Rhode Island Hospital
Cancer Program

Annual Report
2012

Report of the Cancer Committee

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Introduction

The 2012 Annual Report summarizes Cancer Program statistics for 2011 during which time 2,642 cases were accessioned. Analytic case count was 2,133 and non-analytic case count was 509. For patients diagnosed and treated at Rhode Island Hospital a life long follow-up rate of at least 90% is maintained.

In 2012, the Cancer Committee conducted a Breast Cancer outcome analysis to provide an overview of Rhode Island Hospital's breast cancer experience. Occurring at a rate of 1 in every 8 women, breast cancer is the most commonly diagnosed cancer in women. It is estimated 226,870 new cases of invasive female breast cancer will occur in the Unites States in 2012.

The Cancer Program at Rhode Island Hospital was awarded a 3 year renewed accreditation with commendation from the American College of Surgeons (ACoS), Commission on Cancer (CoC) in 2010. This voluntary accreditation validates that Rhode Island Hospital's Comprehensive Cancer Center meets and exceeds the rigorous Academic Medical Center standards set by the American College of Surgeons, Commission on Cancer.

The Comprehensive Cancer Center at Rhode Island Hospital offers complete care for patients who have been diagnosed with cancer or hematologic disorders. The center's hematology and oncology programs have a disease specific focus led by multidisciplinary teams of highly trained board certified specialists. Teams of expert oncology surgeons, medical oncologists, hematologists, radiation oncologists, radiologists, pathologists, nurse practitioners, physician assistants, nurses, clinical pharmacists, patient navigators, social workers and dietitians are dedicated to the diagnosis, treatment, and prevention of cancer. They closely and compassionately work with patients and families to ensure the best possible care is provided to achieve the best possible outcome. When treatment is completed, the center continues to support patients and their families through survivorship programs.

The goals and achievements of the Cancer Program for 2012 were as follows:

Programmatic:
The Rhode Island Hospital Cancer Program achieved Quality Oncology Practice Initiative (QOPI) Certification from the American Society of Clinical Oncology (ASCO) for Adult Ambulatory Medical Oncology. Certification was awarded in February 2012.

Clinical:
A clinical goal for 2012 was to develop and implement a standardized tool to identify patients with increased hereditary risk for malignancy. Approximately 5-10% of cancers have a hereditary link. The *Family History Questionnaire*, developed in conjunction with the Genetics department has been implemented in the Comprehensive Cancer Center. The questionnaire documents patient's three - to - four generation pedigree, including detailed cancer information about first, second, and third degree relatives including their age at diagnosis. Patients complete the questionnaire with input from family members in the comfort of their own home.

2012 Quality Improvements:
Developed and implemented the *Cancer Genetics Testing* referral form:

- The form was developed as a result of a Genetic Counseling study and is based on recommendations from the Cancer Committee. The form, currently utilized by Adult Hematology Oncology, Radiation Oncology and Neuro-Oncology identifies patients at risk of developing familial cancer syndromes that are appropriate for genetic counseling and subsequent testing.

Developed and implemented a protocol for management of hypersensitivity reaction during cancer chemotherapy treatment:

- Hypersensitivity reactions are commonly associated with certain chemotherapy agents, monoclonal antibodies and intravenous iron therapy. With the increasing use of these agents, hypersensitivity reactions are more commonly encountered. Hypersensitivity reactions generally occur within seconds or minutes of drug administration and are defined as mild, moderate and severe. The *Management of Hypersensitivity Reactions* protocol was developed to provide guidelines for the rapid management of any hypersensitivity reaction experienced in the cancer center.

Achieved National Accreditation for the specialized Pharmacy Oncology Residency program:

- The Pharmacy Oncology Residency (Post-Graduate Year 2, PGY2) is a one-year training program that provides an opportunity to develop the necessary skills for specialized practice in oncology pharmacy. Pharmacist residents are directed in skills critical to patient care, communication and leadership within a multidisciplinary health care team and specialized to the unique needs of the oncology patient. The American Society of Health System Pharmacists (ASHP) awarded official accreditation of the PGY2 Oncology Pharmacy Residency program in September 2012.

Developed and implement a pilot breast cancer Survivorship Treatment Summary and Follow-up Care Plan:

- The survivorship Treatment Summary and Follow-up Care Plan was developed at RIH by a multidisciplinary team consisting of medical, radiation, and surgical oncologists. This comprehensive summary provides patients and referring physicians a complete overview of the treatment received. The form captures surgical information, chemotherapy/biological therapy and/or hormone therapy, radiation therapy, side effect experienced, IV port placement information, staging and detailed follow-up guidelines.

  A pilot program involving breast cancer patients was initiated November 1, 2012. Upon completion of treatment, the patient specific follow-up care plan, prepared by the patient's physician, will be reviewed with the patient and any questions that may arise will be answered.

2012 Cancer Committee Membership

Pamela Bakalarski, MPA, CCRP	Manager	Lifespan Oncology Clinical Research
Cindy Benson, MS, CGC	Genetic Counselor	Genetics Clinic
Lois Brown, RN	Clinical Manager	Ambulatory Pediatric Hematology/Oncology
Kristen Bunnell	Clinical Pharmacist	Pharmacy and Pain Management
James Butera, MD	Medical Director	The Comprehensive Cancer Center
Christine Collins, MBA, RPh	Director	Pharmacy
Judy Diaz, RN, MPH	LCHS/Director	Community Outreach
Thomas DiPetrillo, MD	Clinical Director Chair, Cancer Committee	Radiation Oncology
Damian Dupuy, MD	Director	Diagnostic Imaging
Jeanne Ehmann	Director	Quality Management
Alexandra Fiore	Representative	American Cancer Society
Paulette Gagner, RN, C, BSN	Clinical Manager	Inpatient Pediatric Hematology/Oncology
Douglas Gnepp, MD	Pathologist	Pathology Services
Theresa Graves, MD	Breast Surgeon	Cancer Liaison Physician, American College of Surgeons State Chair
Camille Gregorian, LISCW	Clinical Manager	Clinical Social Work
Meredith Hurley, RN, BSN, OCN	Clinical Manager	Adult Inpatient Oncology Nursing
Susan Leckie	Manager	Health Information Services
Charles Mahoney, RPh, MS	Vice President	Pharmacy & Cancer Services
Beth Measley, RPh	Director	The Comprehensive Cancer Center

2012 Cancer Committee Membership

Karen Pasquazzi, RD	Senior Dietitian	Adult Ambulatory Hematology/Oncology
Margot Powell, RN	Coordinator	Avon Breast Navigator Program
Ann Rochette, RN, MS	Coordinator	Tomorrow Fund
Cindy Schwartz, MD	Director	Pediatric Hematology/Oncology
Carol Sepe, PT	Clinical Education Coordinator	Rehabilitation Clinical Education
Nellie Sousa, RN	Clinical Nurse Manager	Adult Ambulatory Hematology/Oncology
Marsha Stephenson, RN	Clinical Coordinator	Home & Hospice Care Of Rhode Island
Debra Sumner, RN	Quality & Safety Coordinator	The Comprehensive Cancer Center
Tara Szymanski, CTR	Manager	Oncology Data Management
Michael Vezeridis, MD	Oncology Surgeon	University Surgical Associates
Adrienne Walsh	Manager	Volunteer Services
Pat Wolfe, PT	Director	Rehabilitation Services

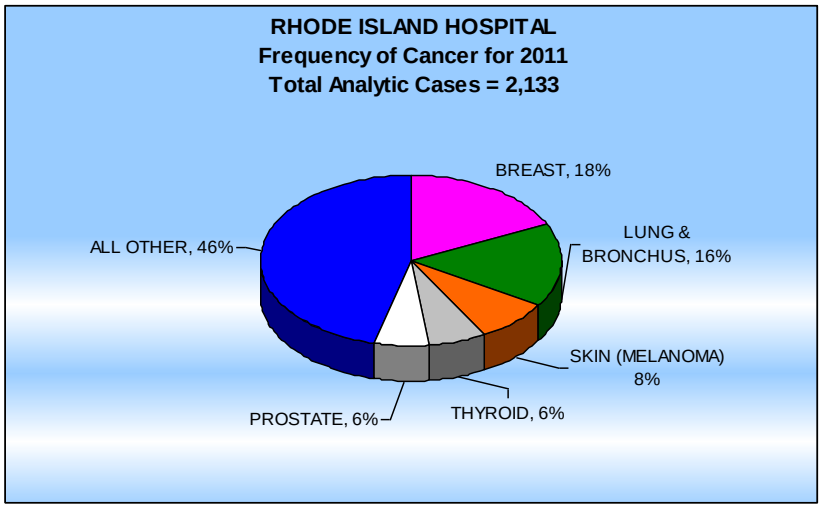
2011 Analytic Case Distribution by Primary Site

PRIMARY SITE	TOTAL	SEX		AJCC STAGE					Stage Unknown	Stage Not Applicable
		M	F	0	1	2	3	4	99	88
Oral Cavity	36	28	8	1	3	3	8	19	1	0
Lip	0	0	0	0	0	0	0	0	0	0
Tongue	11	8	3	0	1	0	3	7	0	0
Salivary Gland	5	4	1	0	1	1	2	1	0	0
Floor of Mouth	0	0	0	0	0	0	0	0	0	0
Gum & Other Mouth	8	6	2	1	1	1	1	3	1	0
Nasopharynx	1	1	0	0	0	1	0	0	0	0
Tonsil	6	6	0	0	0	0	1	5	0	0
Oropharynx	2	1	1	0	0	0	1	1	0	0
Hypopharynx	2	1	1	0	0	0	0	2	0	0
Other Oral Cavity Organs	1	1	0	0	0	0	0	0	0	1
Digestive System	305	181	124	12	66	68	64	71	13	11
Esophagus	31	24	7	0	7	8	6	9	1	0
Stomach	42	25	17	1	12	6	9	12	2	0
Small Intestine	7	3	4	0	1	2	2	1	1	0
Colon	86	42	44	4	18	19	24	16	4	1
Rectum & Rectosigmoid	37	24	13	2	6	10	12	6	1	0
Anus & Anorectum	8	0	8	2	0	2	4	0	0	0
Liver & Intrahepatic Duct	35	27	8	0	9	7	2	8	2	7
Gallbladder	3	0	3	0	0	1	1	1	0	0
Other Biliary	17	11	6	0	5	2	2	4	2	2
Pancreas	36	23	13	3	7	11	1	14	0	0
Retroperitoneum	2	1	1	0	1	0	1	0	0	0
Other Digestive Organs	1	1	0	0	0	0	0	0	0	1
Respiratory System	370	184	186	6	93	38	65	154	11	3
Larynx	22	15	7	3	4	1	4	8	1	1
Lung & Bronchus	343	167	176	3	88	37	61	143	10	1
Other Respiratory	5	2	3	0	1	0	0	3	0	1
Mesothelioma	3	3	0	0	0	0	0	2	1	0
Bone & Soft Tissue	5	3	2	0	1	1	0	2	1	0
Bone & Joints	5	3	2	0	1	1	0	2	1	0
Soft Tissue	6	2	4	0	3	0	1	2	0	0
Skin Excluding Basal & Squamous Cell	180	101	79	47	81	20	16	8	7	1
Melanoma – Skin	172	97	75	47	79	19	15	8	4	0
Other Non-Epithelial Skin	8	4	4	0	2	1	1	0	0	0
Other Defined Sites	64	35	29	0	0	0	0	0	0	64
Breast	375	7	368	86	153	68	27	11	30	0

PRIMARY SITE	TOTAL	SEX		AJCC STAGE					Stage Unknown	Stage Not Applicable
		M	F	0	1	2	3	4	99	88
Female System	60	N/A	60	0	25	8	19	6	1	1
Cervix Uteri	16	N/A	16	0	6	4	4	2	0	0
Corpus & Uterus, NOS	32	N/A	32	0	19	3	9	1	0	0
Ovary	4	N/A	4	0	0	0	2	1	1	0
Vagina	3	N/A	3	0	0	0	1	1	0	1
Vulva	5	N/A	5	0	0	1	3	1	0	0
Other Female Organs	0	N/A	0	0	0	0	0	0	0	0
Male System	121	121	N/A	0	28	57	20	14	8	0
Prostate	119	119	N/A	0	23	55	20	14	7	0
Testis	8	8	N/A	0	5	2	0	0	1	0
Penis	0	0	N/A	0	0	0	0	0	0	0
Other Male Organs	0	0	N/A	0	0	0	0	0	0	0
Urinary System	103	61	42	18	45	5	15	11	6	3
Urinary Bladder	37	24	13	16	12	1	3	3	2	0
Kidney & Renal Pelvis	63	35	28	1	33	3	12	7	4	3
Ureter	2	1	1	1	0	0	0	1	0	0
Other Urinary Organs	1	1	0	0	0	1	0	0	0	0
Brain & Other Nervous System	147	70	77	0	0	0	0	0	0	147
Brain	78	43	35	0	0	0	0	0	0	78
Cranial Nerves & Other	69	27	42	0	0	0	0	0	0	69
Endocrine System	152	40	112	0	101	19	14	1	2	15
Thyroid Gland	137	33	104	0	101	19	14	1	2	0
Other including Thymus	15	7	8	0	0	0	0	0	0	15
Hematopoietic System	80	48	32	0	0	0	0	0	0	80
Leukemia	54	31	23	0	0	0	0	0	0	54
Myeloma	26	17	9	0	0	0	0	0	0	26
Lymphomas	118	71	47	0	32	22	19	40	3	1
Hodgkin's Disease	22	14	8	0	1	11	6	4	0	0
Non-Hodgkin’s	96	57	39	0	31	11	13	36	4	1
Kaposi Sarcoma	0	0	0	0	0	0	0	0	0	0
Total Analytic Cases	**2,133**	**963**	**1,170**	**170**	**631**	**309**	**268**	**341**	**87**	**329**
		45%	**55%**	**8%**	**30%**	**14%**	**13%**	**16%**	**4%**	**15%**

Top Five Sites for Rhode Island Hospital

The five most common sites for Rhode Island Hospital's 2011 analytic* cases are (in descending order by percent of total incidence) Breast (18%), Lung and Bronchus (16%), Skin (Melanoma) (8%), Thyroid (6%), and Prostate (6%). This distribution differs from that of the American Cancer Society (ACS) which is noted to be (in descending order by percent of total incidence) Prostate (15%), Female Breast (14%), Lung and Bronchus (14%), Colon & Rectum (9%), and Melanoma (5%).

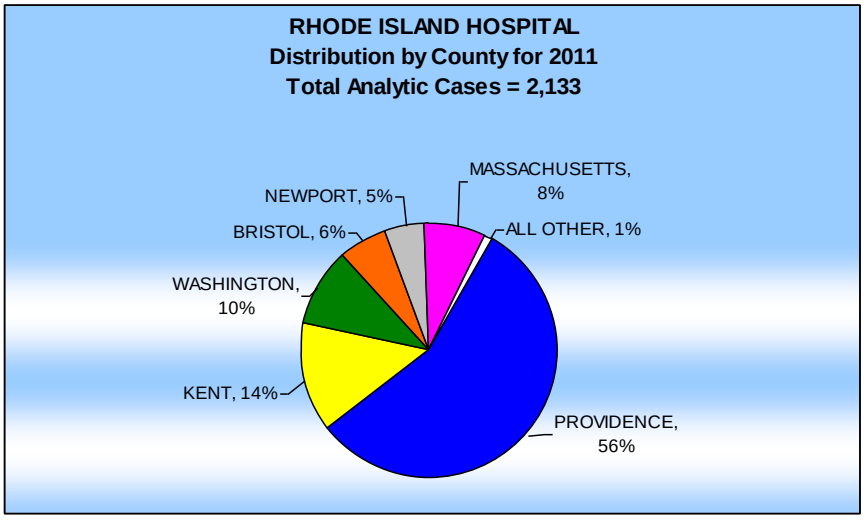


*Analytic - cancer case that was diagnosed and/or received all or part of the first course treatment at the reporting facility

Source: Rhode Island Hospital Oncology Data Management Department
Source: http://www.cancer.org/acs/groups/content/@epidemiologysurveilance/documents/document/acspc-029771.pdf

Residence at Diagnosis

Rhode Island Hospital, located in Providence County serves as a major referral center for Rhode Island, Massachusetts, and the surrounding areas. More than 50% of the Hospital's analytic cancer patients accessioned in 2011 reside in Providence County. The remainder of the Hospital's analytic cancer patients is distributed throughout Rhode Island and Massachusetts.

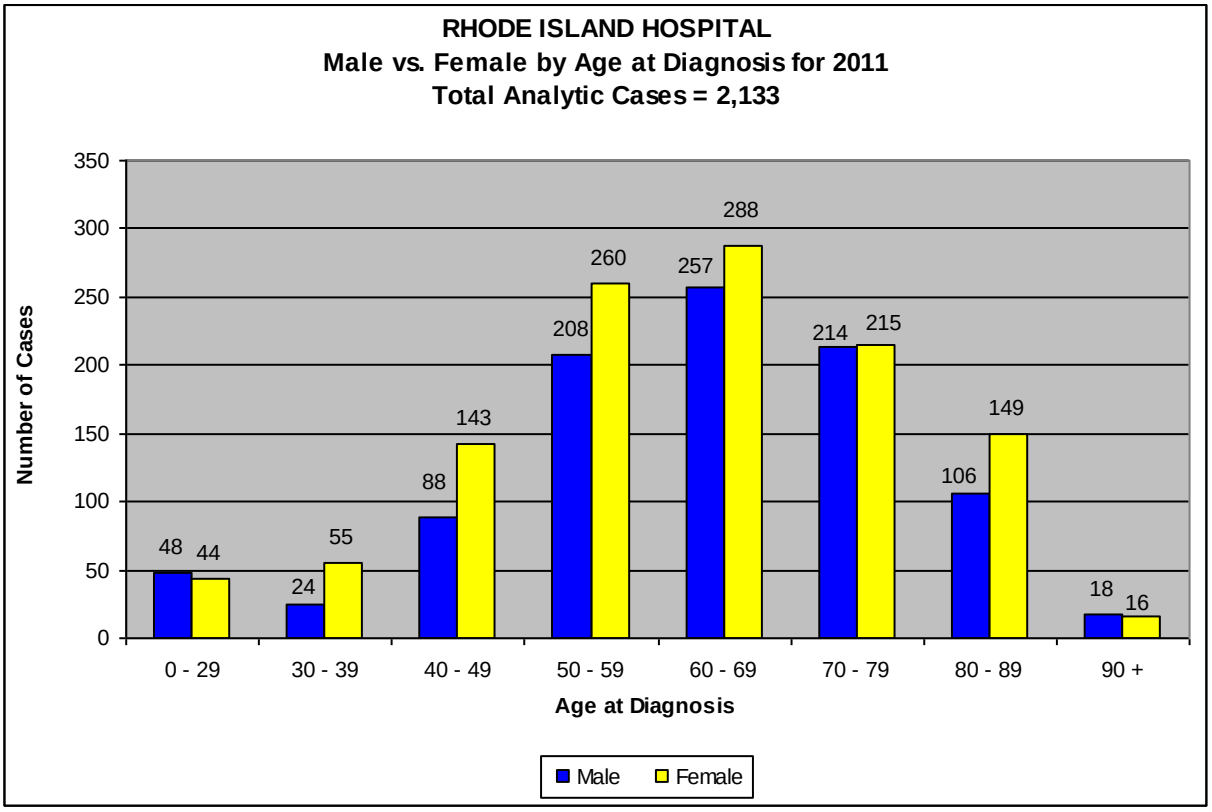


Source: Rhode Island Hospital Oncology Data Management Department

Gender by Age and Stage of Disease at Diagnosis

Gender by Age

In 2011, the gender distribution for Rhode Island Hospital was 45% male and 55% 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 2011 was 52% male and 48% female. The most common age group for Rhode Island Hospital was 60 – 69; approximately 26% of patients were in this age group at the time of initial diagnosis.

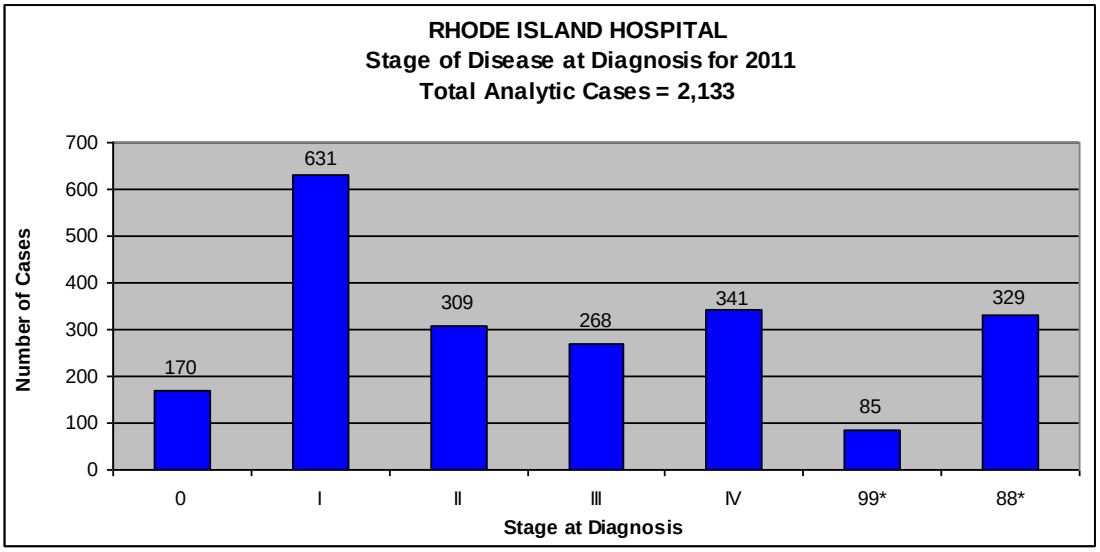


Source: Rhode Island Hospital Oncology Data Management Department
Source: http://www.cancer.org/acs/groups/content/@epidemiologysurveilance/documents/document/acspc-026238.pdf

Stage of Disease at Diagnosis

Cases entered into the Rhode Island Hospital 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. Of analytic cases entered into the Rhode Island Hospital Cancer Registry, 170 (8%) were classified as TNM stage 0, 631 (30%) as stage I, 309 (14%) as stage II, 268 (13%) as stage III, 341 (16%) as stage IV, 85 (4%) were classified as not staged, and 329 (15%) were not applicable for the TNM staging system.

Stage of Disease at Diagnosis and Survival by AJCC Stage for All Cancer Sites

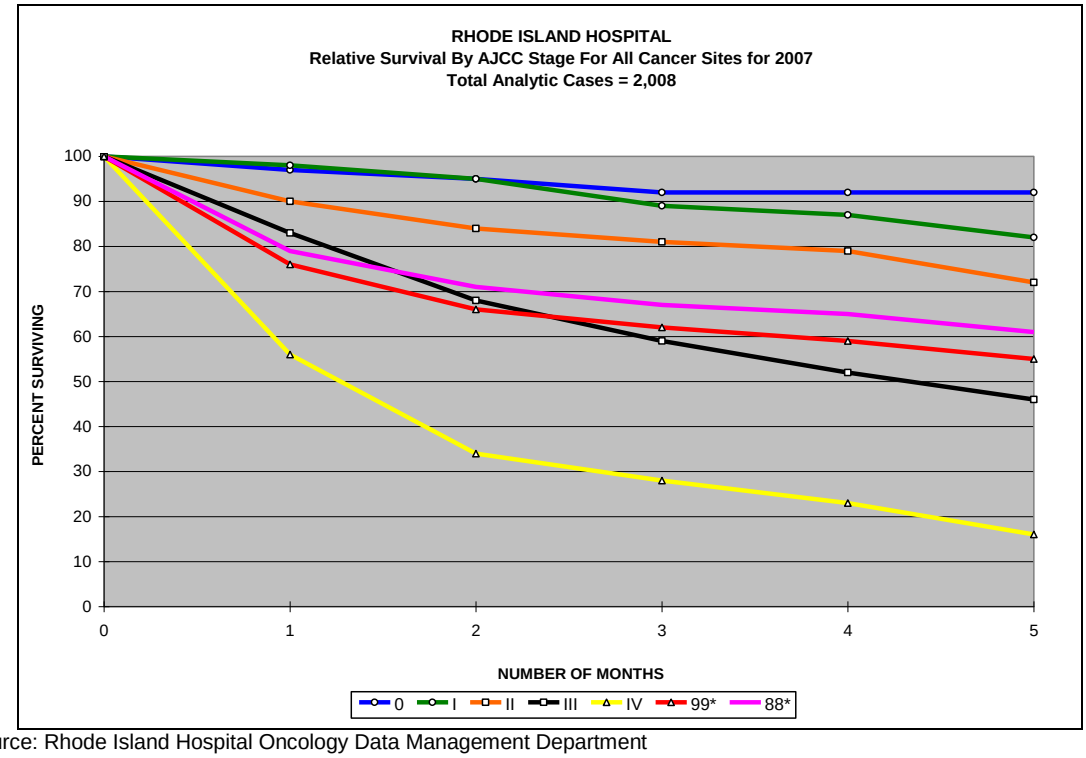


Source: Rhode Island Hospital Oncology Data Management Department

*99 – AJCC stage is unknown
*88 – AJCC stage is not applicable

Survival by AJCC Stage for All Cancer Sites

Relative survival rates by stage were as expected. The survival rate for stage 0 was best overall, with 92% alive at five years. This rate was followed by stage I with over 80% alive at five years. This survival graph is based on 2007 data, for 2007 a total of 2,008 analytic cases were collected.



Source: Rhode Island Hospital Oncology Data Management Department

*99 – AJCC stage is unknown
*88 – AJCC stage is not applicable

In 2011 an estimated 230,480 new cases of female breast cancer will be diagnosed in the United States and an estimated 930 female residents in Rhode Island will be diagnosed with breast cancer.

Breast cancer is the most commonly diagnosed cancer in women with an incidence of 1 in 8. Women are 100 times more likely to develop breast cancer then men. Several of the well-established risk factors for breast cancer are listed below.

Risk Factors

Age and gender – the risk of developing breast cancer increases with age. On average, women over 60 are more likely to be diagnosed with breast cancer. Only about 10 to 15 percent of breast cancers occur in women younger than 45. However, this may vary for different races and ethnicities.

Family history of breast cancer – approximately 20-30% of women with breast cancer have a family history of the disease.

Genes – the most common genetic defects are found in the BRCA1 and BRCA2 genes.

Menstrual cycle – women who get their period early (before age 12) or go through menopause late (after age 55) have an increased risk for breast cancer.

Hormone replacement therapy (HRT) – receiving hormone replacement therapy for several years can increase the risk of developing breast cancer.

Radiation – receiving radiation therapy as a child or young adult to treat cancer of the chest area can significantly increase the risk of developing breast cancer (8 – 25 fold).

Symptoms/Signs of Early Breast Cancer

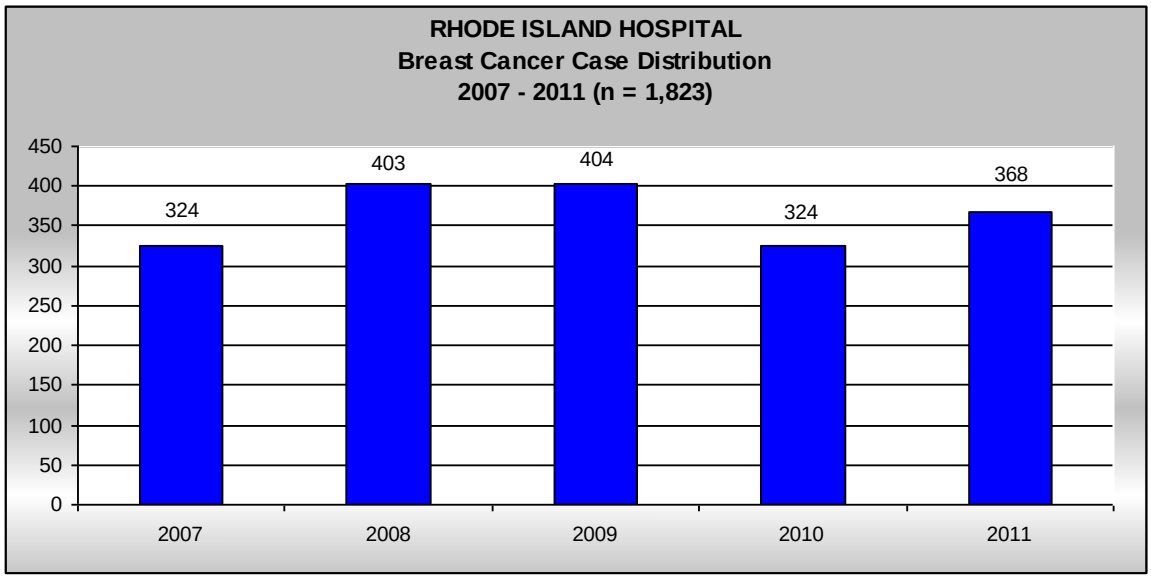
- None, lump in the breast or armpit that is firm
- Change in the size, shape, or feel of the breast or nipple
- Fluid expressed from the nipple
- General pain in/on any part of the breast

Symptoms/Signs of Advanced Breast Cancer

- Malaise/Fatigue
- Weight Loss
- Nipple Retraction
- Peeling or flaking of the nipple skin
- Bone Pain
- Swelling of breast or arm on the same side as the affected breast
- Redness or pitting of the breast skin
- Breast pain or discomfort
- Skin Ulceration

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

From 2007 through 2011, the Rhode Island Hospital Oncology Data Management Department accessioned 1,823 female breast cancer patients.



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

Hospital comparison benchmark reports are available from the NCDB for the years 2000 to 2010. Various comparisons can be made by primary site, hospital type (Teaching Research Hospital Cancer Programs), by geographical location (individual state, ACS Division, or all states) and diagnostic year (2000 to 2010, or combined).

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

2012 Breast Cancer Patient Outcome Analysis

The table below is based on information obtained from the National Cancer Data Base (NCDB) and illustrates a case distribution comparison between Rhode Island Hospital and the other hospitals within the state of Rhode Island.

Breast Cancer Diagnosed 2000 to 2010 by YEAR
All Diagnosed Cases – Hospital Type: All Types/Systems
Rhode Island Hospital, Providence, RI vs. Hospitals in the State of Rhode Island
Data from 11 Hospitals

	Number of Cases		Percent of Cases
	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital	Rhode Island Hospital
YEAR			
2000	810	231	28.52%
2001	828	230	27.78%
2002	786	258	32.82%
2003	757	239	31.57%
2004	820	307	37.44%
2005	794	315	39.67%
2006	852	345	40.49%
2007	884	306	34.61%
2008	900	388	43.11%
2009	902	406	45.01%
2010	814	316	38.82%
Total	9,147	3,341	36.52%

Source: 2012 National Cancer Data Base (NCBD) / Commission on Cancer (CoC) / Developer: Florin Petrescu

2012 Breast Cancer Patient Outcome Analysis

Each year in the United States, over 200,000 females will learn they have breast cancer. The highest overall breast incidence rates are in Caucasian, non-Hispanic women, while African American women are noted to have the highest mortality rate from breast cancer.

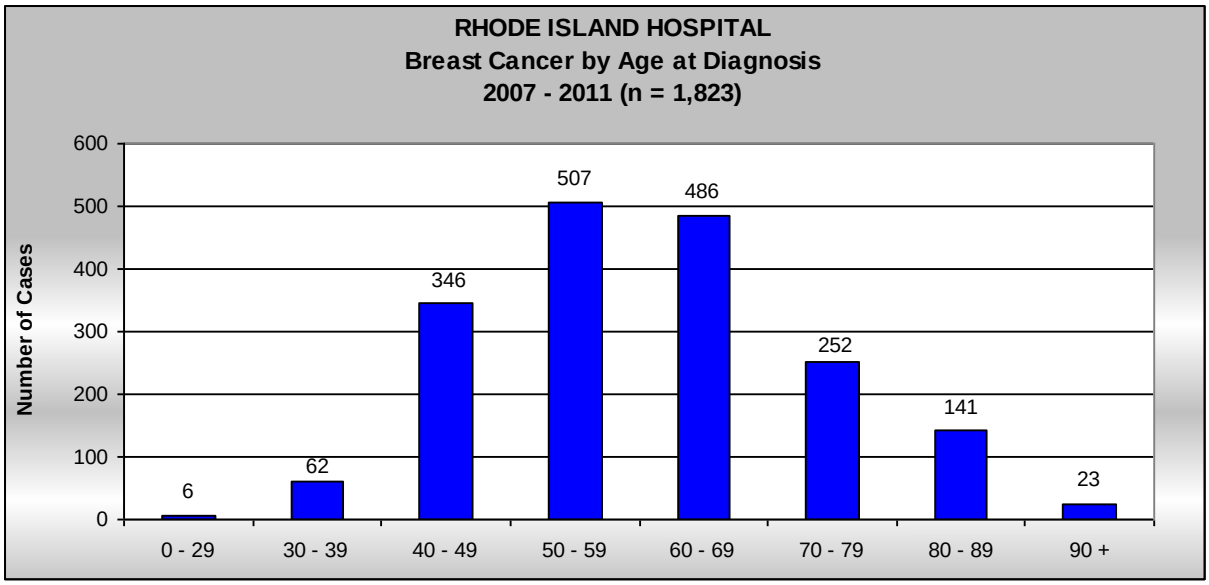
The table below is based on information obtained from the National Cancer Data Base (NCDB) and illustrates a race comparison between Rhode Island Hospital and the other hospitals within the state of Rhode Island.

Breast Cancer Diagnosed 2000 to 2010 by RACE
All Diagnosed Cases – Hospital Type: All Types/Systems
Rhode Island Hospital, Providence, RI vs. Hospitals in the State of Rhode Island
Data from 11 Hospitals

	Number of Cases		Percent of Total Breast Cancer Cases by Race	
	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital
RACE				
White	8,195	3,056	89.59%	91.47%
Black	225	122	2.46%	3.65%
Hispanic	259	72	2.83%	2.16%
Asian/Pacific Islands	80	24	0.87%	0.72%
Native American	16	2	0.17%	0.06%
Other/Unknown	372	65	4.07%	1.95%
Total	9,147	3,341	100%	100%

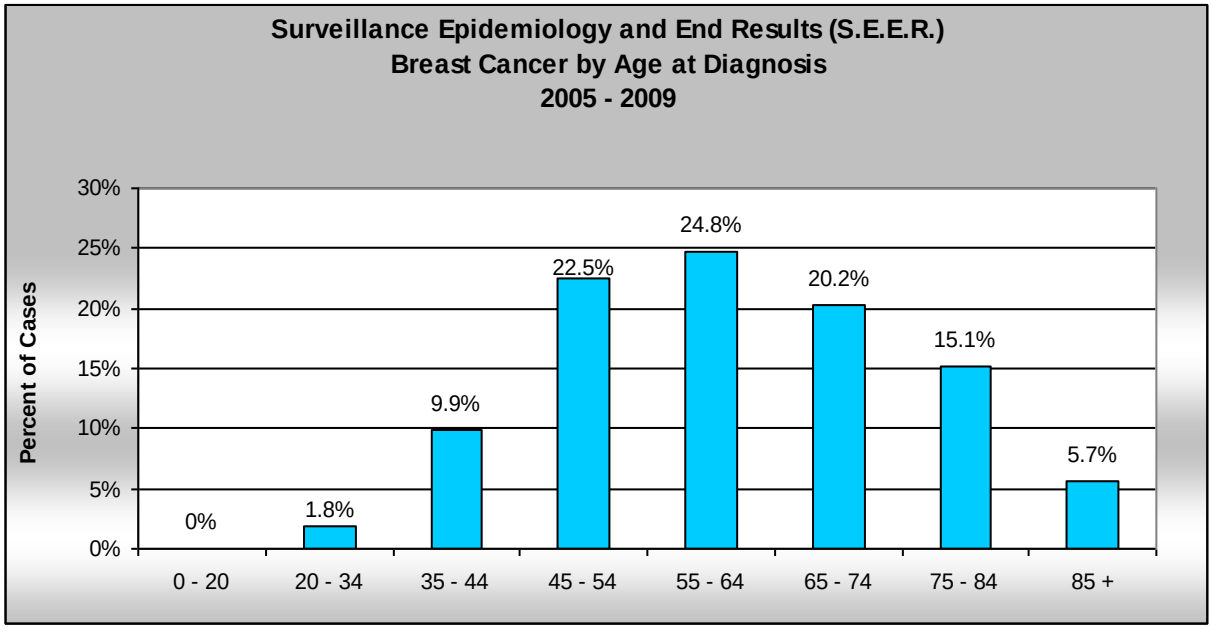
Source: 2012 National Cancer Data Base (NCBD) / Commission on Cancer (CoC) / Developer: Florin Petrescu

The age distribution for breast cancer at Rhode Island Hospital ranges from 19 to 98 with the majority occurring in patients' age 50 to 59. The age distribution for Rhode Island Hospital is illustrated in the graph below and is based on overall age distribution and is not limited by any specific histology.



Source: Rhode Island Hospital Oncology Data Management

Per S.E.E.R. data: From 2005 – 2009, the median age at diagnosis for cancer of the breast was 61 years of age. Approximately 0% were diagnosed under age 20; 1.8% between 20 and 34; 9.9% between 35 and 44; 22.5% between 45 and 54; 24.8% between 55 and 64; 20.2% between 65 and 74; 15.1% between 75 and 84; and 5.7% 85+ years of age.



Per S.E.E.R Website: http://seer.cancer.gov/statfacts/html/urinb.html

2012 Breast Cancer Patient Outcome Analysis

The table below illustrates an age comparison between National reporting Teaching Research hospitals, other hospitals within the state of Rhode Island, and Rhode Island Hospital. The table is based on information obtained from the National Cancer Data Base (NCDB).

Breast Cancer Diagnosed 2000 to 2010 by AGE
Teaching Research Hospitals in All States vs. All Hospitals in the State of Rhode Island vs. Rhode Island Hospital, Providence, RI

	Number of Cases			Percent of Total Breast Cancer Cases by Age		
	Teaching Research Hospitals	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital	Teaching Research Hospitals	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital
AGE						
Under 20	96	0	1	0.02%	0%	0.03%
20-29	3,835	31	12	0.62%	0.34%	0.36%
30-39	34,812	373	143	5.59%	4.08%	4.28%
40-49	131,286	1,681	697	21.08%	18.38%	20.86%
50-59	168,046	2,070	854	26.98%	22.63%	25.56%
60-69	140,139	1,932	776	22.50%	21.12%	23.23%
70-79	95,626	1,786	541	15.35%	19.53%	16.19%
80-89	43,776	1,117	270	7.03%	12.21%	8.08%
90+	5,280	157	47	0.85%	1.72%	1.41%
Total	622,897	9,147	3,341	100%	100%	100%

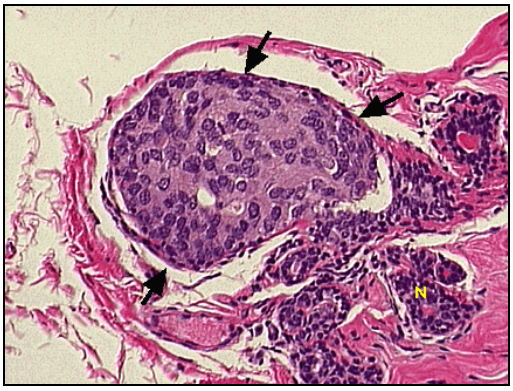
Source: 2012 National Cancer Data Base (NCBD) / Commission on Cancer (CoC) / Developer: Florin Petrescu

The most common histological type of invasive breast cancer is ductal carcinoma, making up nearly 70% – 80% of diagnoses. Lobular carcinoma is noted to be the second most common type, accounting for 1 out of 10 invasive breast cancers. The histologic characteristics including the tumor grade can have important therapeutic implications and affect prognosis. Some of the less common invasive breast cancer histology's include tubular, mucinous, papillary, adenoid cystic, inflammatory and Paget's disease.

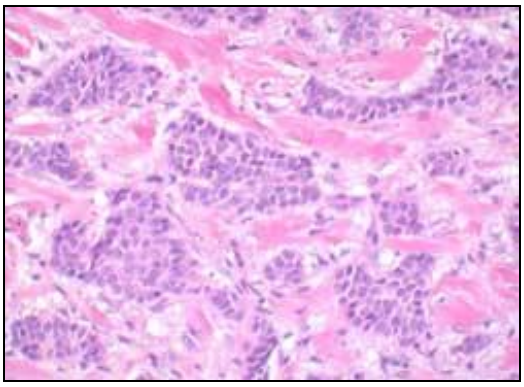
Inflammatory breast cancer is a rare and aggressive type of breast cancer that often starts in the soft tissue of the breast. Inflammatory breast cancer accounts for 1 to 5 percent of all breast cancers in the United States and affects younger women more than other breast cancer types.

Paget's disease of the breast is another rare type of cancer which usually begins in the breast ducts and spreads to the skin of the nipple and areola. This may results in scaly, red, itchy or irritated skin in these areas.

Ductal carcinoma in-situ, often described as non-invasive or intraductal carcinoma is another form of breast cancer which lies solely within the lining of the milk ducts and has not spread through the duct walls into surrounding breast tissue. If ductal carcinoma in-situ lesions are left untreated, over time cancer cells may break through the duct and spread to nearby tissue, becoming an invasive cancer.



Ductal Carcinoma in Lymphatic



Lobular Carcinoma

The breast cancer histological distribution for Rhode Island Hospital is displayed in the table below.

RIH Breast Cancer Histological Distribution	Number of Cases Per Histology	Percentage of Cases Per Histology
Intraductal Carcinoma, NOS	67	3.68%
Ductal Carcinoma In-Situ, Solid Type	35	1.92%
Infiltrating Duct Carcinoma, NOS	951	52.17%
Infiltrating Duct and Lobular Carcinoma	151	8.28%
Lobular Carcinoma In-Situ, NOS	49	2.69%
Lobular Carcinoma, NOS	115	6.31%
Other	455	24.95

Source Image 1: http://esynopsis.uchc.edu/eAtlas/Breast/1690b...
Source Image 2: http://ccm.ucdavis.edu/bcancercd/312/lob_carcinoma.html
Source: http://www.cancer.gov/cancertopics/factsheet/Sites-Types/paget-breast

Tumor Grade

Multiple grading systems have been proposed in an effort to minimize interobserver variability. The Scarff-Bloom-Richardson classification system utilizes tubule formation, nuclear pleomorphism and mitotic count. It assigns a score of between 1 and 3 to each with an overall score of 3-5 described as well-differentiated, 6-7 moderately differentiated and 8-9 poorly differentiated. This system has been shown to be of independent prognostic significance. A group from Nottingham, UK refined this methodology. They evaluate three morphological features: percentage of tubule formation, degree of nuclear pleomorphism and an accurate mitotic count using a defined field area. They also assign a score of between 1 and 3 for each and again a strong correlation exists between the score and prognosis with the highest scores having a worse prognosis. The Nottingham Combined Histologic Grade System can be summarized as follows:

Grade 1 (G1) Well Differentiated, Low combined histologic grade 3-5 (favorable)
Grade 2 (G2) Moderately Differentiated, Intermediate combined histologic Grade 6-7 (moderately favorable)
Grade 3 (G3) Poorly Differentiated, High combined histologic grade 8-9 (unfavorable)

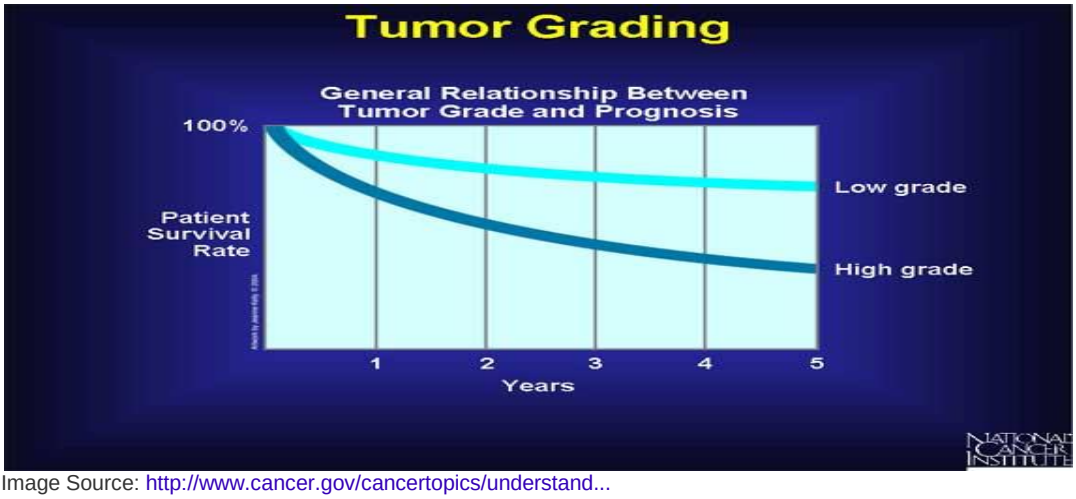
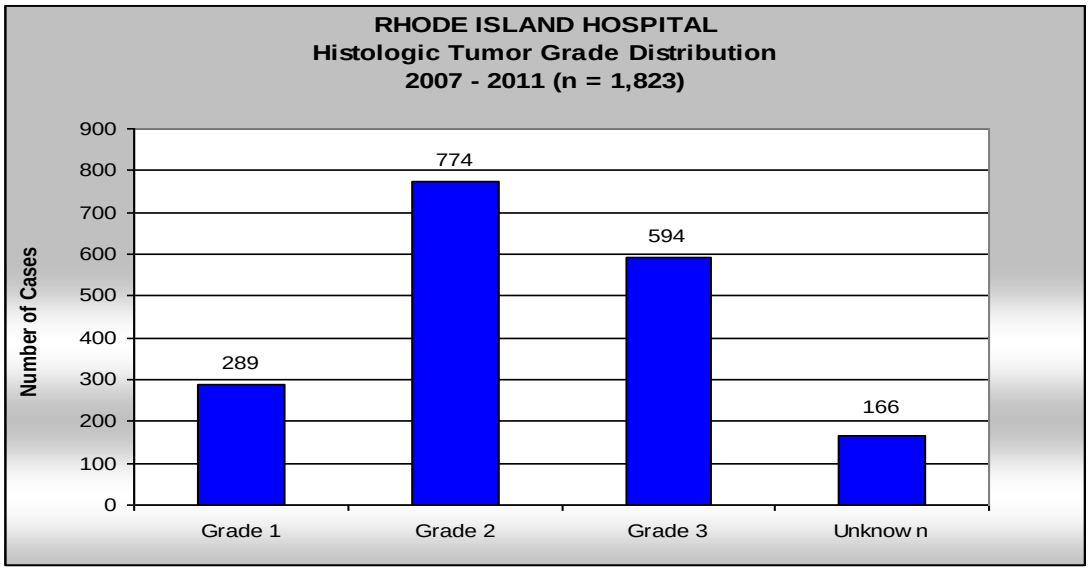


Image Source: http://www.cancer.gov/cancertopics/understand...



Source: Rhode Island Hospital Oncology Data Management

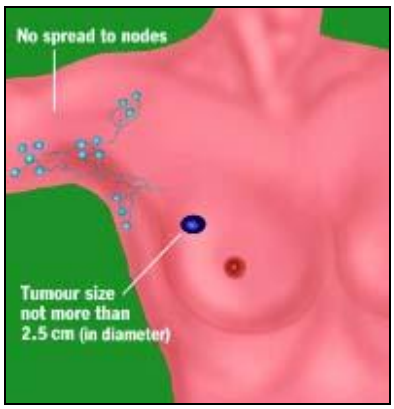
Accepted diagnostic imaging techniques that assist the physician when staging a breast cancer patient are:

1. Breast Ultrasound
2. Breast MRI
3. Digital Mammography (Tomosynthesis)

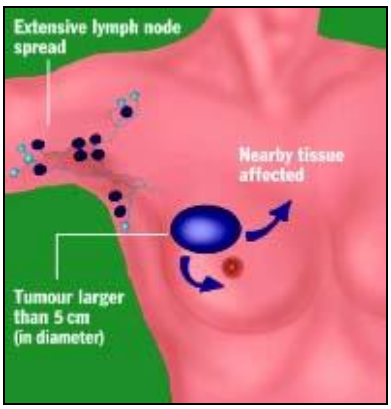
Tomosynthesis is a new type of digital mammogram that provides three-dimensional (3-D) images of the breast, which provides radiologist significantly more visual information about the mammogram. With a standard two-dimensional (2-D) mammogram, overlapping tissue can hide abnormalities or can make normal tissue appear suspicious. Tomosynthesis, however, gives the radiologist a way to see the whole breast in 3-D without the uncertainty caused by overlapping tissue or normal variation in breast tissue.

Staging System

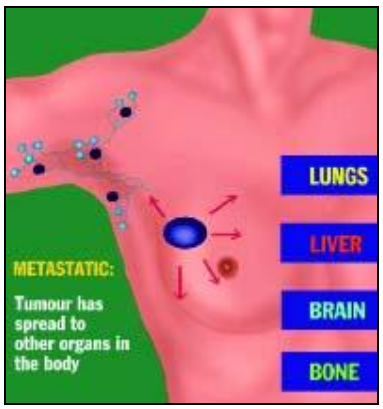
The most widely used staging scheme is the AJCC Cancer Staging Manual (TNM). The TNM describes the extent of primary Tumor (T stage), whether or not the cancer has spread to regional lymph Nodes (N stage), and the absence or presence of distant Metastasis (M stage). Patients diagnosed with breast cancer after January 1, 2003 are staged with the AJCC Cancer Staging Manual 6th Edition. The 7th Edition Staging Manual was implemented for cancer diagnosed on or after January 1, 2010.



Stage II



Stage III



Stage IV

Source Image 1: http://www.aboutadvice.com/breast-cancer/img/....
Source Image 2: http://www.aboutadvice.com/breast-cancer/img/...
Source Image 3: http://www.aboutadvice.com/breast-cancer/img/...

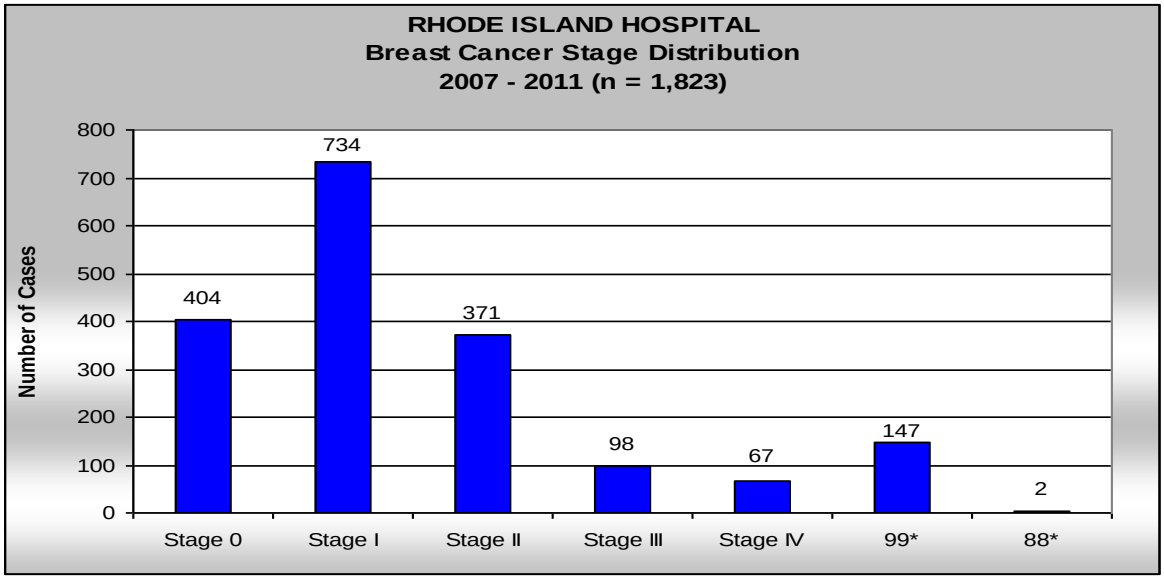
The table on the next page illustrates a stage comparison between National reporting Teaching Research hospitals, other hospitals within the state of Rhode Island and Rhode Island Hospital. The table is based on information obtained from the National Cancer Data Base (NCDB).

Breast Cancer Diagnosed 2000 to 2010 by STAGE
Teaching Research Hospitals in All States vs. All Hospitals in the State of Rhode Island vs. Rhode Island Hospital, Providence, RI

	Number of Cases			Percent of Total Breast Cancer Cases by Stage		
	Teaching Research Hospitals	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital	Teaching Research Hospitals	Other Reporting Hospitals In Rhode Island	Rhode Island Hospital
STAGE						
0	127,183	1,813	591	20.42%	19.82%	17.69%
I	228,590	3,656	1,336	36.70%	39.97%	39.99%
II	163,184	2,285	774	26.20%	24.98%	23.17%
III	53,218	575	194	8.54%	6.29%	5.81%
IV	24,040	291	94	3.86%	3.18%	2.81%
Not Applicable	774	11	3	0.12%	0.12%	0.09%
Unknown	25,908	516	349	4.16%	5.64%	10.45%
Total	622,897	9,147	3,341	100%	100%	100%

Source: 2012 National Cancer Data Base (NCBD) / Commission on Cancer (CoC) / Developer: Florin Petrescu

The stage distribution for the 1,823 breast cancer patients diagnosed at Rhode Island Hospital from 2007 to 2011 is illustrated in the graph below.



Source: Rhode Island Hospital Oncology Data Management

Treatment for Breast Cancer

Treatment for breast cancer is based on many factors including the histology, the stage, whether or not the cancer is sensitive to certain hormones, and whether or not the cancer overproduces HER-2/neu. Many studies indicate that patients with hormonal (ER and or PR) receptors have a significantly higher survival rate. Tumors expressing both hormone receptors have the greatest benefit from hormonal therapy.

There are several treatment options for patients with breast cancer: surgery, chemotherapy, radiation therapy, and hormone therapy. Most patients will receive a combination of these treatments.

Stage 0 cancers will be treated with breast conservation surgery plus radiation or mastectomy. Stage I and II cancers will undergo breast conservation surgery plus radiation or mastectomy with lymph node removal. Hormone therapy, chemotherapy, or a biologic therapy may also be recommended. Stage III cancers will have surgery and possibly hormone therapy, chemotherapy, or a biologic therapy. Stage IV cancers may involve surgery, radiation, chemotherapy, hormonal therapy, or a combination of these treatments.

Breast conservation surgery – involves removal of the cancer and a small area of healthy tissue surrounding it. This procedure is less radical than a mastectomy and preserves as much breast tissue as possible. In general, this referrers to a lumpectomy or partial mastectomy.

Sentinel lymph node biopsy – a fairly new procedure which identifies lymph nodes most likely to contain cancerous cells. This allows physicians to determine how far the cancer has spread and limits the number of lymph nodes removed for examination.

Mastectomy – is a procedure which removes the whole breast. There are four different types of mastectomies: simple or total mastectomy, modified radical mastectomy, radical mastectomy and nipple-sparing mastectomy.

- Simple or total mastectomy – removes the entire breast, nipple and areola, no lymph nodes are removed unless they are located directly in the tissue of the breast. No muscles are taken with this procedure.
- Modified radical mastectomy – involves removal of the entire breast plus axillary lymph nodes. The lining over the muscle in the chest is removed but the actual muscles are usually not disturbed during this procedure.
- Radical mastectomy – the entire breast including the nipple is removed, the underarm lymph nodes are also removed. The muscles located in the chest wall under the breast are also extracted. This procedure is rarely performed today, as the modified radical mastectomy, a less invasive procedure, is proven to be equally as effective.
- Nipple-sparing mastectomy – is a type of skin sparing mastectomy that removes the breast tissue but allows a woman to retain her areola and nipple. This procedure is intended to improve the cosmetic result without compromising the effectiveness of the surgery.

AccuBoost Image Guided Breast Radiotherapy – Rhode Island Hospital was one of the first institutions in New England to utilize IMRT, a type of conformal radiation, which shapes radiation beams to closely approximate the shape of the tumor. The intensity of the radiation in IMRT can be changed during treatment to spare more adjoining normal tissue than is spared during conventional radiation therapy and direct an increased dose of radiation to the tumor. IMRT treatments are typically delivered daily over a 6-8 week time period.

Accelerated Partial Breast Irradiation (APBI) – APBI encompasses a number of different techniques and approaches utilizing brachytherapy or external beam radiotherapy. With APBI, the radiation treatment is focused specifically on the part of the breast following a lumpectomy where the tumor was removed. Because the radiation is so targeted, it affects less of the healthy tissue and organs close to the breasts, including the lungs, heart, ribs and muscles. This treatment can be given in a more condensed schedule than some alternative radiation therapies for breast cancer.

Breast cancer rehabilitation – is a program which focuses on the changes and deficits that occur following surgery, reconstruction, chemotherapy and/or radiation therapy.

Treatment Goals	*Interventions*
1. Supple and pain free scar mobility	Scar management – scar massage techniques, Silicone gel strips, and soft-tissue mobilization
2. Increase mobility	Stretching activities – to lengthen muscles and tissues tightened by surgery and adjuvant therapies
3. Increase muscle strength	Strengthening exercises – progressive exercise
4. Improve posture	Postural exercises and education
5. Improve skin sensitivity	Scar management/skin desensitization
6. Improve function/endurance	Therapeutic activities and exercises
7. Increase education/knowledge	Education regarding scar management, lymphedema, awareness, return to exercise, posture, body mechanic and home program

Lymphedema Management – is a program which utilizes a four step method called Complete Decongestive Therapy (CDT) to reduce the side effects associated with breast cancer surgery and/or radiation therapy.

Components of Complete Decongestive Therapy (CDT)
- Manual lymphatic drainage (MLD)
- Compression
- Skin care/hygiene
- Exercise

Goals of Lymphedema Management
- Reduce swelling
- Facilitate the flow of lymphatic fluid to decongest the area
- Increase motion and function
- Decrease congested tissue
- Prevent or reduce episodes of infection
- Reduce fibrosis (soften hardened skin and tissue) and increase scar mobility
- Independence in self care of lymphedema management including use of compression garments as needed

The program at Rhode Island Hospital is staffed by licensed physical therapists that have been trained in lymphedema management.

Cancer Program Practice Profile Reports (CP3R)

The performance rates displayed in the Cancer Program Practice Profile Reports (CP3R) match the specifications of the breast cancer care measures endorsed by the NQF in April 2007.

- Breast Conserving Surgery/Radiation Therapy (BCS/RT) – patients receiving breast conserving surgery who are under the age of 70 should receive radiation therapy
- Multi Agent Chemotherapy (MAC) – patients with Stage I (tumor size > 1cm and N0) or Stage II/III, with ER/PR – tumors should receive or be considered for combination therapy.
- Hormone Therapy (HT) – patients with Stage I (tumor size > 1cm and N0) or Stage II/III, ER+ or PR+ tumors should receive or be considered for hormone therapy (Tamoxifen or third generation Aromatase Inhibitor).
- Adjuvant Chemotherapy (ACT) – patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer, adjuvant chemotherapy is considered or administered within 4 months (120 days) of diagnosis.
- Regional Lymph Node (12RLN) – at least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer.
- Adjuvant Radiation Therapy (AdjRT) – radiation therapy is considered or administered within 6 months (180 days) of diagnosis for patients under the age of 80 with a clinical or pathologic AJCC T4N0M0 or Stage III receiving surgical resection for rectal cancer.

Rhode Island Hospital's concordance rates for the breast and colorectal care measures are illustrated in the table below.

	Measures	Estimated Performance Rates			
		2007	2008	2009	2010
BREAST	Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer. [BCS/RT]	92.5%	94.6%	92.9%	92.4%
	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. [MAC]	91.7%	100%	100%	100%
	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. [HT]	88.5%	94.6%	88.4%	93.8%

	Measures	Estimated Performance Rates			
		2007	2008	2009	2010
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. [ACT]	100%	100%	88.9%	87.5%
	At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer. [12RLN]	86.5%	87.8%	95.3%	94.1%
RECTUM	Radiation therapy is considered or administered within 6 months (180 days) of diagnosis for patients under the age of 80 with a clinical or pathologic AJCC T4N0M0 or Stage III receiving surgical resection for rectal cancer. [AdjRT]	100%	80%	100%	85.7%

Quality Oncology Practice Initiative (QOPI®)

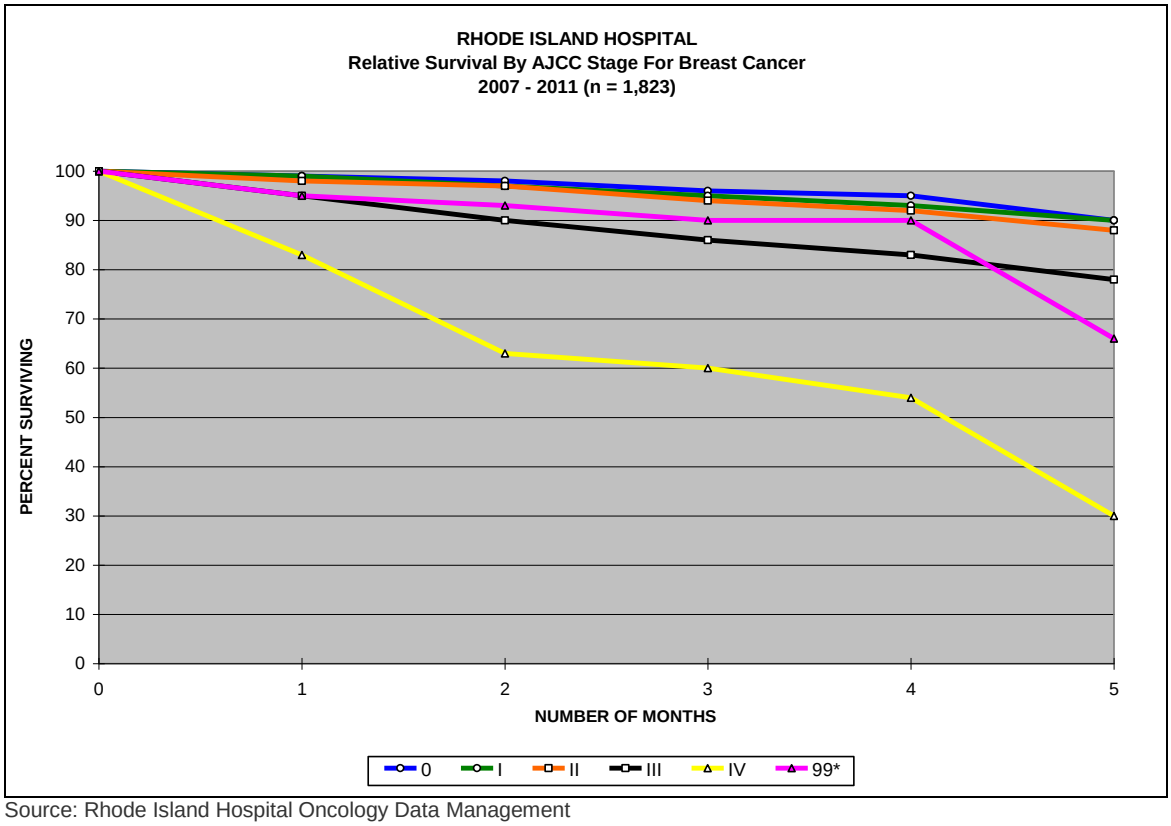
QOPI is an oncologist-led, practice-based quality improvement program sponsored by the American Society of Clinical Oncology (ASCO). The program offers a retrospective chart review for ambulatory hematology – oncology practices for systematic data collection, adherence to accepted standards of care and quality improvement goals to effectively measure and compare results with other practices in a consistent and meaningful way.

Rhode Island Hospital's performance rates for the breast cancer measures from the Spring 2012 data collection round are illustrated in the table below.

Measure	Comprehensive Cancer Center		
	Spring 2012		
	Num	Denom	Rate
Chemotherapy recommended within 4 months of diagnosis for women under 70 with AJCC stage I (T1c) to III ER/PR negative breast cancer	3	3	100%
Combination chemotherapy received within 4 months of diagnosis by women under 70 with AJCC stage I (T1c) to III ER/PR negative breast cancer	3	3	100%
Test for Her-2/neu overexpression or gene amplification	34	34	100%
Trastuzumab recommended for patients with AJCC stage I (T1c) to III Her-2/neu positive breast cancer	8	9	88%
Trastuzumab not received when Her-2/neu is negative or undocumented	24	24	100%
Trastuzumab received by patients with AJCC stage I (T1c) to III Her-2/neu positive breast cancer	8	8	100%
Tamoxifen or AI recommended within 1 year of diagnosis for patients with AJCC stage I (T1c) to III ER or PR positive breast cancer	19	19	100%
Tamoxifen or AI received within 1 year of diagnosis by patients with AJCC stage I (T1c) to III ER or PR positive breast cancer	10	10	100%
Lower score is excepted for the measures displayed below: Tamoxifen or AI received when ER/PR status is negative or undocumented (*Lower Score - Better*)	0	3	0%
Trastuzumab received when Her-2/neu is negative or undocumented (*Lower Score - Better*)	0	24	0%

Survival Analysis

Five year survival analysis for patients diagnosed with breast cancer between January 1, 2007 and December 31, 2011 was done using the relative survival method. The survival for the 1,823 Rhode Island Hospital breast cancer patients is illustrated below.

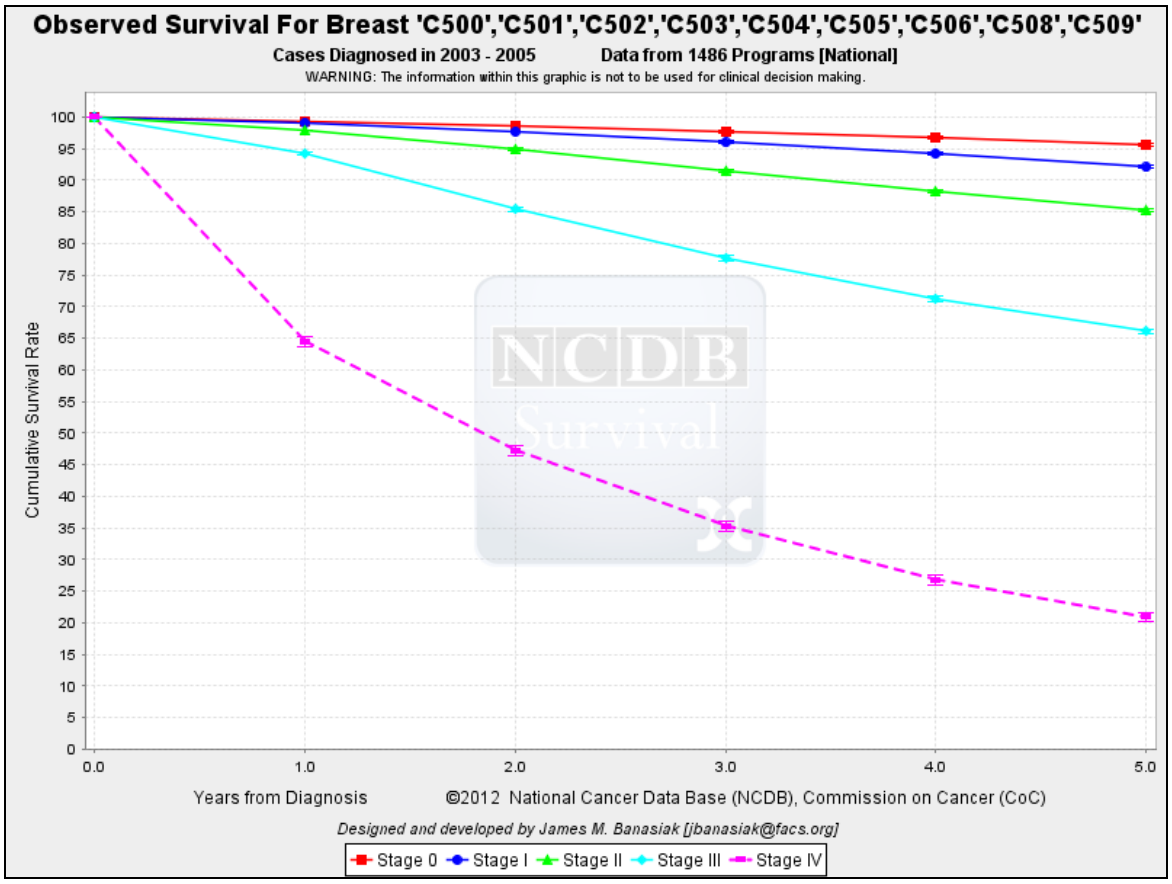


Source: Rhode Island Hospital Oncology Data Management

*99 – AJCC stage is unknown

Survival Analysis

The graph below is based on information obtained from the National Cancer Data Base (NCDB) and illustrates the survival for breast cancer patients diagnosed from 2003 - 2005. The data reflects information received from 1,486 Programs (National).



Stage of Disease	ENTER	0.0 yr	1.0 yr	2.0 yr	3.0 yr	4.0 yr	5.0 yr	95% Confidence Interval
Stage 0	77643	100.0	99.4	98.6	97.7	96.8	95.6	95.4 - 95.7
Stage I	156118	100.0	99.1	97.7	96.0	94.2	92.1	92 - 92.3
Stage II	113508	100.0	98.0	94.9	91.5	88.3	85.3	85 - 85.5
Stage III	43066	100.0	94.2	85.4	77.7	71.3	66.1	65.6 - 66.5
Stage IV	15362	100.0	64.5	47.3	35.3	26.8	20.9	20.3 - 21.6

Conclusion

This is a review of the breast cancer patients who presented to Rhode Island Hospital over a five year period from 2007-2011. The number of breast cancer cases in Rhode Island Hospital has increased over the period from 2007 to 2009 with a decrease in 2010 to a value equal to that of 2007. The number of cases diagnosed at Rhode Island Hospital as a percent of those diagnosed elsewhere in Rhode Island increased over the period 2000 to 2006 from 28% to ~ 40%, a 6% decrease was noted in 2007.

As seen in the rest of Rhode Island, Caucasians made-up the vast majority of breast cancer cases in Rhode Island Hospital but unlike the rest of the State, African Americans made-up the second most common group as opposed to Hispanics. Our distribution of breast cancers by age was similar to that found in other hospitals in Rhode Island and was also similar to that reported by the National Cancer Data Base (NCDB) with the majority occurring between the ages of 50 and 59.

Stage I was the most frequently reported stage of breast cancer at diagnosis in Rhode Island Hospital and was also reported as the most frequent stage by the National Cancer Data Base (NCDB).

The Comprehensive Cancer Center at Rhode Island Hospital adheres to NCCN (National Comprehensive Cancer Network) Clinical Practice Guidelines for treatment of all cancers. The majority of patients treated for breast cancer at Rhode Island Hospital underwent surgery alone, which is consistent with the treatment distribution seen at other hospitals in the state and at national Teaching Research hospitals. Surgery, radiation and hormone therapy was the second most common treatment distribution observed for all hospitals.

Five year overall survival at Rhode Island Hospital was in line with the stage 0, I, II distribution reported by the National Cancer Data Base (NCDB) for 2003 (the most recent year reported by NCDB). The overall survival for stage III cancer was lower than the national average and stage IV breast cancer cases at Rhode Island Hospital were statistically insufficient for comparison to national survival data.