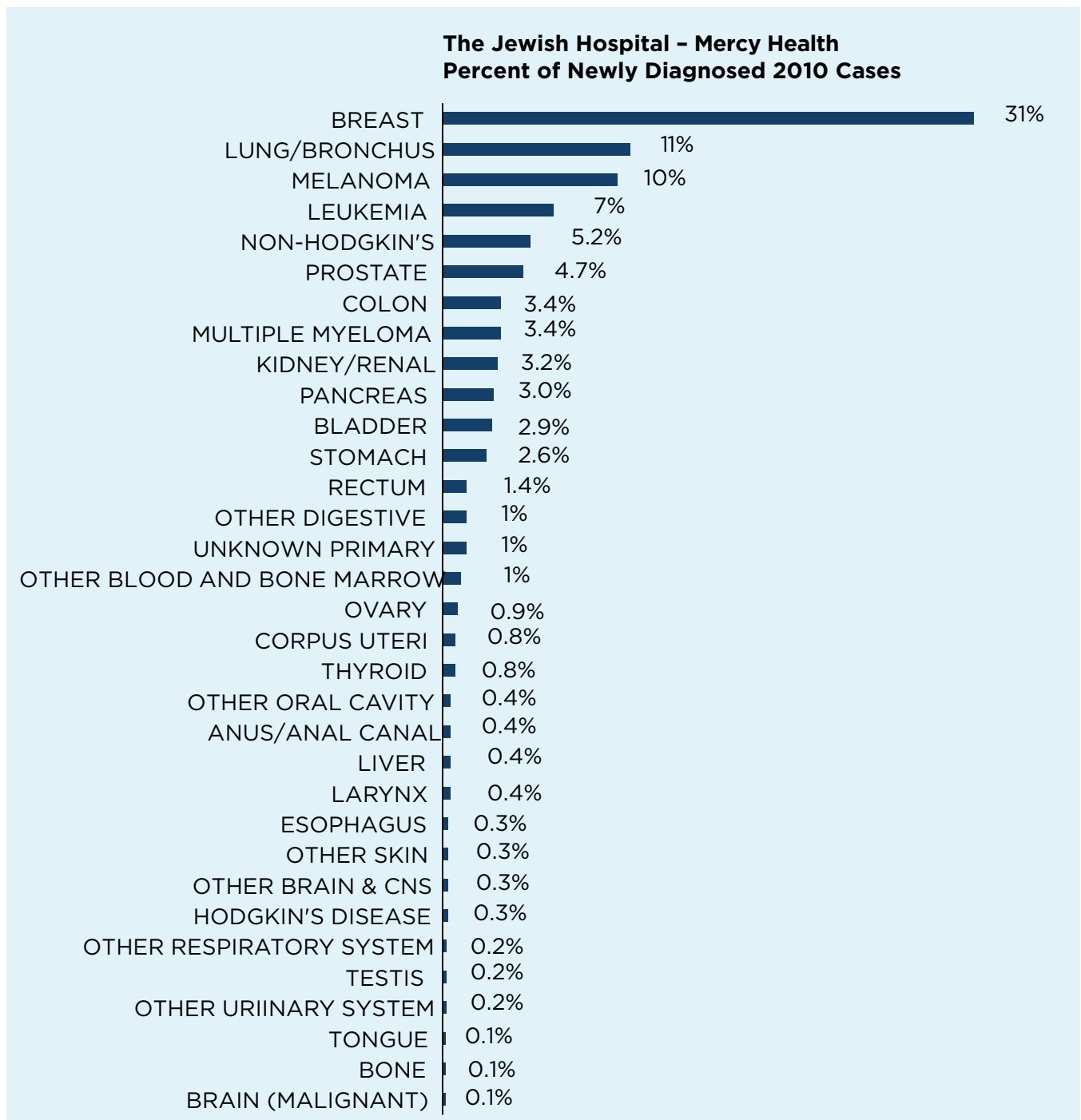


<u>Female</u>	
Breast	
U.S. 28%	TJH 50%
Lung & Bronchus	
U.S. 14%	TJH 10%
Colon & Rectum	
U.S. 10%	TJH 5%
Uterine Corpus	
U.S. 6%	TJH 1%
Thyroid	
U.S. 5%	TJH 1%
Non-Hodgkin lymphoma	
U.S. 4%	TJH 4%
Melanoma of the Skin	
U.S. 4%	TJH 7%
Kidney & Renal Pelvis	
U.S. 3%	TJH 3%
Ovary	
U.S. 3%	TJH 1%
Pancreas	
U.S. 3%	TJH 2%

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 Jewish Hospital Cancer Registry database since the 2003 reference date is 8,840 cases. 8,256 of these cases are available for analytic studies. During 2010, a total of 1,024 cases were accessioned into the registry database, 933 analytic (newly diagnosed) cases and 91 non-analytic (recurrent cancer) cases. The statistics contained in this report represent only analytic cancer cases.



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 lymphomas 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.

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 Commission on Cancer (CoC)-approved cancer programs were large B-cell diffuse lymphomas with 27% follicular types.

Findings: Our histology types have a lesser percentage of large B-cell diffuse lymphoma and an increased percentage of follicular lymphoma which could be explained by the lymphoma being diagnosed early before the follicular lymphoma transforms to the large B-cell diffuse histology. Non-Hodgkin, NOS is a histology term that is obsolete and no longer used, which explains our lower percentage.

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. Our age distribution compared favorably to what was 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.

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: We had more stage 2 and stage 3 cases and this can be explained by using better diagnostic methods including PET scans which allow for the actual findings of the initial stage of the lymphoma. We had no cases that were staged unknown.

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 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 and Alemtuzumab. These drugs are given for initial treatment and recurrence of some types of NHL.

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

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

Stem Cell Transplant

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 allow engraftment of stem cells and destroy malignant cells.

The stem cells may be obtained from a bone marrow harvest or via an apheresis procedure which collects the cells from the peripheral blood. This typically requires 2-3 four (4) hour apheresis procedures.

Treatment Comparison to National Cancer Database

Findings:

Stage 1 –40% of the cases were treated with chemotherapy alone or in combination with other treatments. 7% had no first course of treatment and there were 13% of the cases that were only treated with surgery.

Stage 2 –64% of the cases were treated with chemotherapy alone or in combination with other treatments. 2% had no first course of treatment and there were 0% of the cases that were only treated with surgery.

Stage 3 –70% of the cases were treated with chemotherapy alone or in combination with other treatments. There were 5% of the cases that had no first course of treatment.

Stage 4 –63% of the cases were treated with chemotherapy alone or in combination with other treatments. 1% had no first course of treatment.

Compared to the NCDB all stages had a higher percentage of cases that had some type of treatment which may be explained by the effort that is concerted in obtaining all treatment information. That also explains why there were fewer cases that had no first course of treatment.

Non-Hodgkin Lymphoma- Diagnosed 2006 - 2008

Treatment by Stage Comparison

National Cancer Data Base vs Jewish Hospital

Treatment Type	NCDB	TJH	NCDB	TJH	NCDB	TJH	NCDB	TJH	NCDB	TJH	NCDB	TJH
	Stage 1		Stage 2		Stage 3		Stage 4		Stage N/A		Stage Unknown	
Surgery Only	15%	13%	8%	0%	7%	1%	5%	0%	12%	0%	10%	0%
Surgery and Chemotherapy	6%	2%	8%	12%	10%	4%	7%	3%	7%	0%	7%	0%
Radiation and Chemotherapy	8%	7%	7%	14%	2%	0%	3%	2%	1%	0%	3%	0%
Chemotherapy only	17%	22%	26%	14%	32%	27%	33%	23%	19%	0%	25%	0%
Surgery, Chemotherapy and Hormone	2%	9%	3%	10%	6%	5%	4%	8%	1%	0%	2%	0%
Chemotherapy and Hormone	4%	0%	11%	14%	13%	34%	13%	27%	4%	0%	5%	50%
Other Specified Therapy	29%	40%	23%	33%	14%	23%	16%	35%	8%	0%	16%	0%
No 1st Course Rx	20%	7%	14%	2%	16%	5%	19%	1%	47%	0%	33%	50%
% of Cases for Stage Group	18%	17%	15%	16%	20%	30%	30%	36%	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 Jewish Hospital to National Survival

Findings: Comparison of survival data for our patients diagnosed in 2003 shows that our survival is higher than national survival, except for stage 1. This may be explained because three of the six patients with stage 1 were of advance age, precluding optimal cancer treatment of the patients.

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%

Jewish Hospital

Non-Hodgkin Lymphoma-nodal 5 Year Survival Diagnosed 2003

	Year				
	1	2	3	4	5
Stage 1	100.0%	90.0%	90.0%	90.0%	70.0%
Stage 2	88.8%	83.3%	77.7%	66.6%	66.6%
Stage 3	66.6%	50.0%	50.0%	50.0%	50.0%
Stage 4	83.3%	66.0%	66.6%	58.3%	50.0%
Overall	86.9%	76.0%	71.7%	65.2%	58.6%

Summary of Findings and Recommendations:

Sex Comparison – Our male/female incidence is the same as the national distribution; we have seen more males than females. National the percentage for males was 52% and Jewish Hospital had 55%. The percentage for females was 48% and 45%. This was not felt to be a significant difference.

Histologies: Our histology types have a lesser percentage of large B-cell diffuse lymphoma and an increased percentage of follicular lymphoma. This may be explained by the fact that the majority of patients with nodular lymphoma will present with bone marrow involvement and Jewish Hospital had a disproportionate percentage of nodular lymphoma.

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

Stage: Our stage had higher incidence of stage 3 and 4 disease and this was explained through the number of patients with advanced stage of disease diagnosis of the initial stage of the lymphoma. We had one case that was staged unknown compared to 17% nationally.

Survival: Our survival rate was higher with all stages except stage 1 when compared to the national data. There were three of six patients in the group that had advanced age that precluded optimal cancer treatment.

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.

Provide access to The Jewish's Hospital Cancer Resource Center to provide the latest clinical trials for promising therapies in the treatment of lymphoma.

Present cases at cancer conference and discuss NCCN guidelines for treatment of lymphoma.

Provide information to community for National

Bone Marrow transplant registry.

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.cancertrials-help.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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