**Rhode Island Hospital**


**The Miriam Hospital**

**Newport Hospital**

# Cancer Program Annual Report 2019

## Report of the Cancer Committee

## Content

## Introduction

In August 2013, the cancer programs at Rhode Island Hospital, The Miriam Hospital, and Newport Hospital officially merged into one, system-wide Integrated Network Cancer Program. The mission of the program is to provide patient centered, research focused, high quality, high value care that is consistent across our network.

The Lifespan Cancer Institute a Program of Rhode Island Hospital, brings together world-renowned physicians whose level of knowledge and experience are unparalleled in Rhode Island. A multidisciplinary team of specialists from Rhode Island Hospital, The Miriam Hospital and Newport Hospital provide patients diagnosed with cancer or hematologic disorders access to a full range of cancer services.

The hematology and oncology program has a disease specific focus, led by highly trained board-certified specialists. Teams of expert medical oncologists, hematologists, radiation oncologists, oncology surgeons, radiologists, pathologists, nurse practitioners, physician assistants, nurses, clinical pharmacists, patient navigators, rehabilitation specialists, geneticists, social workers and dietitians are dedicated to the diagnosis, treatment and prevention of cancer. Our model of care provides patient access to disease specific multidisciplinary clinics where patients see all disciplines in one setting and a proposed treatment plan is developed. The team works closely and compassionately with patients and families to ensure the highest standard of care is provided to achieve the best possible outcome. Nurse, financial and lay navigators ensure patients have the information and resources they require. When treatment is completed the Institute continues to support patients and their families through survivorship, support groups and wellness programs.

The Cancer Program at Rhode Island Hospital, The Miriam Hospital and Newport Hospital was surveyed by the Commission on Cancer (CoC) of the American College of Surgeons (ACoS) in 2018. This voluntary accreditation validates that our Integrated Network Cancer Program meets and exceeds the rigorous standards set by the Commission on Cancer of the American College of Surgeons.

This 2019 Annual Report summarizes Cancer Program statistics for 2018, during which time 4,562 cases were accessioned. The analytic case count was 3,852 and the non-analytic case count was 710. For patients diagnosed and treated at Rhode Island Hospital, The Miriam Hospital and Newport Hospital a lifelong follow-up rate of at least 90% is maintained.

In 2019, the Cancer Committee conducted a lung cancer outcome analysis to assess the program's overall experience with this disease. It is estimated 234,030 new cases of lung cancer were diagnosed in the United States during 2018 and 880 residents in Rhode Island will be affected by this disease. Overall the chance of developing lung cancer during one's lifetime is about 1 in 15 or 6.8 percent for men and 1 in 17 or 5.9 percent for women, making lung cancer the second most commonly diagnosed cancer in both genders. About 13% of all new cancers are lung cancer. Lung cancer is by far the leading cause of cancer death among both men and women. Each year, more people die of lung cancer than of colon, breast and prostate cancers combined.

The programmatic and clinical goals for 2019 were as follows:

***Programmatic*:** *Programmatic Goal – improve the chemotherapy pre-release process utilized in the LCI, increasing the percentage of pre-releases and improve Press Ganey patient satisfaction scores for "Wait time in the chemo area".*

Background: The Lifespan Cancer Institute (LCI) provides services to hematology oncology patients throughout Rhode Island, Massachusetts and Connecticut. We are an

Integrated Network Cancer Program (INCP) with four outpatient sites. Our larger sites have an average daily census of 80 patients while the smaller sites have an average daily census of 20 patients. We are open six days per week with a fixed capacity of 79 chairs across the 4 sites. With our limitations in capacity, innovation was needed to support the growing oncology population while delivering health with care.

To achieve this goal, a multidisciplinary approach including patients, providers, nurses and pharmacy was implemented.

To measure the success of this initiative, several metrics were applied including:

- Number of patients released the day before (limited to applicable patients: no labs or same day MD visits)
- Hours saved on infusion medication wait time (medications available at start of appointment time regardless if released the day before or morning of)
- Patient satisfaction- "overall facility" and "wait time in chemotherapy area"
- Incremental nursing overtime
- Provider collaboration - percentage of plans signed 24 hours in advance (exclusion of MD same day visit)
- Waste (Drug waste cost/total cost of drugs & Preventable waste/total waste)
- Error review of infusion medications (actual)
- Near Miss events (potential to have higher volume with advanced prep and more time to review)

Interventions:

- Nursing and pharmacy partnership developed
- RN Leadership review of waste data
- Categorized preventable / unpreventable
- Patient experience data shared with staff
- Developed a report to assist with overall compliance and monitoring

Throughout 2019, the number of pre-released chemotherapy's increased from 16.70% to 20.40%.

The 2019 programmatic goal was met.

***Clinical:*** *Develop and implement a standardized process for oral chemotherapy provided to the hematology / oncology patient population (planning, education, & follow-up monitoring) across the system. Increase compliance with specified Quality Oncology Practice Initiative (QOPI) oral chemotherapy measures by 10% (specifically Administration Schedule, Plan, and Follow-Up Adherence)*

Interventions:

- Standardized resources and documentation by utilizing Via for monitoring & patient education
- Established a process for monitoring compliance by collaborated with Shields
- Developed and implemented an electronic trigger for follow-up monitoring

Review of spring 2019 compliance with QOPI's oral chemotherapy measures compared to spring 2018 results revealed the following: dose remained stable at 100%; documentation of administration schedule increased by 16% (57% in 2018 to 73% in 2019); plan provided prior to start increased by 2%; documentation of indications for treatment increased by 15% (85% in 2018 to 100% in 2019); education prior to start of therapy for missed dose increased by 6%; toxicity education increased by 5%; education related to clinic contact instructions increased by 3%; follow-up monitoring for medication adherence increased by 27% (38% in 2018 to 65% in 2019); addressing medication adherence revealed a decrease from 100% in spring 2018 to 66% in spring 2019.

Based on review of all measures, the 2019 clinical goal was noted to be met.

## 2019 Cancer Oversight Committee Membership

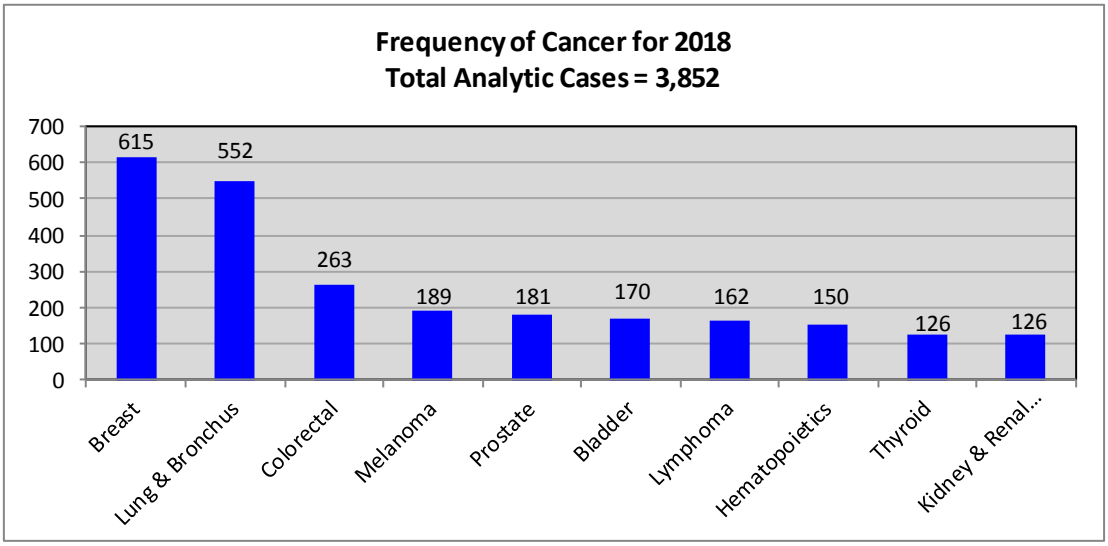
| | | |
|---|---|---|
| Sheryl Amaral, MBA, MS CCC-SLP | Community Representative | RIH Foundation, Board of Trustees |
| Megan Begnoche, RN, AOCN | Nursing Quality & Safety Manager<br>*Quality Improvement Coordinator* | Lifespan Cancer Institute |
| Carrie Bridges-Feliz | Director<br>*Community Outreach Coordinator* | Community Outreach |
| Laura Butterfield, RN, OCN | Director | Lifespan Cancer Institute |
| Christine Collins, MBA, RPh | Vice President | Lifespan Pharmacy |
| Mary Cordo | Cancer Registrar | Oncology Data Management |
| Thomas DiPetrillo, MD | Radiation Oncologist<br>*Chair, Cancer Committee*<br>*Cancer Conference Coordinator* | Radiation Oncology |
| Don Dizon, MD | Medical Oncologist | Lifespan Cancer Institute |
| Christine Duffy, MD | Survivorship Administrator | Internal Medicine |
| Sheila Earle, CTR | Cancer Registrar | Oncology Data Management |
| Mary Flynn, PhD, RD, LDN | Nutritionist | Nutrition Services |
| Theresa Graves, MD | Director, Breast Program<br>Breast Surgeon | Surgery |
| Angela Hall-Jones | Community Representative | American Cancer Society |
| Arnold Herman, MD | Cancer Committee Liaison | Surgery (Retired) |
| Charlene Hokanson, RN, OCN | Clinical Manager | Clinical Manager, Inpatient, TMH |
| Jason Iannuccilli, MD | Radiologist | Diagnostic Imaging |
| Theresa Jenner, LICSW | Administrative Director<br>*Psychosocial Services Coordinator* | Clinical Social Work |
| Susan Korber, MS, RN, OCN | Cancer Program Administration<br>Vice President | Lifespan Cancer Institute |
| Mark LeGolvan, MD | Pathologist | Pathology Services |
| Kara Lynne Leonard, MD | Radiation Oncologist, CLP | Radiation Oncology |
| Rishi Lulla, MD | Pediatric Medical Oncologist | Pediatrics |
| Carrie Marcil, PT, LANA | Physical Therapist | Rehabilitation Services |
| Camille Higel-McGovern, NP | Survivorship Administration | Lifespan Cancer Institute |

## 2019 Cancer Oversight Committee Membership

| | | |
|---|---|---|
| Kim McDonough | Clinical Manager | Lifespan Cancer Institute |
| Alessandro Papa, MD | Medical Oncologist | Lifespan Cancer Institute |
| Julie Principe, MS, RN | Director | Lifespan Cancer Institute |
| Debra Pultman, CTR | Cancer Registrar | Oncology Data Management |
| Andrew Schumacher, CCRP | Manager<br>*Clinical Research Coordinator* | Lifespan Oncology Clinical Research |
| Jennifer Schwab, MS, CGC | Genetics Counselor | Genetics Clinic |
| Marsha Stephenson, RN | Clinical Coordinator | Hope Hospice & Palliative Care of Rhode Island |
| Rochelle Strenger, MD | Medical Oncologist | Lifespan Cancer Institute |
| Tara Szymanski, CTR | Manager, Quality, Data Mngt.<br>*Cancer Registry Coordinator* | Oncology Data Management |
| Angela Taber, MD | Palliative Care / Medical Oncologist | Lifespan Cancer Institute |
| Christine Vieira, CTR | Cancer Registrar | Oncology Data Management |

## Top Ten Sites and Residence at Diagnosis

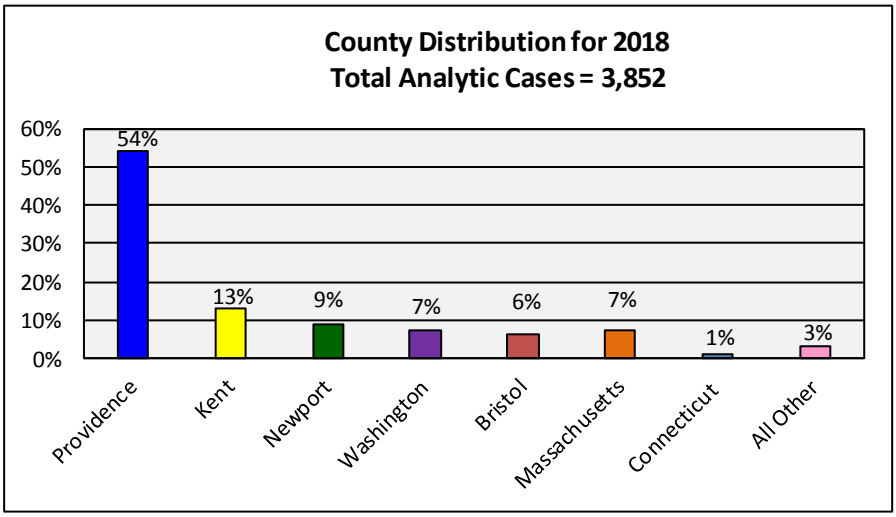
The ten most common sites for the Cancer Program, based on 2018 analytic* cases are (in descending order by percent of total incidence) Breast (16%), Lung & Bronchus (15%), Prostate (7%), Colorectal (7%), Melanoma (5%), Lymphoma (5%), Hematopoietic Malignancy (Leukemia & Myeloma) (5%), Bladder 183 (5%), Thyroid 177 (4%), Kidney & Renal Pelvis (4%). This distribution differs from that of the American Cancer Society (ACS) which was noted to be (in descending order by percent of total incidence) Breast (15%), Lung and Bronchus (13%), Prostate (9%), Colorectal (8%),Hematopoietic Malignancy's (5%), Melanoma (5%), Lymphoma (5%), Bladder (5%), Kidney & Renal Pelvis (4%), Uterine Corpus (4%).




Source: Rhode Island, Miriam, & Newport Hospital Oncology Data Management Departments
Source: https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2019/cancer-facts-and-figures-2019.pdf

### Residence at Diagnosis

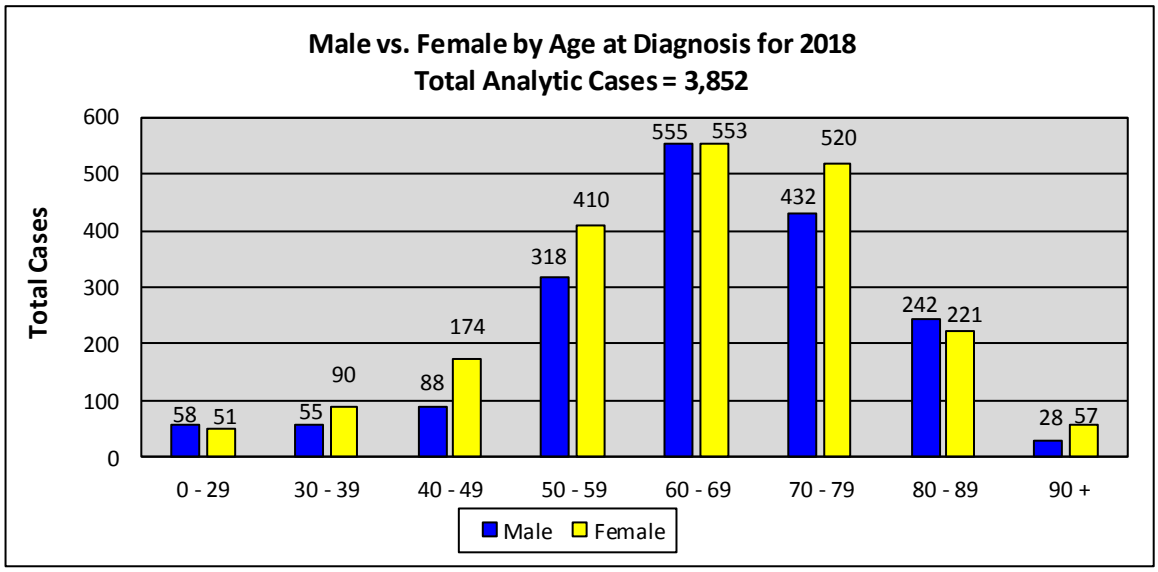
Rhode Island Hospital and The Miriam Hospital are located in Providence County and serve as major referral centers for Rhode Island, Massachusetts, and the surrounding areas. More than 50% of the Hospital's analytic cancer patients accessioned in 2018 reside in Providence County. The remainder of the Hospital's cancer patient population is distributed throughout Rhode Island and Massachusetts. Newport Hospital however, is located on Aquidneck Island and serves as the major referral center for Newport and Bristol County. More than 88% of Newport Hospital's analytic cancer patients accessioned in 2018 reside in Newport County.



## Gender by Age and Stage of Disease at Diagnosis

### Gender by Age

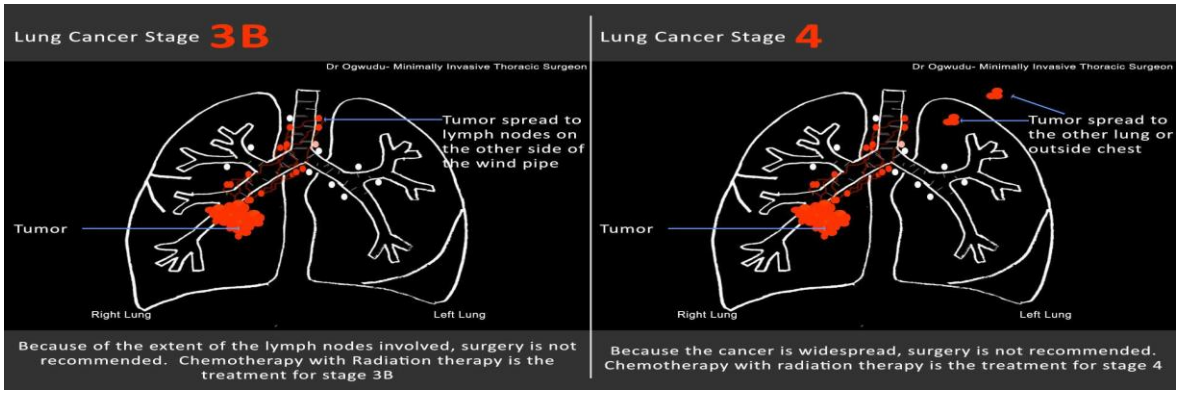
In 2018, the gender distribution for the program was 46% male and 54% female. This distribution differs from the American Cancer Society (ACS) gender distribution. Based on American Cancer Society (ACS) data, the estimated gender distribution of US cancer cases in 2018 was 49% male and 51% female. The most common age group for the Lifespan Cancer Institute was 60 – 69; approximately 28% of patients were in this age group at the time of initial diagnosis.




Source: Rhode Island, Miriam, & Newport Hospital Oncology Data Management Departments
Source https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2019/cancer-facts-and-figures-2019.pdf

### Stage of Disease at Diagnosis

Cases entered into the Cancer Registry are categorized according to the tumor / node / metastases (TNM) staging system developed by the American Joint Committee on Cancer (AJCC) to describe the extent or spread of disease at diagnosis, which is generally predictive of survival.




Source:http://www.bing.com/images/search?q=image+of+stage+1+lung+cancer&qpvt=image+of+stage+1+lung+cancer&FORM=IGRE#view=detail&id=17C723999C7E7AE707539C50573A4C9726FCBF49&selectedIndex=20

## Cancer Program Practice Profile Report (CP3R)

Cancer Program Practice Profile Reports (CP3R) – were developed by the Commission on Cancer of the American College of Surgeons to encourage quality improvement. Evidence based measures and accountability measures promote improvements in care delivery and are the highest standard for measurement. The 2016 data findings displayed below demonstrate accountability and promote transparency. No applicable cases were identified for the new kidney cancer measures (not noted below).

| BREAST | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| | Breast conservation surgery rate for women with AJCC clinical stage 0, I, or II breast cancer (Surveillance) (BCS) **(Compliance – N/A)** | 84% | 84.6% | 66.7% | 84% |
| | Image or palpation-guided needle biopsy (core or FNA) of the primary site is performed to establish diagnosis of breast cancer (Quality Improvement) (nBx) **(Compliance – 80%)** | 99.5% | 100% | 100% | 99.5% |
| | Radiation therapy is considered or administered following any mastectomy within 1 year of diagnosis of breast cancer for women with > = 4 positive regional lymph nodes (Accountability) (MASTRT) **(Compliance – 90%)** | 100% | No Applicable Cases | No Applicable Cases | 100% |
| | Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer (Accountability) (BCS/RT) **(Compliance – 90%)** | 95% | 93.3% | 100% | 95.1% |
| | Combination chemotherapy is considered or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1c N0 M0, or Stage II or III ERA and PRA negative breast cancer (Accountability) (MAC) **(Compliance – N/A)** | 100% | 83.3% | 100% | 95% |
| | Tamoxifen or third generation aromatase inhibitor is considered or administered within 1 year (365 days) of diagnosis for women with AJCC T1c N0 M0, or Stage II or III ERA and/or PRA positive breast cancer (Accountability) (HT) **(Compliance – 90%)** | 98% | 97.6% | 100% | 98.1% |

| CERVIX | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| | Radiation therapy completed within 60 days of initiation of radiation among women diagnosed with any stage of cervical cancer (Surveillance) (CERRT) **(Compliance – N/A)** | 60% | No Applicable Cases | No Applicable Cases | 60% |
| | Chemotherapy administered to cervical cancer patients who received radiation for stages IB2-IV cancer (Group 1) or with positive pelvic nodes, positive surgical margin, and/or positive parametrium (Group 2) (Surveillance) (CERCT) **(Compliance – N/A)** | 90.9% | No Applicable Cases | No Applicable Cases | 90.9% |
| | Use of brachytherapy in patients treated with primary radiaton with curative3 intent in any stage of cervical cancer (Surveillance) (CBRRT) **(Compliance – N/A)** | 100% | No Applicable Cases | No Applicable Cases | 100% |

| BLADDER | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| | At least 2 lymph nodes are removed in patients under 80 undergoing partial or radical cystectomy (Surveillance) (BL2RLN) **(Compliance – N/A)** | No Applicable Cases | 100% | No Applicable Cases | 100% |
| | Radical or partial cystectomy; or tri-modality therapy for clinical T234N0M0 patients with urothelial carcinoma of the bladder, 1st treatment within 90 days of diagnosis (Surveillance) (BLCSTRI) **(Compliance – N/A)** | 66.7% | 81.8% | No Applicable Cases | 76.9% |
| | Neo-adjuvant or adjuvant chemotherapy recommended or administered for patients w/ muscle invasive cancer undergoing radical cystectomy (Surveillance) (BLCT) **(Compliance – N/A)** | No Applicable Cases | 75% | No Applicable Cases | 100% |

| | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| COLON | Adjuvant chemotherapy is considered or administered within 4 months (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer (Accountability) (ACT) **(Compliance – N/A)** | 100% | 100% | 100% | 100% |
| | At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer (Quality Improvement) (12RLN) **(Compliance – 85%)** | 95.2% | 94.2% | 87.5% | 92.6% |

| | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| LUNG | At least 10 regional lymph nodes are removed and pathologically examined for AJCC stage IA, IB, IIA, and IIB resected NSCLC (Surveillance) (10RLN) **(Compliance – N/A)** | 58.2% | No applicable cases | No applicable cases | 57.7% |
| | Surgery is not the first course of treatment for cN2, M0 lung cases (Quality Improvement) (LNoSurg) **(Compliance – 85%)** | 92.6% | 100% | No applicable cases | 93.3% |
| | Systemic chemotherapy is administered within 4 months to day preoperative or day of surgery to 6 months postoperatively, or it is considered for surgically resected cases with pathologic lymph node positive (pN1) and (pN2) NSCLC (Quality Improvement) (LCT) **(Compliance – 85%)** | 80.8% | No applicable cases | No applicable cases | 80.8% |

| | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| RECTUM | Preoperative chemo and radiation are administered for clinical AJCC T3N0, T4N0, or Stage III; or Postoperative chemo and radiation are administered within 180 days of diagnosis for clinical AJCC T1-2 N0 with pathologic AJCC T3N0, T4N0, or Stage III; or treatment is considered; for patients under the age of 80 receiving resection for rectal cancer (Quality Improvement) (RECRTCT) **(Compliance – 85%)** | 90% | 90.9% | 100% | 86.7% |

| | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| ENDOMETRIUM | Chemotherapy and/or radiation administered to patients with Stage IIIC or IV Endometrial cancer (Surveillance) (ENDCTRT) **(Compliance – N/A)** | 66.7% | No applicable cases | No applicable cases | 66.7% |
| | Endoscopic, laparoscopic, or robotic performed for all Endometrial cancer (excluding sarcoma and lymphoma), for all stages except stage IV (Surveillance) (ENDLRC) **(Compliance – N/A)** | 75.8% | No applicable cases | No applicable cases | 75.8% |

| | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| OVARY | Salpingo-oophorectomy with omentectomy, debulking/cytoreductive surgery, or pelvic exenteration in Stages I-IIIC Ovarian cancer (Surveillance) (OVSAL) **(Compliance – N/A)** | 100% | No applicable cases | No applicable cases | 100% |

| | 2016 CP3R Rates | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Combined Program |
|---|---|---|---|---|---|
| GASTRIC | At least 15 regional lymph nodes are removed and pathologically examined for resected gastric cancer (Quality Improvement) (G15RLN) **(Compliance – 80%)** | 71.4% | 100% | No applicable cases | 80% |

# 2019 Community Outreach Summary

The mission of the Lifespan Community Health Institute (LCHI) is to eliminate health disparities and promote health equity through healthy behaviors, healthy relationships, and healthy environments.

The LCHI envisions a Rhode Island/region in which all people can achieve their full health potential. We will do this by improving the social, economic and environmental conditions in our communities and by increasing access to high quality health services. Strategies include developing, implementing, evaluating, and disseminating initiatives to improve the health status of the people in Rhode Island and southern New England. Through strategic partnerships, LCHI also serves as a liaison/bridge between Lifespan departments and the community, through one-off events and through ongoing relationships. This includes our work through the Community Health Ambassadors and other stakeholder groups.

Below is an overview of some of the Prevention & Screening program offered in 2019.

| Community Need Addressed | Program Name | Program Activities | Program Date | Num. of Participants | Summary of Effectiveness | Guidelines Used |
|---|---|---|---|---|---|---|
| Front line staff at health and social service organizations need a regular source of up-to-date, continuing education on community health topics and available resources | Lifespan Community Health Ambassadors is a voluntary convening of community partners who come together for:<br>• Education to inform and/or improve their practices in working with populations disproportionately impacted by health disparities;<br>• Networking to share experiences and resources Increased awareness of Lifespan services, research, and programs; and<br>• Offering feedback to Lifespan in order to improve the quality of services and patient satisfaction. | CT Screening for Lung Cancer: How to Save Lives and Stop Cigarette Smoking in Rhode Island: presented by Dr. Christopher Azzoli<br><br>Prevent/Treat/Beat: Reduce Risk of Colorectal Cancer: presented by Angela Hall-Jones<br><br>Cultural Considerations when Working with the Latino Population: presented by Jennifer Gaviria, MSW, LICSW | 2/12/19<br><br>3/12/19<br><br>7/9/19 | 14<br><br>14<br><br>21 | Post event evaluation survey measures extent to which learning objectives were met, quality of event, usefulness of content, engagement of speaker(s), and likelihood to share information. | Front line staff at health and social service organizations need a regular source of up-to-date, continuing education on community health topics and available resources |

| Community Need Addressed | Program Name | Program Activities | Program Date | Num. of Participants | Summary of Effectiveness | Guidelines Used |
|---|---|---|---|---|---|---|
| Age-adjusted incidence of melanoma is up 86% (21.2/100,000) in RI from 1987-91 to 2006-10.<br><br>Age-adjusted mortality is up 4% to 2.6/100,000 during the same time period.<br><br>RI experienced more growth in the incidence of and mortality from melanoma than the national average during this reporting period. (RIDOH) | Skin Check (formerly known as Sun Smarts) | In collaboration with the Partnership to Reduce Cancer in RI (statewide coalition), Brown Dermatology & LCHI offer free melanoma screening and educational materials at local beaches, work sites and community events. | 7/2/19<br>7/20/19<br>7/28/19<br>8/2/19<br>8/9/19<br>8/16/19<br>8/23/19<br><br>*Total* | 56<br>48<br>95<br>98<br>76<br>72<br>70<br><br>*515* | Summer:<br>49 individuals with suspected skin cancer<br><br>43 individuals with suspected non-melanoma<br><br>6 individual with suspected melanoma<br><br>48 individuals with suspected pre-cancer | American Academy of Dermatology – Melanoma/Skin Screening Form |

**Screening Program Follow-Up (how positive findings are tracked):**
For the skin check program, referrals are made as needed on the day of the screening. Brown Dermatology agreed to receive all people identified as needing follow-up, who don't already have a preferred dermatologist, and schedules all appointments in a timely manner. LCHI staff call all people who received a referral three times over the span of 2-3 months to answer questions, request the status of their case, and help them navigate follow-up dermatology services.

## Lung Cancer Analysis

In 2018, an estimated 234,030 new cases of lung & bronchus cancer were diagnosed in the United States, accounting for 13% of all cancer diagnoses. It is estimated 880 residents in Rhode Island will be diagnosed with this disease.

Overall the chance of developing lung cancer during one's lifetime is about 1 in 15 or 6.8 percent for men and 1 in 17 or 5.9 percent for women, making lung cancer the second most commonly diagnosed cancer in both genders. Lung cancer is by far the leading cause of cancer death among both men and women. Each year, more people die of lung cancer than of colon, breast and prostate cancers combined.

In the United States, smoking is by far the leading risk factor for lung cancer. About 80% of lung cancer deaths are thought to result from smoking and is most likely even higher for small cell lung cancer (SCLC). It is very rare for someone who has never smoked to have SCLC.

Risk factors include but are not limited to:
**Tobacco Use –** Smoking remains the greatest risk factor for developing lung cancer. The risk increases with the number of cigarettes smoked daily and the number of years smoked.

**Gender** – Current or former women smokers have a greater risk of developing lung cancer then men who have smoked an equal amount.

**Exposure to Secondhand Smoke** – The risk of lung cancer increases if exposed to secondhand smoke. Per the American Cancer Society, secondhand smoke is thought to cause more than 7,000 deaths from lung cancer each year.

**Exposure to Asbestos & Other Chemicals** – Exposure to asbestos and other substances and other chemicals such as arsenic, chromium, nickel, and tar soot can increase the risk of developing lung cancer especially if concurrently smoking.

**Previous Radiation Therapy to the Lungs** – people who have had prior radiation therapy to the chest for other cancers are at higher risk for lung cancer, particularly if they smoke.

**Family History of Lung Cancer** – People with a parent, sibling or other first degree relative with lung cancer have an increased risk of developing the disease.

**Excessive Alcohol Use** – Drinking more than a moderate amount of alcohol (one drink a day for women or two drinks a day for men) may increase you risk of lung cancer.

**Signs/Symptoms of Lung Cancer**
- Chest pain that worsens when you breathe deeply, laugh, or cough
- A cough that does not go away and gets worse over time
- Coughing up phlegm or blood
- Shortness of breath, or wheezing, hoarseness
- Recurrent pneumonia or bronchitis
- Swelling of neck and face
- Loss of appetite and weight loss, fatigue

Note: These symptoms may be attributed to conditions other than cancer. It is important to consult with a medical professional.

There are several accepted diagnostic techniques that assist physicians in diagnosing this disease and planning the treatment.

**Pulmonary Function Test (PFT)** – this test can measure how well the lungs are working by measuring the amount of air that one can inhale/exhale.

**Chest X-Ray** – chest x-rays are useful for identifying the size, shape, and location of a lung mass and other abnormalities.

**CT Scan** – an x-ray machine that uses a computer to take detailed pictures of the inside of the body. These pictures give the precise location of the tumor and its position in relationship to other organs.

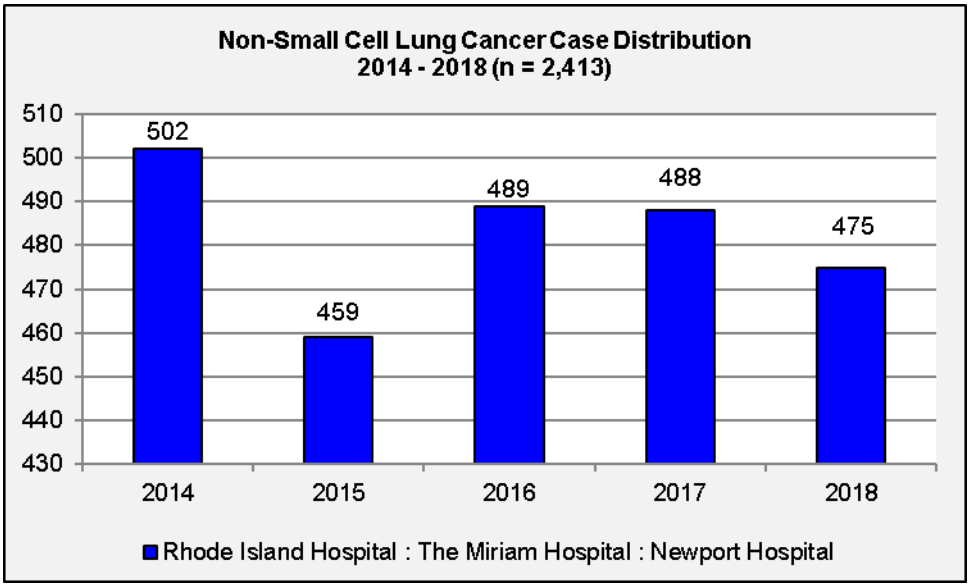
**Fine Needle Aspiration** – a thin needle is inserted through the chest wall and cells are removed from the tumor. Many times this is done in a CT scanner to help the physician position the needle.

**Bronchoscopy** – a flexible lighted tube, called a bronchoscope, is passed through the nose then into the airway and then into the lungs. Often a biopsy or tissue sample is taken.

**Mediastinoscopy** – a lighted tube is inserted through a small incision at the base of the neck, just above the breast bone. This is used to look at lymph nodes in the middle of the chest (mediastinum). The purpose of this procedure is to take samples of the lymph nodes in order to confirm a diagnosis. This procedure can also assist with the staging of the cancer.

**Mediastinotomy** – an an incision is made in the left side of the chest wall in order to examine and biopsy the lymph nodes that cannot be reached by the mediastinoscopy.

From 2014 through 2018, the Cancer Prgoram's Oncology Data Management department accessioned 2,413 analytic patients with non-small cell lung cancer.



## ACoS Commission on Cancer – National Cancer Database Hospital Comparison Benchmark Reports

Hospital comparison benchmark reports are available from the NCDB for the years 2007 to 2016. Various comparisons can be made by primary site, hospital type (Academic, Comprehensive Community, and Community Cancer Programs), by geographical location (individual state, ACS Division, or all states) and diagnostic year (2007 to 2016, or combined).

Throughout this report are samples of hospital comparison benchmarks on lung cancer generated for all ACoS approved Cancer Programs in the United States and the ACoS Cancer Programs in the ACS New England Division. This will be a valuable tool for assessing our diagnostic and therapeutic efforts as more data from proceeding years is added to the database.

**Non-Small Cell Lung Cancer** Diagnosed 2007 to 2016 by YEAR
All Diagnosed Cases – Hospital Type: All Types/Systems
**Lifespan Cancer Institute vs.**
**Other Hospitals in the State of Rhode Island**

| | Number of Non-Small Cell Lung Cancer Cases | | | | |
|---|---|---|---|---|---|
| | Rhode Island Hospital | The Miriam Hospital | Newport Hospital | Lifespan Cancer Institute Combined Total | Combined Total All Other Hospitals In Rhode Island |
| YEAR | | | | | |
| 2007 | 293 | 104 | 13 | 410 | 223 |
| 2008 | 273 | 145 | 25 | 443 | 281 |
| 2009 | 279 | 151 | 15 | 445 | 288 |
| 2010 | 289 | 140 | 20 | 449 | 244 |
| 2011 | 292 | 101 | 33 | 426 | 216 |
| 2012 | 320 | 113 | 33 | 466 | 273 |
| 2013 | 335 | 153 | 20 | 508 | 274 |
| 2014 | 340 | 144 | 25 | 509 | 280 |
| 2015 | 379 | 122 | 15 | 516 | 236 |
| 2016 | 429 | 119 | 16 | 564 | 240 |
| Total | 3,229 | 1,292 | 215 | 4,736 | 2,555 |

Source: ©2019 National Cancer Data Base (NCDB) - Commission on Cancer (CoC) - Thursday, December 5, 2019

## Lung Cancer Analysis

In 2018, it was estimated 234,030 new cases of lung cancer will be diagnosed in the United States. The highest overall incidence of lung cancer is among African American men, followed by Caucasian, American Indian/Alaska Native, Asian/Pacific Islander, and Hispanic men. Among women Caucasians had the highest incidence rate, followed by African American, American Indian/Alaska Native, Asian/Pacific Islander, and Hispanic women.

The table below is based on Non-Small Cell Lung Cancer and contains information obtained from the National Cancer Database (NCDB) which illustrates a race comparison between Rhode Island Hospital, The Miriam Hospital, Newport Hospital and other hospitals within the state of Rhode Island as well as hospitals in all other states.

**Non-Small Cell Lung Cancer** Diagnosed 2007 to 2016 by RACE
All Diagnosed Cases – Hospital Type: All Types/Systems
**Lifespan Cancer Institute vs.**
**All Hospitals in All States**

| | Number of Cases | | Percent of Total Non-Small Cell Lung Cancer Cases by Race | |
|---|---|---|---|---|
| | Lifespan Cancer Institute | National Reporting Hospitals | Lifespan Cancer Institute | National Reporting Hospitals |
| **RACE** | | | | |
| **White** | 3,865 | 1,001,763 | 90.81% | 82.59% |
| **Black** | 185 | 130,978 | 4.35% | 10.8% |
| **Hispanic** | 114 | 35,437 | 2.68% | 2.92% |
| **Asian & Pacific Islander** | 26 | 28,969 | 0.61% | 2.39% |
| **Native American** | 3 | 3,240 | 0.07% | 0.27% |
| **Other/Unknown** | 63 | 12,575 | 1.48% | 1.04% |
| **Total** | 4,256 | 1,212,962 | 100% | 100% |

Source: ©2019 National Cancer Data Base (NCDB) - Commission on Cancer (CoC) - Thursday, December 5, 2019

**SEER 2012 - 2016: New Cases of Lung Cancer by Race/Ethnicity & Sex**

| MALES | |
|---|---|
| All Races | 63.0 |
| White | 63.5 |
| Black | 73.5 |
| Asian/Pacific Islander | 46.3 |
| American Indian/Alaska Native | 43.3 |
| Hispanic | 35.2 |
| Non-Hispanic | 66.6 |

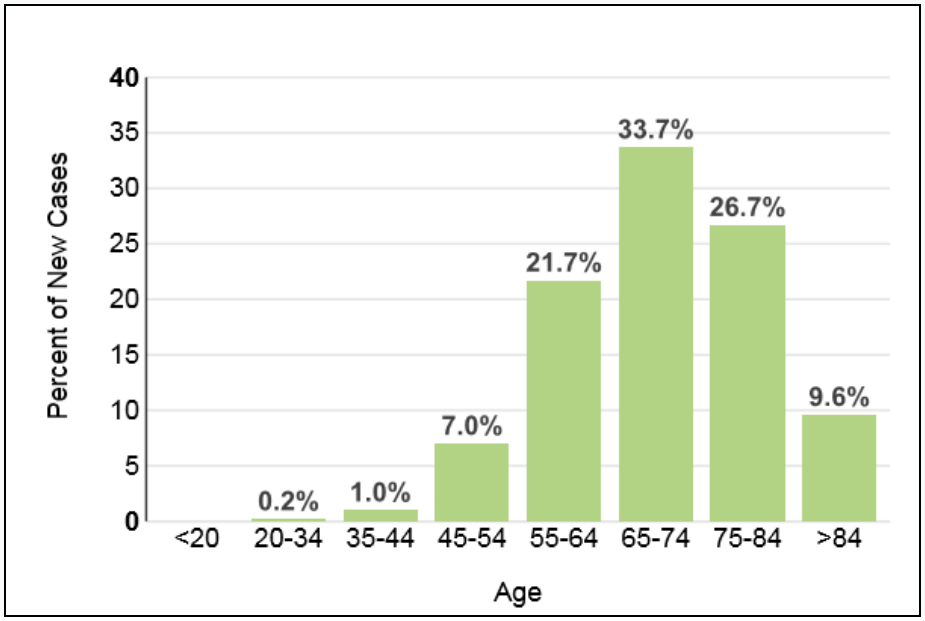
| FEMALES | |
|---|---|
| All Races | 48.9 |
| White | 51.8 |
| Black | 44.6 |
| Asian/Pacific Islander | 28.2 |
| American Indian/Alaska Native | 33.9 |
| Hispanic | 24.8 |
| Non-Hispanic | 52.2 |

**Non-Small Cell Lung Cancer** Diagnosed 2007 to 2016 by AGE
All Diagnosed Cases – Hospital Type: All Types/Systems
**Lifespan Cancer Institute vs. All Type Hospitals in ACS Division of New England vs. All Hospitals in All States**

| | Number of Cases | | | Percent of Total Non-Small Cell Lung Cancer Cases by Age | | |
|---|---|---|---|---|---|---|
| | Lifespan Cancer Institute | ACS Division of New England | National Reporting Hospitals | Lifespan Cancer Institute | ACS Division of New England | National Reporting Hospitals |
| **AGE** | | | | | | |
| **Under 20** | 1 | 18 | 260 | 0.02% | 0.02% | 0.02% |
| **20-29** | 4 | 76 | 1,421 | 0.09% | 0.09% | 0.12% |
| **30-39** | 17 | 322 | 6,024 | 0.4% | 0.38% | 0.5% |
| **40-49** | 180 | 2,842 | 47,122 | 4.23% | 3.36% | 3.88% |
| **50-59** | 701 | 12,166 | 196,583 | 16.47% | 14.36% | 16.21% |
| **60-69** | 1,223 | 24,584 | 367,702 | 28.74% | 29.02% | 30.31% |
| **70-79** | 1,369 | 29,043 | 394,467 | 32.17% | 34.29% | 32.52% |
| **80-89** | 713 | 14,483 | 185,378 | 16.75% | 17.1% | 15.28% |
| **90+** | 48 | 1,170 | 14,004 | 1.13% | 1.38% | 1.15% |
| **Unknown** | 0 | 0 | 1 | 0% | 0% | 0% |
| **Total** | 4,256 | 84,704 | 1,212,962 | 100% | 100% | 100% |

Source: ©2019 National Cancer Data Base (NCDB) - Commission on Cancer (CoC) - Thursday, December 5, 2019

**SEER 2012 - 2016: New Cases of Bladder Cancer by Age**

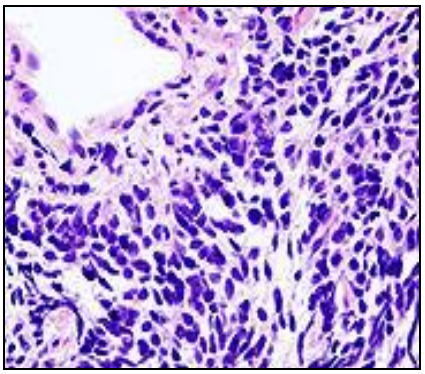



Lung and bronchus cancer is most frequently diagnosed among people aged 65-74.
Median Age at Diagnosis: **70**

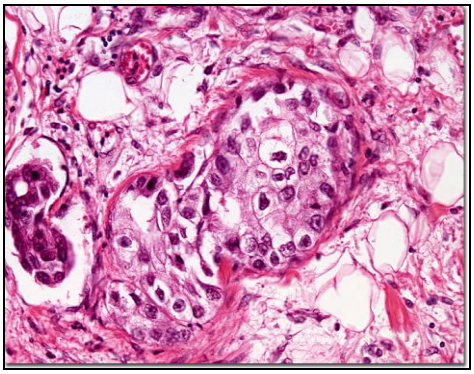
Histological Types of Lung Cancer

There are two general categories of lung cancer, non-small cell lung cancer and small cell lung cancer. Most lung cancer cases are non-small cell lung cancer (NSCLC). Non-small cell lung cancer usually grows and spreads more slowly than small cell lung cancer. There are three main types of non-small cell lung cancer. They are adenocarcinoma, squamous cell carcinoma and large cell carcinoma. Adenocarcinoma accounts for 40% of lung cancer and usually originates in peripheral lung tissue. Most cases of adenocarcinoma are associated with smoking. However, among people who have never smoked, adenocarcinoma is the most common form of lung cancer. Squamous cell lung carcinoma accounts for 25% to 30% of lung cancer and usually starts near a central bronchus. A hollow cavity and associated necrosis are commonly found at the center of the tumor. Well-differentiated squamous cell lung cancers often grow more slowly than other cancer types.

Small cell lung cancer (SCLC) is sometimes called oat cell carcinoma (the cells are shaped like grains of oats when viewed under a microscope). There are three different types of small cell lung cancer. They are small cell carcinoma (oat cell carcinoma), mixed small cell/large cell carcinoma, and combined small cell carcinoma. This type of lung cancer usually starts in the air tubes (bronchi) in the center of the chest. Although these cancer cells are small, they grow quickly and are more likely to spread to other organs. About 15% of all lung cancer cases are small cell lung cancer. Small cell lung cancer is slightly more common in men than women.



Small Cell Carcinoma



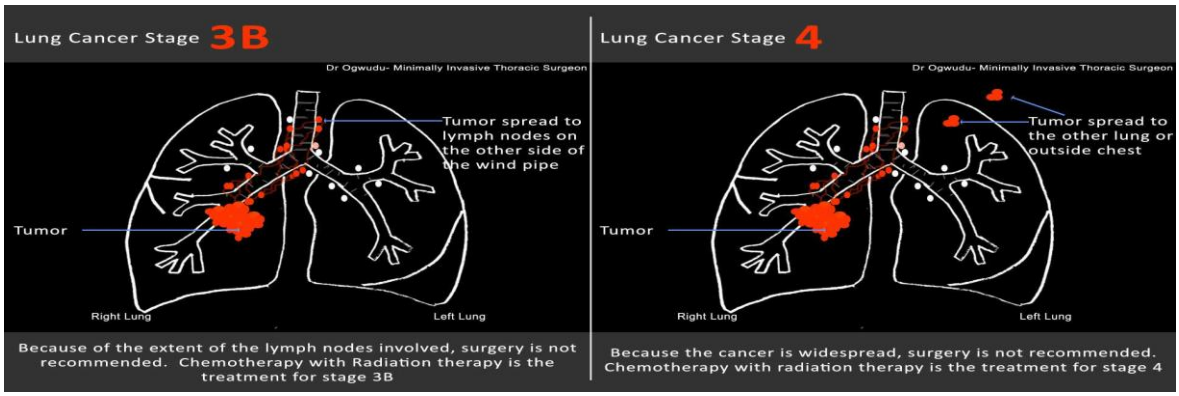
Adenocarcinoma

The lung cancer histological distribution for the Lifespan Cancer Institute between 2014 and 2018 are displayed in the table below.

| Lung Cancer Histological Distribution | Number of Cases Per Histology | Percentage of Cases Per Histology |
|---|---|---|
| Adenocarcinoma, NOS | 1,040 | 36.25% |
| Adenocarcinoma w/ Mixed Subtypes | 167 | 5.82% |
| Squamous Cell Carcinoma, NOS | 308 | 10.74% |
| Non-Small Cell Carcinoma | 134 | 4.67% |
| Small Cell Carcinoma | 291 | 10.14% |
| Acinar Cell Carcinoma | 167 | 5.82% |
| Other | 762 | 26.55% |

## Lung Cancer Analysis

Staging System – The most widely used staging scheme is the AJCC Cancer Staging Manual (TNM). The TNM describes the extent of primary Tumor (T stage), whether or not the cancer has spread to regional lymph Nodes (N stage), and the absence or presence of distant Metastasis (M stage). Patients diagnosed with lung cancer between January 1, 2010 and December 31, 2017 were staged with the AJCC Cancer Staging Manual 7th Edition. Those diagnosed January 1, 2018 and after are staged using the 8th Edition.




The table below contains information obtained from the National Cancer Database (NCDB) and illustrates a stage comparison between the Lifespan Cancer Institute and the other hospitals within the ACS Division of New England as well as all other hospitals in all other states.

**Non-Small Cell Lung Cancer** Diagnosed 2007 to 2016 by STAGE
All Diagnosed Cases – Hospital Type: All Types/Systems
**Lifespan Cancer Institute vs. All Type Hospitals in ACS Division of New England vs. All Hospitals in All States**

| | Number of Cases | | | Percent of Total Non-Small Cell Lung Cancer Cases by Stage | | |
|---|---|---|---|---|---|---|
| | Lifespan Cancer Institute | ACS Division of New England | National Reporting Hospitals | Lifespan Cancer Institute | ACS Division of New England | National Reporting Hospitals |
| **STAGE** | | | | | | |
| **0** | 24 | 276 | 4,369 | 0.56% | 0.33% | 0.36% |
| **I** | 1,314 | 24,260 | 324,392 | 30.87% | 28.64% | 26.74% |
| **II** | 349 | 7,448 | 104,505 | 8.2% | 8.79% | 8.62% |
| **III** | 758 | 16,547 | 246,499 | 17.81% | 19.54% | 20.32% |
| **IV** | 1,525 | 30,557 | 469,792 | 35.83% | 36.08% | 38.73% |
| **OC** | 1 | 206 | 1,635 | 0.02% | 0.24% | 0.13% |
| **Not Applicable** | 0 | 3 | 18 | 0% | 0% | 0% |
| **Unknown** | 285 | 5,407 | 61,752 | 6.7% | 6.38% | 5.09% |
| **Total** | 4,256 | 84,704 | 1,212,962 | 100% | 100% | 100% |

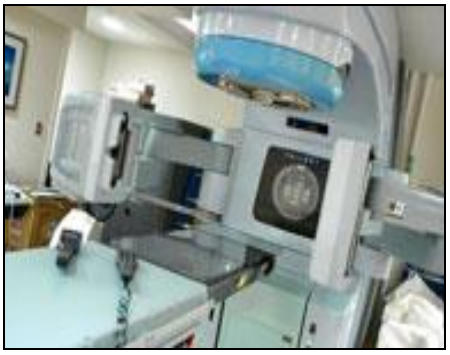
Lung Cancer Treatment

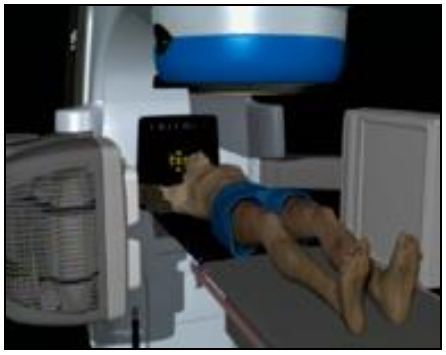
Small cell lung cancer spreads quickly throughout the body. Treatment must include cancer-killing drugs called chemotherapy. Surgery is rarely used to treat small cell lung cancer. It is only considered if it is limited small cell lung cancer with only one tumor that has not spread. Chemotherapy and radiation treatment will be needed after surgery. However, because the disease has usually spread by the time of diagnosis, very few patients with small cell lung cancer are candidates for surgery. Treatment for lung cancer may consist of surgery, radiation therapy, chemotherapy, biotherapy, or a combination of these. Chemotherapy and/or radiation are sometimes used before surgery to shrink the tumor. They may also be used after surgery to kill any remaining cancer cells.

**Surgery** – is usually performed when the lung cancer is detected in only one lung and in nearby lymph nodes (usually stage 1 or 2). Surgery removes all or a portion of a lung to eliminate the cancer. The specific types or surgery are listed below.

- Pneumonectomy - removes the entire lung on one side
- Lobectomy – removes a lobe of the lung
- Wedge resection or segmentectomy - removes a small part of a lobe of the lung

**Radiation Therapy** – also called radiotherapy, this procedure delivers high-energy x-rays that can destroy rapidly dividing cancer cells. Radiation can also be used to relieve shortness of breath by helping to open blocked airways. Radiation can also be used to help relieve pain. Most often, radiation therapy is delivered by the external beam technique, which aims a beam of x-rays directly at the tumor. Treatment is given in a series of sessions, or fractions, usually over six weeks. One specific type of radiation treatment is three-dimensional conformal radiation therapy based on a 3-D image of the tumor taken with CT scanning. This image serves as the target for a high-dose radiation beam that automatically changes its shape and size to match the tumor. This method minimizes radiation exposure of nearby normal lung tissue.





**Chemotherapy** – kills cancer cells by interfering with the cellular chemistry. One or more types of chemotherapy may be used. This can be administered by mouth or by injection into a vein (IV). These medications travel through the bloodstream to all parts of the body. This treatment is used in all stages of lung cancer and can prolong life even in elderly persons as long as they are in good general health.

*Treatment for Lung Cancer Continued on Next Page*

**Radiofrequency Ablation (RFA)** - uses radio waves to heat up and destroy tumors. The use of RFA in treating lung cancer is an emerging experimental technology requiring additional study to determine its effectiveness. Surgical removal of lung tumors (Lobectomy) currently remains the gold standard for treatment of local lung tumors. Other energy sources can be used for ablative treatment such as Cryotherapy and Microwave Ablation.

**Immunotherapy** – is a therapeutic treatment used to treat some forms of lung cancer, particularly non-small cell lung cancers. It is sometimes called biologic therapy or biotherapy. Immunotherapy uses drugs that stimulate your immune system to identify and destroy cancer cells.

The table below is based on information obtained from the National Cancer Database (NCDB) and illustrates a treatment comparison between the Lifespan Cancer Institute and other hospitals within the ACS New England Division as well as all hospitals in all other states.

**Non-Small Cell Lung Cancer** Diagnosed 2007 to 2016 by TREATMENT
All Diagnosed Cases – Hospital Type: All Types/Systems
**Lifespan Cancer Institute vs. All Type Hospitals in ACS Division of New England vs. All Hospitals in All States**

| | Number of Cases | | | Percent of Total Non-Small Cell Lung Cancer Cases by Treatment | | |
|---|---|---|---|---|---|---|
| | Lifespan Cancer Institute | ACS Division of New England | National Reporting Hospitals | Lifespan Cancer Institute | ACS Division of New England | National Reporting Hospitals |
| **TREATMENT** | | | | | | |
| **Surgery Only** | 1,233 | 18,514 | 244,347 | 28.97% | 21.86% | 20.14% |
| **Radiation & Chemo** | 790 | 15,330 | 252,071 | 18.56% | 18.1% | 20.78% |
| **No 1st Course Tx.** | 694 | 19,721 | 233,590 | 16.31% | 23.28% | 19.26% |
| **Radiation Only** | 632 | 10,666 | 181,947 | 14.85% | 12.59% | 15% |
| **Chemotherapy Only** | 374 | 10,455 | 152,396 | 8.79% | 12.34% | 12.56% |
| **Surg. & Chemo** | 178 | 4,486 | 60,365 | 4.18% | 5.3% | 4.98% |
| **Surg., Radiation & Chemotherapy** | 151 | 2,130 | 33,513 | 3.55% | 2.51% | 2.76% |
| **Other Specified Therapy** | 102 | 1,614 | 38,486 | 2.4% | 1.91% | 2.35% |
| **Surg. & Radiation** | 58 | 554 | 10,123 | 1.36% | 0.65% | 0.83% |
| **Active Surveillance** | 28 | 214 | 3,448 | 0.66% | 0.25% | 0.28% |
| **Total** | 4,256 | 84,704 | 1,212,962 | 100% | 100% | 100% |

Source: ©2019 National Cancer Data Base (NCDB) - Commission on Cancer (CoC) - Thursday, December 5, 2019

## Lung Multidisciplinary Clinic

The lung cancer multidisciplinary clinic (MDC), a program of the Lifespan Cancer Institute was originally established at The Miriam Hospital in 2009 to provide patients a streamlined approach to diagnostic and treatment options. Patients who present with a lung malignancy typically require evaluation by multiple specialists including a surgical oncologist, medical oncologist, radiation oncologist, and palliative care specialist, and may require treatment from some or all of the above disciplines. The team members of the lung MDC work together to create an individualized, coordinated plan of care which is based on national treatment guidelines. A dedicated nurse navigator then guides patients through the health care system and their treatment.

Patients who present with a lung cancer malignancy are also discussed during multidisciplinary tumor boards. In 2019, 266 cases were prospectively reviewed. Tumor board discussions include a case review, national treatment guidelines, applicable prognostic indicators, as well as applicable clinical trials.

The physicians of the lung cancer MDC are affiliated with The Warren Alpert Medical School of Brown University and actively participate in on-going clinical research. Eligible patients have access to clinical trials which focus on advanced radiation techniques and targeted chemotherapy agents.

## Lung Cancer Clinical Trials Available at The Lifespan Cancer Institute

- LS-P-Stable-Mates: Sublobar Resection (SR) vs Stereotactic Ablative Radiotherapy (SAbR) High Risk Stage I NSCLC (PI: DiPetrillo)
- Alliance Alchemist A081105: Randomized Study of Erlotinib VS Observation in Patients with Completely Resected Epidermal Growth Factor Receptor (EGFR) Mutant Non-small Cell Lung Cancer (NSCLC) (PI: Khurshid)
- Alliance Alchemist E4512: A Randomized Phase III Trial for Surgically Resected Early Stage Non-Small Cell Lung Cancer: Crizotinib versus Observation for Patients with Tumors Harboring the Anaplastic Lymphoma Kinase (ALK) Fusion Protein (PI: Birnbaum)
- BrUOG L358: Durvalumab and Consolidation SBRT Following Chemoradiation for Locally Advanced Stage III Non-Small Cell Lung Cancer (PI: Khan)
- LS-P-Emerge: Phase 2 Multicenter Trial of ICOS Agonist Monoclonal Antibody (mAb) JTX-2011 and a CTLA-4 inhibitor in PD-1/PD-L1 Inhibitor Experienced Adult Subjects with Non-small Cell Lung Cancer or Urothelial Cancer
- NRG LU005: Limited Stage Small Cell Lung Cancer (LS-SCLC): A Phase II/III Randomized Study of Chemoradiation Versus Chemoradiation Plus Atezolizumab

## Summary

This is a review of non-small cell lung cancer patients who presented to Rhode Island, Miriam, and Newport Hospital over a five year period from 2014 – 2018. During this period, the program accessioned 2,413 patients. The number of non-small cell lung cancer cases within the program experienced a slight decrease in 2011. However, this was followed by a steady increase from 2012 to 2016.

As seen with all other reporting hospitals, Caucasians made-up the vast majority of non-small cell lung cancer cases for the program and like all other hospitals nationwide, African Americans made-up the second most common group. The distribution of non-small cell lung cancer by age at diagnosis for patients 20 to 39 was similar to other hospitals in the Northeast ACS division as well as all other ACoS accredited hospitals. However, the 40 to 59 age group was noted to be slightly higher than the ACS division and all other accredited hospitals. Review of the 60 to 79 age group, revealed a lower incidence rate when compared to the ACS division and other ACoS accredited hospitals.

Stage IV was the most frequently reported stage of non-small cell lung cancer for the program and was also the most frequently reported stage by the National Cancer Data Base (NCDB).

The Lifespan Cancer Institute at Rhode Island Hospital, The Miriam Hospital, and Newport Hospital adhere to NCCN (National Comprehensive Cancer Network) Clinical Practice Guidelines for the treatment of all cancers. The majority of patients treated for non-small cell lung cancer underwent surgery alone (28%), which was higher than the distribution seen at all other hospitals (20%). Chemotherapy with radiation therapy was the second most common treatment modality observed at the Lifespan Cancer Institute and for most other hospitals. Patient received chemotherapy alone or no 1$^{st}$ course treatment was noted to be lower at Lifespan when compared to other hospitals in the ACS division as well as all other ACoS accredited hospitals.