

2011 SANTA BARBARA COTTAGE HOSPITAL



CANCER PROGRAM ANNUAL REPORT

This Annual Report contains data pertaining to 2010.

SANTA BARBARA COTTAGE HOSPITAL CANCER PROGRAM

2011 ANNUAL REPORT

This Annual Report is produced by Cottage Health System. All data are collected by the Cancer Data Center staff in compliance with the requirements of the American College of Surgeons, Commission on Cancer.

The 2011 Santa Barbara Cottage Hospital Cancer Program Annual Report was prepared by Rosa Cosio, CTR, and produced by the Cottage Health System Public Affairs Department and Andrea Russell.

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Our mission is to provide a leadership role in ensuring a comprehensive continuum of cancer services to patients and their families through focusing on prevention, education, early detection and management of cancer. The Commission on Cancer of the American College of Surgeons has accredited Santa Barbara Cottage Hospital as a community hospital comprehensive cancer program. The Cancer Committee is committed to the Commission's standards of performance, quality improvement, cost-effective measures and a comprehensive, integrated approach with other healthcare practices.

Santa Barbara Cottage Hospital has brought together state-of-the-art diagnostic and treatment technologies, expertise, and a caring personal approach to patient care in an easily accessible setting. Providing our patients with the best care in an environment that responds to their emotional as well as physical needs, we are generating success rates that meet or exceed national standards.

The Cancer Committee is charged with several responsibilities, including promoting and coordinating educational conferences, providing a system for quality of care evaluation, and encouraging the medical staff to utilize the data collected in the Cancer Data Center.

This Annual Report includes an in-depth statistical analysis of all cancer patients newly diagnosed or treated at SBCH in 2010. Also included in the Annual Report is an in-depth review of thyroid carcinoma. This review discusses diagnosis, treatment and surveillance. In 2010 our Cancer Program again achieved high recognition from the American College of Surgeons survey, earning "Three Year Accreditation with Commendation" – an accomplish-

ment shared by only 41 percent of California hospitals. The newly-instituted Breast Program, designated as a breast care center "without walls," went through its inaugural survey in 2010 and received accreditation as the Santa Barbara Breast Care Alliance (SBBCA) by the National Accreditation Program for Breast Centers (NAPBC), an accrediting division of the American College of Surgeons. This program may serve as a model for future organ-specific Cancer Programs under the umbrella of the overall Cancer Program.

We would like to thank the physician staff, residents, nurses, and allied health professionals who offer a patient-centered model of care, enabling Cottage to integrate these disciplines into a comprehensive approach that recognizes the impact cancer has on the lives of individuals and their families.



JOHN BLAUSTEIN, MD
CANCER COMMITTEE CHAIRMAN

Special Thanks

Special thanks to Mark D. Wilson, MD, for his discussion of thyroid cancer in this Annual Report. We would also like to thank the departments of Pathology, Health Information Management, Radiology, and Administration as well as our Cancer Committee members for their continued support. Additionally, many thanks to staff at the Cancer Center of Santa Barbara and Sansum Clinic —Thomas Weisenburger,

MD, Chair of the Tumor Board; Frederic Kass, MD, Chair of the Cancer Forum; Rosa Choi, MD, FACS, Cancer Liaison Physician and Mark Abate, MD — for support of the Cancer Conferences. We would especially like to thank John Blaustein, MD, for his continued support as Cancer Committee Chairman.

CANCER COMMITTEE

The Cancer Committee, a multi-disciplinary board, is a standing committee established by the bylaws of Santa Barbara Cottage Hospital. It consists of representatives from medical and radiation oncology as well as other specialties (i.e. Pathology, Diagnostic Radiology, Surgery, Urology, Gynecology, Pain Management). Also on the Committee are non-physician representatives from Hospital Administration, Cancer Data Center, Oncology Nursing, Quality Improvement, and Social Services.

OBJECTIVES OF THE CANCER COMMITTEE

- Offer leadership to ensure success in planning, initiating, and assessing all cancer-related activities at Santa Barbara Cottage Hospital.
- Develop and evaluate the annual goals and objectives of the clinical, educational and programmatic activities related to cancer.
- Ensure that an active supportive care system is in place for patients, families and staff.
- Monitor quality management and improvement through completion of quality management studies that focus on quality, access to care, and outcomes.
- Promote clinical research.
- Perform quality control of registry data.
- Organize, publicize, conduct, and evaluate regular educational and consultative cancer conferences that are multi-disciplinary and patient-oriented.

PREVENTION AND EARLY DETECTION PROGRAMS

On October 16, 2010, the Santa Barbara Cottage Hospital teamed up with the Cancer Center of Santa Barbara, the Santa Barbara Neighborhood Clinics, County of Santa Barbara Public Health Department, Breast Cancer Resource Center, the American Cancer Society, Sansum Clinic and the St. Francis Foundation to hold the 2010 Community Cancer Prevention Fair at Santa Barbara Cottage Hospital. Two hundred four people attended with a total of 277 screenings performed.

Total Screenings

Breast - 85 Oral - 95 Colon - 97

Free cancer screenings included:

- Visual oral screening, clinical breast exam, colon cancer at-home screening (FOTB) kits

Cancer prevention topics included:

- Mammograms, HPV, pap smears, hereditary cancer risk, lung cancer and Stop Smoking courses, community health assistance and education programs, cancer fighting foods, nutrition, stress reduction and exercise, skin cancer self examination, prostate cancer screening guidelines, signs and symptoms of ovarian cancer, Cancer Center Resource Library.

CANCER COMMITTEE MEMBERS

Physician Members

Mark Abate, MD Medical Oncology
 John Blaustein, MD (Chair) Pathology
 Michael Bordofsky, MD IM/Pain Management
 Stuart Braverman, MD Diagnostic Radiology
 James Cavins, MD Urology
 Rosa Choi, MD (Cancer Liaison) Surgery
 Kimberly Grafton, MD Surgery
 Daniel Greenfield, MD Pediatric Oncology
 Daniel Greenwald, MD Medical Oncology
 William M. Hogan, MD Gynecology Oncology
 Frederic Kass, MD Medical Oncology
 Ronald G Latimer, MD Surgery
 Thomas Weisenburger, MD Radiation Oncology

Thomas Woliver, MD Medical Oncology
 Steven Young, MD Internal Medicine

Professional Staff Members

Anna Bissell, RN Clinical Manager, Oncology Unit
 Debra Collingwood Director, Health Information Management
 Rosa Cosio, CTR Cancer Data Center
 Barbara Conviser Director of Research & Quality, CCSB
 Dana Goba Community Health Coordinator
 Kate Hanna American Cancer Society
 Karen Jones Vice President, Finance
 Josh Richo, LCSW Clinical Social Services, Oncology Unit
 Colleen Wheeler, RN Quality Support Services

CANCER DATA CENTER

The SBCH Cancer Data Center is one of the major components of the multi-disciplinary cancer program at Santa Barbara Cottage Hospital. The purpose of the Center is to collect, manage, and analyze the hospital's cancer experience, in addition to supplying data for special audits, studies and administration planning.

During 2010, the Cancer Data Center abstracted 1,121 cases. Of these, 1,019 of those cases were analytic cases with the initial diagnosis and/or first course of treatment at Cottage. Another 102 cases were non-analytic cases of recurrent or persistent disease diagnosed elsewhere and initially treated before our reference date or elsewhere. A total of 25,561 cases have been entered into the database since the reference date of January 1, 1988. Overall data accuracy remained high (99 percent and above) as reported by the California Cancer Registry.

The cancer database includes in each case: patient demographics, primary site, histology, predisposing factors, and collaborative staging. It also includes American Joint Commission on Cancer (AJCC) staging, first course of therapy, disease recurrence, subsequent therapy, and a lifetime of follow-up.

The Cancer Data Center is mandated by law to submit cancer data to the California Cancer Registry. The data is also submitted to the American College of Surgeons (ACOS) Commission on Cancer as part of a nationwide effort to collect information for the National Cancer Data Base (NCDB). Through these means, cancer data provides national statistics for incidence reporting and research. The cancer program coordinator can assist with developing criteria and ascertaining the appropriate data and reports requested by members of Santa Barbara Cottage Hospital's medical staff who undertake studies within their areas of special interest.

The information collected also provides Cottage with the ability to assess the community's needs as well as giving the community the ability to see how well our physicians and hospital compare to the national average.

FOLLOW-UP ACTIVITIES

Each patient in the database is followed annually in order to acquire necessary information on recurrences, subsequent treatment and survival data that is vital for continued patient care. Through the process of annual follow-up, the importance of continued medical supervision is conveyed to the patient.

Active follow-up is conducted on approximately 8,900 cases annually and the successful follow-up rate is maintained at 90 percent or higher.

COTTAGE TOP LEVEL OF CARE

Since 1976, the Commission on Cancer of the American College of Surgeons has recognized SBCH's commitment, accrediting our program for the quality of services as a Community Hospital Comprehensive Cancer Program. The CoC accredits about 25 percent of the cancer programs in the United States.

Being an accredited cancer program gives us access and privilege to national cancer information and the ability to collect and compare the treatment results of our patients with those of patients at other cancer centers.

2010 CANCER DATA CENTER ACTIVITIES

- Participated in successful Commission on Cancer Accreditation Survey.
- Provided data and research information to various hospital departments and physicians.
- Coordinated the weekly tumor boards and quarterly Cancer Committee meetings.
- Submitted status reports at every Cancer Committee meeting.
- Reported required cases to the CCR within six months of diagnosis on a monthly basis.
- Implemented the use of required revised 2010 Cancer Registry tools: 7th Edition American Joint Committee on Cancer (AJCC) Staging Manual; Collaborative Staging (CSv2) Manual; Facility Oncology Registry Data Standards (FORDS) Manual; and Multiple Primary and Histology (MPH) Rules.
- Maintained ongoing quality reviews of data by annual physician review of 10 percent analytic cases inclusive of physician clinical TNM stage, collaborative stage review and use of College of American Pathology (CAP) protocols on eligible pathology reports.
- Completed the required SAR annual update.

PATIENT CARE EVALUATION STUDIES

Data are submitted yearly to the National Cancer Data Base. The data submitted are used to provide feedback to assess the quality of patient care. This feedback enables cancer programs to compare treatment and outcomes with regional, state, and national patterns.

MULTIDISCIPLINARY CANCER CONFERENCES

Weekly multidisciplinary tumor board/cancer conferences are conducted under the leadership of Thomas Weisenburger, MD. This meeting provides a consultative service to the physician treating the patient, with input regarding further diagnostic work-up, staging, treatment, and follow-up options.

The latest diagnostic technology and research protocols are also discussed. Required attendance includes representatives from surgery, pathology, radiology, and medical and radiation oncology. Physicians earn one CME unit for each conference attended. Ancillary personnel are also invited to attend.

Several times per year cancer conferences shift to other general oncology presentations featuring nationally or locally recognized speakers. These cancer forums are open educational opportunities for all health professionals. In 2010, a total of 46 Tumor Boards and 46 Breast Cancer Conferences were held, totaling 183 case presentations; 164 (89 percent) being perspective. This percentage far exceeds the 75 percent requirement set by the Commission on Cancer.

Physicians are encouraged to submit cases for presentation by contacting the Cancer Data Center the week prior to the conference at 805-569-8280.

CONFERENCE SCHEDULES

Tumor Board:
Every Tuesday, 12:15 pm

Breast Conference:
Every Wednesday, 12:00 pm

Surgical Grand Rounds/Tumor Board:
First Wednesday each month, 7:45 am

TUMOR BOARD CASES PRESENTED IN 2010

| | |
|----------------------------|------------|
| Adrenal | 1 |
| Anus | 2 |
| Brain | 2 |
| Breast | 110 |
| Colon | 3 |
| Endometrium | 3 |
| ENT | 5 |
| Esophagus | 6 |
| Gallbladder | 3 |
| Gastric | 6 |
| Lung | 10 |
| Lymphoma | 3 |
| Melanoma | 1 |
| Ovary | 2 |
| Pancreas | 2 |
| Prostate | 2 |
| Rectum | 2 |
| Sarcoma | 8 |
| Skin | 2 |
| Testis | 2 |
| Thymus | 2 |
| Thyroid | 3 |
| Unknown Primary | 3 |
| TOTAL PRESENTATIONS | 183 |

CANCER FORUMS HELD IN 2010

Targeting Tumors with Tumor-Penetrating Peptides
Erkki Ruoslahti, MD, PhD

Evidence-based Risk Assessment and Decision Making in Early Stage Breast Cancer: The Role of Established and Newer Molecular Markers
Debu Tripathy, MD

Cancer Prevention Research: A View from the National Cancer Institute
Peter Greenwald, MD, PhD

THE SANTA BARBARA COTTAGE HOSPITAL CANCER TEAM

Santa Barbara Cottage Hospital's team of doctors, nurses, social workers, pharmacists, physical therapists and clergy recognizes the diversity and uniqueness of every person, especially those who are facing cancer. The people who seek our services expect the very best medical treatment. We are committed to offering support and comfort to the body, the mind, and the spirit.

ADULT ONCOLOGY UNIT

The Santa Barbara Cottage Hospital Adult Oncology Unit was originally opened in April 1986. This year we celebrate 24 years as a dedicated unit caring for cancer patients who may live in the many communities along the Central Coast of California. Located on the sixth floor, the beds offer spectacular views of the ocean on one side and the mountains on the other side. With a professional staff of 48, the department consists of 36 RNs, 1 LVN, 7 Patient Care Technicians, four Unit Coordinators, a Case Manager, a Social Worker, Spiritual Care and Palliative Care Team. We are proud of our accomplishments in the past 24 years. The registered nurses are all trained and certified to administer chemotherapy/biotherapy, and half of the staff are Oncology Certified Nurses (OCN). In addition, some are also Certified Medical Surgical Registered Nurses, and certified Pain Management and Hospice and Palliative Care Nurses. We are especially proud of the excellent physician-nurse collaboration that exists on the nursing unit with the nine local Oncologists.

The Oncology Unit maintains a liberal visiting policy and is supportive of family involvement in care. A large family room is available with a TV/VCR/DVD and a video library. Other services include a pet therapy program, Healing Touch and hand and foot massages that are offered by a very dedicated volunteer.

To serve our patients more effectively, an Outpatient Infusion Center was opened six years ago. It has grown rapidly in the past two years, and was recently expanded to six chairs to allow for the care of additional patients. Also located on the sixth floor, it sees from 250 to 300 patients a month.

SPIRITUAL CARE

Cancer patients and their families are often in special need of spiritual support. The Department of Spiritual Care, with both professional and volunteer members, provides spiritual and emotional support to all patients and their families in coping with a range of issues. These include healing, prayer, grief, anger, pain, loneliness and ethical values. This interfaith program is under the direction of The Reverend Pamela Washburn. You can reach the department and its staff at 569-8386.

PALLIATIVE CARE CONSULTATION SERVICE

Cottage Health System inaugurated its Palliative Care Consultation Service (PCCS) in August 2005 and today works in partnership with Hospice of Santa Barbara, Visiting Nurse and Hospice Care, and the St. Francis Hospital Foundation. This important new program was developed as a direct result of recommendations made by physicians on the Medical Advisory Panel in November 2003. Palliative care is specialized care that helps patients who are living with serious illness. The Palliative Care Consultation Service treats pain, manages difficult symptoms, and provides spiritual and emotional support to patients and their families. The PCCS can also help patients identify what is most important to them and their families and can help communicate these wishes to the healthcare team. Palliative care differs from hospice care in that it can be started early in the course of illness and is provided at the same time as other treatments a patient is receiving. Anyone involved with a patient's care may ask the primary physician for a palliative care referral. This includes the patient, family members, nurses, social workers, spiritual care providers, respiratory therapists, physical therapists, case managers, and others. The service is also available to support nurses with information, coaching, and help assessing the need for palliative care. Once the primary physician has given the order for palliative care, members of the team will begin meeting with the patient and the patient's family, as well as with the patient's physicians and nurses to determine how we can help. The team will make recommendations to the primary physician regarding pain and symptom management. Team members will spend time with the patient and family, providing emotional and spiritual support. Finally, the team will work with the patient's case manager regarding discharge planning needs.

In 2010 there were 661 referrals made to PCCS; of these, 51 percent had a cancer diagnosis.

Palliative Care Consultation Team

- Dennis Baker, MD, medical director
- Michael Bordofsky, MD, medical director
- Michael Kearney, MD, medical director
- Eric Trautwein, MD, medical director
- Julie Hirsch, RN, palliative care nurse
- Jennifer Kane, RN, palliative care nurse
- Lori Mendez, RN, palliative care nurse
- Susan E White, RN-BC, MSN, palliative care manager
- Sherie Davis, LCSW, palliative care social worker
- Katherine Zeiss, MSW, palliative care social worker
- Clay Napier, Chaplain
- Valerie Moore, LCSW, bereavement coordinator

PEDIATRIC ONCOLOGY UNIT

The pediatric oncology unit at Santa Barbara Cottage Hospital started treating children with cancer in 1996. Currently under the direction of Daniel Greenfield, MD, and David Slomiany, MD, we provide the only full service childhood cancer program between Los Angeles and the Bay Area. Our aim is to provide the highest quality care in a caring and personal approach.

The program is an active, contributing member of the Children's Oncology Group (COG), a National Cancer Institute supported clinical trials group, which is the world's largest organization devoted exclusively to childhood and adolescent cancer research. Approximately 13,500 children and adolescents are diagnosed with cancer each year in the United States, and more than 90 percent are treated by cooperating COG member institutions like ours. Because of these cooperative methods, children with cancer are assured of state-of-the-art care, no matter where they live. By pooling scientific ideas, research skills, and patient data, COG can obtain answers to important medical and scientific questions more rapidly than researchers working alone. With these research efforts children's cancer has gone from a virtually incurable

We are proud members of COG, offering excellent childhood cancer care for families locally in Santa Barbara, San Luis Obispo and Ventura counties while contributing to the effort to improve the cure rate for all the world's children with cancer.

In pediatric oncology, our cure rates have improved so dramatically over the past few years that we have had to redefine our treatment philosophy. We have been participating in studies to reduce the amount of therapy (and therefore side effects), while maintaining high cure rates. For many pediatric cancers, the cure rates now exceed 90 percent, which has shifted our focus on long-term survivor care and the unique issues that arise years after therapy.

The childhood cancer program at Santa Barbara Cottage Hospital provides child-specific, family centered care. We understand the needs of children of different ages and developmental stages in life. We also coordinate care with schools and support services because we know the importance of school and play to children. We treat the entire family because we understand the pressures and stresses on families of children with cancer.

PUBLIC EDUCATION

Santa Barbara Cottage Hospital offers individual and group cancer prevention education. The educational topics include, but are not limited to, cancers of the skin, breast, colon, and prostate, as well as smoking cessation programs. Members of the community also have access to the most recent cancer literature and clinical trials through a variety of computer resources available in Reeves Medical Library. The library provides computers so individuals can search for information online or access the entire library collection. Many books and medical journals are also available in Reeves Library. The public will need to obtain a temporary identification badge at the entrance to the hospital in order to access the Reeves Medical Library.

REHABILITATION /PHYSICAL THERAPY

Physical and occupational therapists and those trained in speech and communication therapy provide patients with rehabilitative support throughout their illness and recovery period. These therapists give special attention to patient balance and safety, teaching patients to conserve energy, helping patients improve their mobility and endurance, improving patient muscle weaknesses and loss of motion, and assisting patients who have swallowing dysfunction.

PHARMACY SERVICES

The Department of Pharmacy Services offers vital support to cancer patients. All chemotherapy agents for inpatients at Santa Barbara Cottage Hospital are prepared in the pharmacy. This service facilitates the efficient administration of drugs and enhances the interaction between the other members of the healthcare team. Pharmacists

also support chemotherapy protocols. The pharmacy department at SBCH acquired a large stationary robotic system that automatically fills drug prescriptions after verification by the pharmacist. Installed in November 2005, Robot-RX takes up approximately 144 square feet in the department, with 700 pegs holding up to 25,000 single doses. The hospital fills approximately one million prescriptions per year. Robot-RX is part of the hospital's strategy for ensuring medication accuracy and safety. With the acquisition, SBCH is only one of approximately six hospitals in California—and one of only about 300 nation-



wide—to operate such an in-house system. The robot frees up pharmacists to spend more time advising physicians, staff, and employees about drug and drug interactions, reduces pharmacy costs through increased speed and efficiency, and reduces the risk of medication errors.

NUTRITION SERVICES

Nearly 80 percent of patients with cancer experience side effects of the disease and/or treatment that have an impact on their nutritional health. Poor nutrition impacts tolerance to therapy and healing, affects the immune system and decreases quality of life. Registered dietitians are trained to evaluate and work with patients suffering from side effects of treatment that interfere with eating such as loss of appetite, changes in smell and taste, difficulty chewing or swallowing and problems with digestion and bowel regulation. Dietitians are also involved in the provision of enteral and parenteral nutrition therapies when warranted. Registered dietitians evaluate diet history, weight changes, laboratory and physical parameters and past and present medical history to develop a comprehensive plan of care to improve or maintain nutritional status before, during and after therapy. They also work closely with the entire care team to coordinate resources needed during and after treatment.

DEPARTMENT OF RADIOLOGY

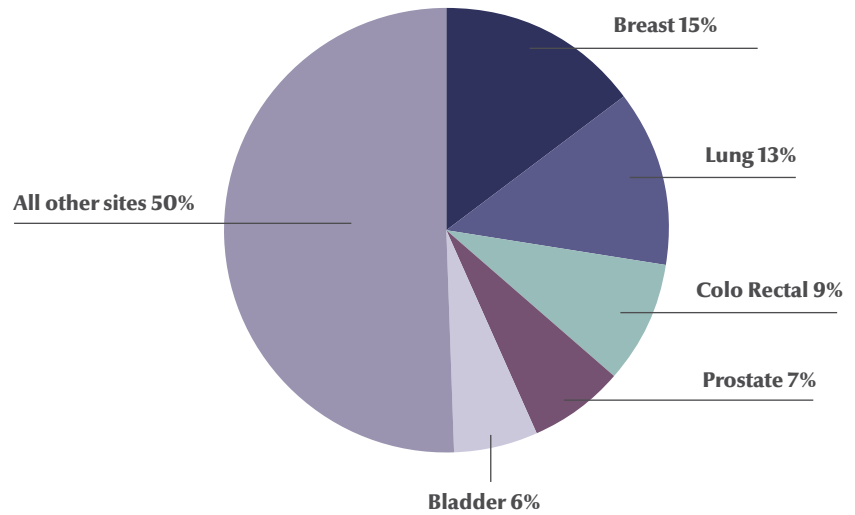
The Department of Radiology is accredited by the Food and Drug Administration (FDA) and is staffed by 14 radiologists, 70 technologists, and 20 staff support personnel. The department is divided into General Diagnostic, Ultrasound, CT scan, Angiography, and MRI. SBCH is an ACR accredited mammography site. The Department of Radiology performs approximately 100,000 exams per year, including 2,200 mammograms. In addition to its daily activities, the Department of Radiology provides training for radiology residents. The department also provides vital services in ongoing medical education for physicians and provides weekly services for the Cancer Conference and the Surgical Grand Rounds.

MEDICAL SOCIAL SERVICES

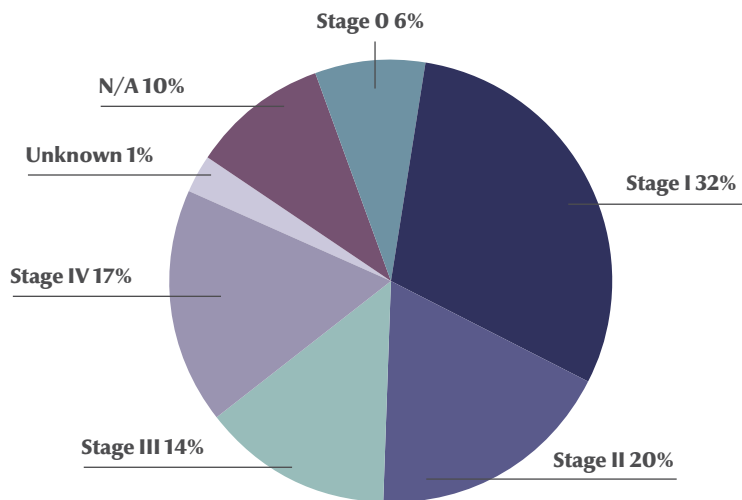
Cancer has a tremendous impact on the entire family, and Cottage's clinical social workers provide patients and family members with emotional support, guidance, and understanding. Upon referral by the physician, nurse, patient, patient's family, or any other member of the healthcare team, the social workers evaluate needs, support systems, understanding of diagnosis and treatments, and awareness of prognosis. They also counsel patients and family members on financial and insurance matters and develop plans for patients and loved ones to make the transition from the hospital as smooth as possible. Another important role of the clinical social worker is providing linkages with community agencies and support groups. The clinical social worker on the Oncology Unit plays an integral role in the care of cancer patients and their families at SBCH.

TOP 5 NEWLY DIAGNOSED CANCER CASES - 2010

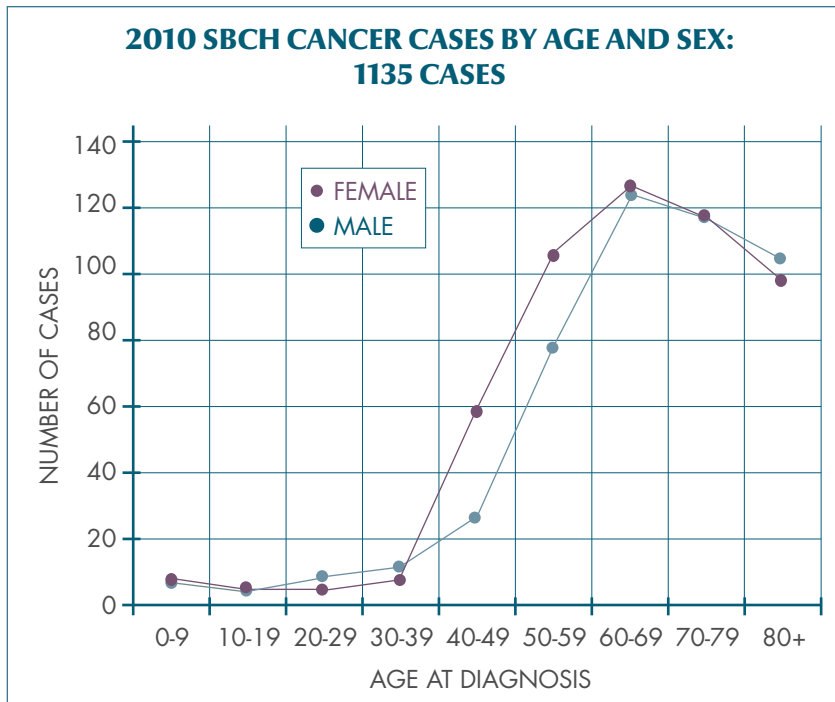
In 2010, Santa Barbara Cottage Hospital treated 1121 patients with cancer of which 1019 were newly diagnosed. Breast carcinoma was the most frequent primary site, followed by lung carcinoma. Of the newly diagnosed cases, 85 percent were from Santa Barbara County, 4.3 percent were from Ventura County, 3.6 percent were from San Luis Obispo County, and 2 percent were from Tulare County. The remaining cases were from various counties throughout California, Nevada and several other states.



NEWLY DIAGNOSED CANCER CASES BY AGE AND SEX



*This number pertains to sites or histologic types which do not have an AJCC staging scheme.



NEWLY DIAGNOSED CANCER CASES BY AGE AND SEX

In 2010, 53 percent of our cancer patients were women, 47 percent were men. Cancer diagnosis occurred most frequently in those between the ages of 60-69 for both men and women. More women than men developed cancer under the age of 50, reflecting the high number of younger women with breast cancer.

TOP FIVE PRIMARY FEMALE SITES

These tables demonstrate a comparison between the top five sites for females in 2010 at SBCH and the top five primary sites for females as estimated by the American Cancer Society for 2010.

**2010 ESTIMATED NEW CANCER CASES
AMERICAN CANCER SOCIETY**

| | |
|----------------|-----|
| BREAST | 28% |
| LUNG | 14% |
| COLON & RECTUM | 10% |
| UTERINE CORPUS | 6% |
| THYROID | 5% |

**2010 NEW CANCER CASES
SANTA BARBARA COTTAGE HOSPITAL**

| | |
|-----------------|-----|
| BREAST | 29% |
| LUNG & BRONCHUS | 9% |
| UTERINE CORPUS | 9% |
| COLON & RECTUM | 6% |
| OVARY | 6% |

TOP FIVE PRIMARY MALE SITES

The top five primary sites for males in 2010 at SBCH are similar to the top five primary sites as estimated by the American Cancer Society for 2010.

**2010 ESTIMATED NEW CANCER CASES
AMERICAN CANCER SOCIETY**

| | |
|------------------|-----|
| PROSTATE | 28% |
| LUNG & BRONCHUS | 11% |
| COLON & RECTUM | 10% |
| URINARY BLADDER | 7% |
| MELANOMA OF SKIN | 5% |

**2010 NEW CANCER CASES
SANTA BARBARA COTTAGE HOSPITAL**

| | |
|-----------------------|-----|
| PROSTATE | 16% |
| LUNG & BRONCHUS | 13% |
| URINARY BLADDER | 12% |
| COLON & RECTUM | 10% |
| KIDNEY & RENAL PELVIS | 6% |

| PRIMARY SITE | TOTAL CASES | CLASS | | SEX | | STAGE* | | | | | | |
|----------------------------------|-------------|-------------|--------------|------------|------------|-----------|------------|------------|------------|------------|-----------|----------|
| | | Analytic | Non-Analytic | M | F | 0 | I | II | III | IV | N/A | Unknown |
| ALL SITES | 1121 | 1019 | 102 | 533 | 588 | 65 | 327 | 202 | 147 | 171 | 99 | 8 |
| ORAL CAVITY | 24 | 20 | 4 | 12 | 12 | 0 | 8 | 3 | 3 | 6 | 0 | 0 |
| TONGUE | 10 | 8 | 2 | 6 | 4 | 0 | 4 | 0 | 1 | 3 | 0 | 0 |
| SALIVARY GLANDS, MAJOR | 5 | 5 | 0 | 4 | 1 | 0 | 1 | 1 | 1 | 2 | 0 | 0 |
| GUM, FLOOR OF MOUTH, OTHER | 6 | 5 | 1 | 1 | 5 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| TONSIL | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| HYPOPHARYNX | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DIGESTIVE SYSTEM | 191 | 181 | 10 | 110 | 81 | 2 | 40 | 48 | 33 | 52 | 4 | 2 |
| ESOPHAGUS | 7 | 6 | 1 | 4 | 3 | 0 | 2 | 1 | 1 | 2 | 0 | 0 |
| STOMACH | 20 | 18 | 2 | 15 | 5 | 0 | 5 | 7 | 2 | 4 | 0 | 0 |
| SMALL INTESTINE | 3 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 2 | 0 | 0 |
| COLON | 73 | 70 | 3 | 38 | 35 | 1 | 16 | 23 | 18 | 10 | 1 | 1 |
| RECTUM & RECTOSIGMOID | 22 | 22 | 0 | 15 | 7 | 0 | 4 | 6 | 5 | 7 | 0 | 0 |
| ANUS, ANAL CANAL, ANORECTUM | 5 | 5 | 0 | 1 | 4 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| LIVER | 16 | 15 | 1 | 9 | 7 | 0 | 6 | 2 | 2 | 5 | 0 | 0 |
| GALLBLADDER | 4 | 4 | 0 | 0 | 4 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| BILE DUCTS | 6 | 5 | 1 | 6 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 |
| PANCREAS | 31 | 29 | 2 | 20 | 11 | 1 | 2 | 7 | 2 | 16 | 0 | 1 |
| PERITONEUM, OMENT, MESENT, OTHER | 4 | 4 | 0 | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 2 | 0 |
| RESPIRATORY | 151 | 140 | 11 | 84 | 67 | 3 | 35 | 20 | 24 | 56 | 1 | 1 |
| NASAL CAVITY, SINUS, EAR | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| LARYNX | 7 | 7 | 0 | 7 | 0 | 3 | 2 | 1 | 1 | 0 | 0 | 0 |
| LUNG/BRONCHUS-SMALL CELL | 15 | 15 | 0 | 7 | 8 | 0 | 3 | 0 | 4 | 8 | 0 | 0 |
| LUNG/BRONCHUS-NON SM CELL | 125 | 114 | 11 | 67 | 58 | 0 | 30 | 19 | 19 | 45 | 0 | 1 |
| PLEURA | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| BLOOD & BONE MARROW | 54 | 40 | 14 | 35 | 19 | 0 | 0 | 0 | 0 | 1 | 39 | 0 |
| LEUKEMIA | 31 | 27 | 4 | 20 | 11 | 0 | 0 | 0 | 0 | 1 | 26 | 0 |
| MYELOMA | 12 | 8 | 4 | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 8 | 0 |
| OTHER HEMATOPOIETIC | 11 | 5 | 6 | 7 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| BONE | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| SOFT TISSUE | 12 | 10 | 2 | 7 | 5 | 0 | 1 | 0 | 6 | 3 | 0 | 0 |
| MELANOMA OF SKIN | 30 | 29 | 1 | 21 | 9 | 4 | 15 | 5 | 4 | 1 | 0 | 0 |
| OTHER SKIN CA | 6 | 5 | 1 | 3 | 3 | 0 | 1 | 0 | 0 | 1 | 3 | 0 |
| BREAST | 166 | 157 | 9 | 1 | 165 | 23 | 75 | 43 | 11 | 5 | 0 | 0 |
| FEMALE GENITAL | 122 | 104 | 18 | 0 | 122 | 4 | 59 | 9 | 21 | 8 | 1 | 2 |
| CERVIX UTERI | 14 | 13 | 1 | 0 | 14 | 0 | 9 | 0 | 1 | 3 | 0 | 0 |
| CORPUS UTERI/UTERUS, NOS | 51 | 49 | 2 | 0 | 51 | 2 | 38 | 1 | 6 | 1 | 1 | 0 |
| OVARY | 43 | 31 | 12 | 0 | 43 | 0 | 6 | 7 | 14 | 2 | 0 | 2 |
| VAGINA | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| VULVA | 13 | 10 | 3 | 0 | 13 | 2 | 6 | 1 | 0 | 1 | 0 | 0 |
| MALE GENITAL | 101 | 89 | 12 | 101 | 0 | 1 | 17 | 54 | 11 | 5 | 0 | 1 |
| PROSTATE | 87 | 76 | 11 | 87 | 0 | 0 | 6 | 53 | 11 | 5 | 0 | 1 |
| TESTIS | 13 | 12 | 1 | 13 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 0 |
| OTHER MALE GENITAL | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| URINARY | 119 | 109 | 10 | 95 | 24 | 28 | 38 | 9 | 15 | 17 | 2 | 0 |
| BLADDER | 72 | 66 | 6 | 63 | 9 | 27 | 23 | 6 | 4 | 6 | 0 | 0 |
| KIDNEY AND RENAL PELVIS | 43 | 41 | 2 | 30 | 13 | 0 | 15 | 3 | 11 | 10 | 2 | 0 |
| URETER | 4 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| BRAIN | 23 | 21 | 2 | 13 | 10 | 0 | 0 | 0 | 0 | 0 | 21 | 0 |
| OTHER NERVOUS SYSTEM | 15 | 14 | 1 | 3 | 12 | 0 | 0 | 0 | 0 | 0 | 14 | 0 |
| THYROID | 38 | 37 | 1 | 8 | 30 | 0 | 27 | 2 | 8 | 0 | 0 | 0 |
| OTHER ENDOCRINE | 5 | 5 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| LYMPHATIC SYSTEM | 51 | 48 | 3 | 31 | 20 | 0 | 11 | 8 | 11 | 16 | 0 | 2 |
| HODGKIN'S DISEASE | 6 | 6 | 0 | 2 | 4 | 0 | 1 | 1 | 3 | 1 | 0 | 0 |
| NON-HODGKIN'S LYMPHOMA | 45 | 42 | 3 | 29 | 16 | 0 | 10 | 7 | 8 | 15 | 0 | 2 |
| UNKNOWN OR ILL-DEFINED | 12 | 9 | 3 | 7 | 5 | 0 | 0 | 0 | 0 | 0 | 9 | 0 |

*Tabulations for Stage Distribution include analytic cases only.

SPECIAL REPORT

THYROID CANCER

MARK D. WILSON, MD

BACKGROUND AND CLASSIFICATION

Thyroid cancer consists of three major types; differentiated follicular thyroid cancer (DTC), medullary thyroid cancer and anaplastic thyroid cancer. DTC is by far the most common, comprising 90-95 percent of all primary thyroid malignancies. This group is further classified as papillary, follicular and Hurthle cell carcinoma. As such, most of this survey will be focused on DTC.

Medullary thyroid cancer is derived from the c-cells of the thyroid gland and is physiologically and histologically distinct from follicular cells of the thyroid. Finally, anaplastic thyroid cancer is thought to arise from DTC.

EPIDEMIOLOGY

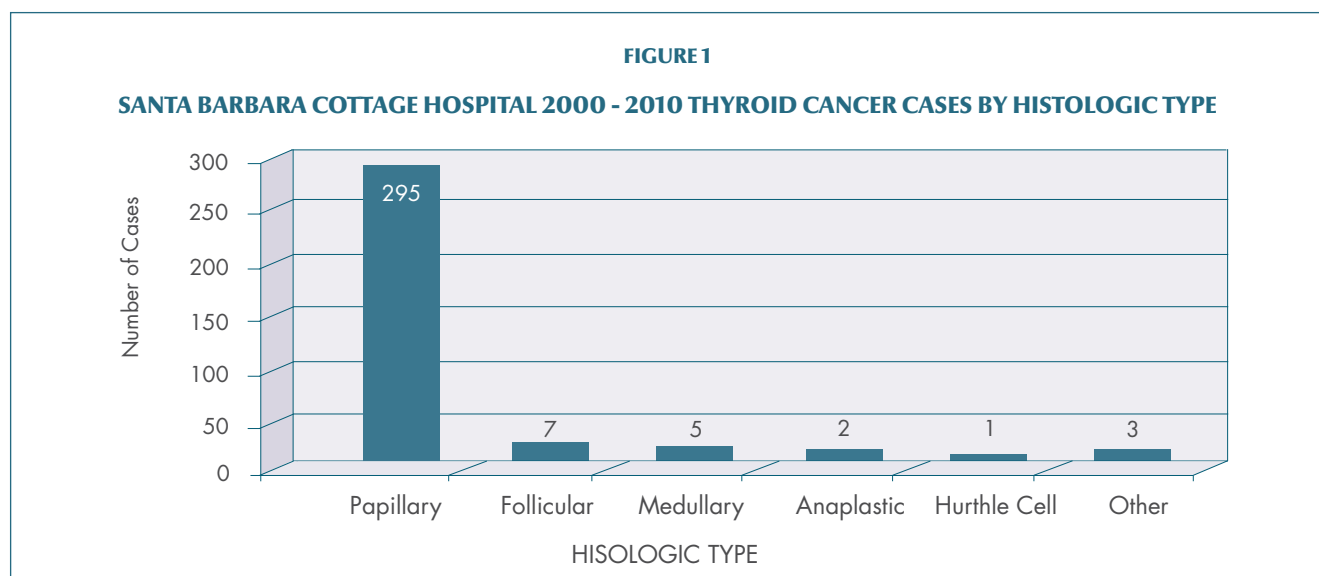
Thyroid cancer is relatively uncommon, comprising 2% of all cancer in the United States. That being said, it is by far the most common endocrine tumor. According to the Surveillance Epidemiology and End Results (SEER) database, 48,000 patients will be diagnosed with thyroid cancer in the United States in 2011, and 1,700 will die from this disease.

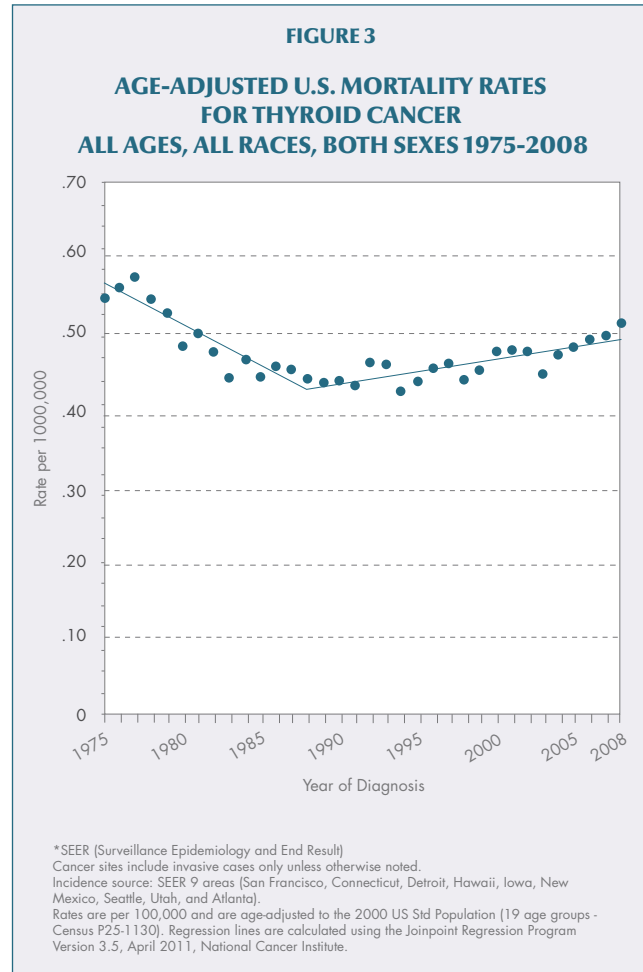
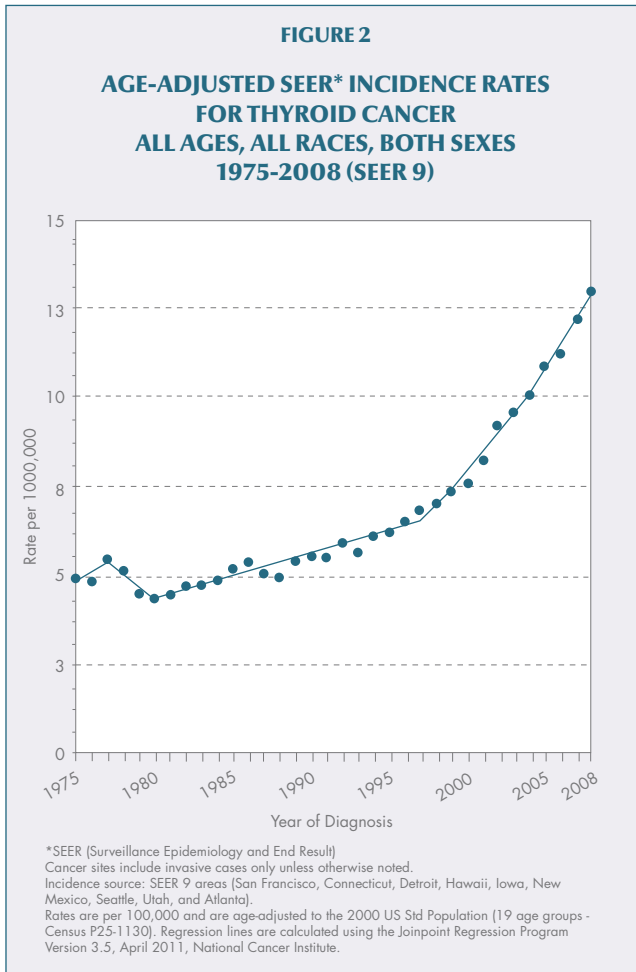
According to national cancer registry statistics, papillary thyroid cancer (which includes many subtypes such as the

follicular variant of papillary thyroid cancer) is by far the most common, accounting for 79% of all thyroid cancer. Fortunately, it also has the most favorable prognosis. Follicular thyroid cancer represents 13% of all thyroid cancers. Medullary thyroid cancer has frequency of 4%, while Hurthle cell and anaplastic each represent 2% of the overall total of primary thyroid malignancies.

Figure 1 demonstrates the relative frequency of the thyroid carcinoma subtypes at Santa Barbara Cottage Hospital over the past decade. During this time, papillary thyroid cancer was observed more commonly than the national average, whereas all other subtypes were seen less frequently than the national average.

Thyroid cancer has become more common in the past 35 years with an increased incidence of 230% (see Figure 2). Despite the increased detection of thyroid cancer, mortality rates are stable to slightly decreased over the past three decades (Figure 3). Interestingly, all of the increase in the incidence of thyroid cancer is of the papillary subtype. This observation is not limited to the United States, but observed in most of the world. The increased frequency of thyroid cancer is partially explained by increased detection of smaller, indolent cancers. However, larger and





aggressive tumors also account for part of the observed higher incidence.

DTC is three times more common in women than men. For women, the peak age at diagnosis is in the 4th and 5th decades, while frequency peaks in the 6th and 7th decades in men (Figure 4 demonstrates the combined sex distribution for local versus national statistics). Over the past five years, on average, 34 cases of thyroid cancer have been diagnosed at SBCH annually (Figure 5). In 2010, 78% of thyroid cancer at SBCH was identified in women. This is commensurate with national statistics.

There is no clear explanation for the increased incidence for papillary thyroid cancer observed over the past few decades. Contributing factors may include increased BMI, radiation exposure, iodine intake or polybromi-

nated diphenyl ethers (PBDEs).

Radiation exposure is the strongest risk factor for the development of thyroid carcinoma. An increased incidence of thyroid cancer in Eastern Europe after the Chernobyl disaster has been observed, and obvious concerns exist regarding the recent Japanese nuclear accident. Also, sex hormones are considered to be involved in the pathogenesis of this disease, as women are much more likely to develop both thyroid nodules and thyroid cancer, and the sex discrepancy in frequency of the disease is much more apparent during the reproductive years.

Thyroid dysfunction, either hyperthyroidism or hypothyroidism, is associated with an increased risk of thyroid cancer. DTC can be seen with cancer syndromes such as familial adenomatous polyposis or Cowden's disease.



FIGURE 4
THYROID CARCINOMA CASES BY AGE AT DIAGNOSIS
CASES DIAGNOSED 2000-2008 SBCH VS. NCDB DATA FROM 555 HOSPITALS IN ALL STATES

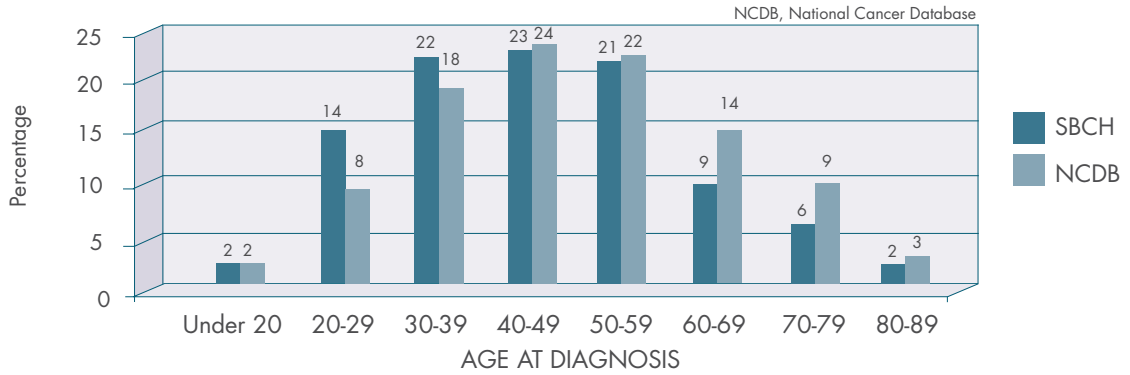
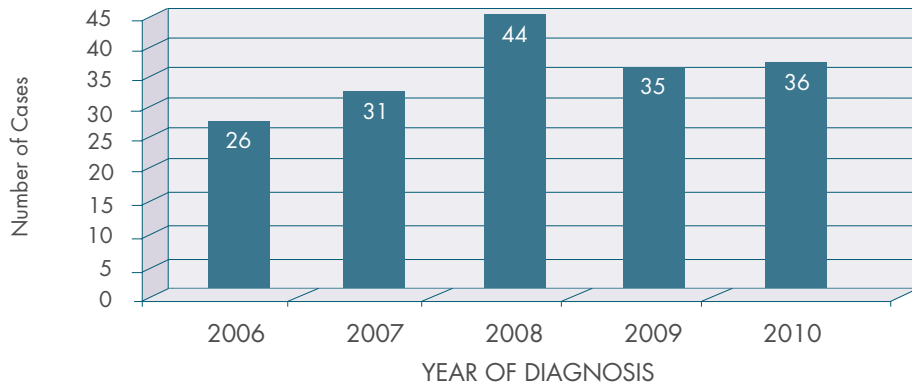


FIGURE 5
SANTA BARBARA COTTAGE HOSPITAL 2000 - 2010 THYROID CANCER CASES PER YEAR



However, 5% of all DTC is familial without a defined genetic cause.

DIAGNOSIS

Often, thyroid cancer is diagnosed when a thyroid mass is noted by the patient or physician. Equally common is the incidental recognition of a thyroid nodule during radiographic evaluation of the neck for another purpose by MRI, CT or duplex ultrasound of the carotid arteries. The standard evaluation for thyroid nodules is tissue sampling with fine needle biopsy. Thyroid nodules that produce thyroid hormone are rarely cancer, and are generally not biopsied. Less commonly, thyroid cancer is detected once

metastasis is recognized in the neck, bones, lung or brain.

Although thyroid nodule biopsy is an accurate and reliable means of diagnosing thyroid carcinoma, this procedure has limitations. Specifically, cytology specimens are classified as diagnostic, i.e. benign or malignant, or indeterminate. Up to 25% of thyroid biopsies are designated as indeterminate. This is because follicular carcinoma, the follicular variant of papillary thyroid carcinoma and Hurthle cell carcinoma are challenging, if not impossible, to diagnose on biopsy specimen alone and are therefore classified as indeterminate. Indeterminate nodules are usually removed due to an inability to properly classify whether they are malignant or benign based on biopsy findings

alone. Ultimately, 20% of these nodules are found to be malignant after they have been surgically excised.

THERAPY

Standard therapy for DTC is thyroidectomy, followed by radioactive iodine and thyroid hormone replacement. With more advanced disease, external radiation therapy may be used. Tyrosine kinase inhibitors are a promising therapy for progressive thyroid cancer. Conventional cytotoxic chemotherapy is not used commonly.

As only a small minority of patients with DTC die of the disease, it is important to take into account the risks and benefits of any potential therapy. This concept applies to all treatment modalities described above, and is the subject of vigorous study and debate.

Total thyroidectomy is standard therapy for DTC. Lobectomy (removal of approximately 50% of the gland) is rarely recommended because in 40% of cases, cancer is multifocal and often not recognized on radiographic studies. If, on physical exam or on pre-operative radiographic studies, neck lymphadenopathy is recognized, suspicious lymph nodes will be removed. If no concerning

lymph nodes are identified prior to surgery, it is currently recommended that lymph nodes of the central neck be removed at the time of surgery. This is critical for staging, prognosis and determination of whether patients should receive additional therapy.

Very small papillary thyroid carcinoma (micropapillary thyroid carcinoma defined as < 1 cm in maximum dimension) is generally considered cured with surgical excision alone. However it is recognized that a small percentage of micropapillary thyroid carcinoma can metastasize and require further therapy.

Radioactive iodine (RAI) is an elegant method of specifically directing ionizing radiation to thyroid tissue. Iodine is intracellularly incorporated in substantial amounts only by thyroid tissue, both normal and malignant. Ideally, this

| THYROID GLAND | |
|--|---|
| <i>Papillary, follicular and medullary carcinoma</i> | |
| T1 | <2 cm intrathyroidal |
| T2 | >2 to 4 cm intrathyroidal |
| T3 | >4 cm or minimal extension |
| T4a | Subcutaneous, larynx trachea, oesophagus, recurrent laryngeal nerve |
| T4b | Preverbral fascia, mediastinal vessels, carotid artery |
| <i>Anaplastic/undifferentiated carcinoma</i> | |
| T4a | Tumor limited to thyroid |
| T4b | Tumor beyond thyroid capsule |
| <i>All types</i> | |
| N1a | Level V1 |
| N1b | Other regional |

| PAPILLARY OR FOLLICULAR | | | |
|---|-------------|--------|----|
| <i>Under 45 years</i> | | | |
| Stage I | Any/T | Any/N | Mo |
| Stage II | Any/T | Any/N | M1 |
| <i>Papillary or Follicular 45 years and older and Medullary</i> | | | |
| Stage I | T1 | No | Mo |
| Stage II | T2 | No | Mo |
| Stage III | T3 | No | Mo |
| | T1. T2. T3. | N1a | Mo |
| Stage IVA | T1. T2. T3. | N1b | Mo |
| | T4a | No. N1 | Mo |
| Stage IVB | T4b | Any N | Mo |
| Stage IVC | Any T | Any N | M1 |
| <i>Anaplastic/Undifferentiated (all cases are Stage IV)</i> | | | |
| Stage IVA | T4a | Any N | Mo |
| Stage IVB | T4b | Any N | Mo |
| Stage IVC | Any T | Any N | M1 |

therapy destroys all normal thyroid tissue not removed at surgery, as well as any thyroid cancer present in lymph nodes or metastatic disease. This destruction enables the clinician to monitor the thyroid protein, thyroglobulin, to indicate recurrence or persistence of thyroid cancer. It is clear that in patients with large primary tumors or with metastasis outside the neck, RAI reduces recurrence rates, and has been found to reduce the risk of death.

Radioactive iodine is generally considered safe. Dose dependent side effects include salivary gland inflammation and impairment, secondary malignancies and reduction in blood cell production. These risks need to be considered when weighing the benefit of this therapy, especially when repeated doses are administered. The use of this therapy for less advanced disease is a topic of continued study and debate.

As the majority of patients with DTC are treated with total thyroidectomy, lifelong thyroid hormone replacement is required. Replacement of thyroid hormone at higher levels than would be normally produced by the gland has been shown to reduce the likelihood of recurrence in high risk patients.

External radiation therapy is reserved for cancer that is not resectable surgically either in the neck, or in metastatic disease in the bone or brain. This therapy is rarely curative,

but can improve survival in a substantial portion of patients.

Traditional, cytotoxic chemotherapy is rarely used to treat DTC due to lack of efficacy. However, in recent years, tyrosine kinase inhibitors have proven to be quite effective for some patients with advanced disease.

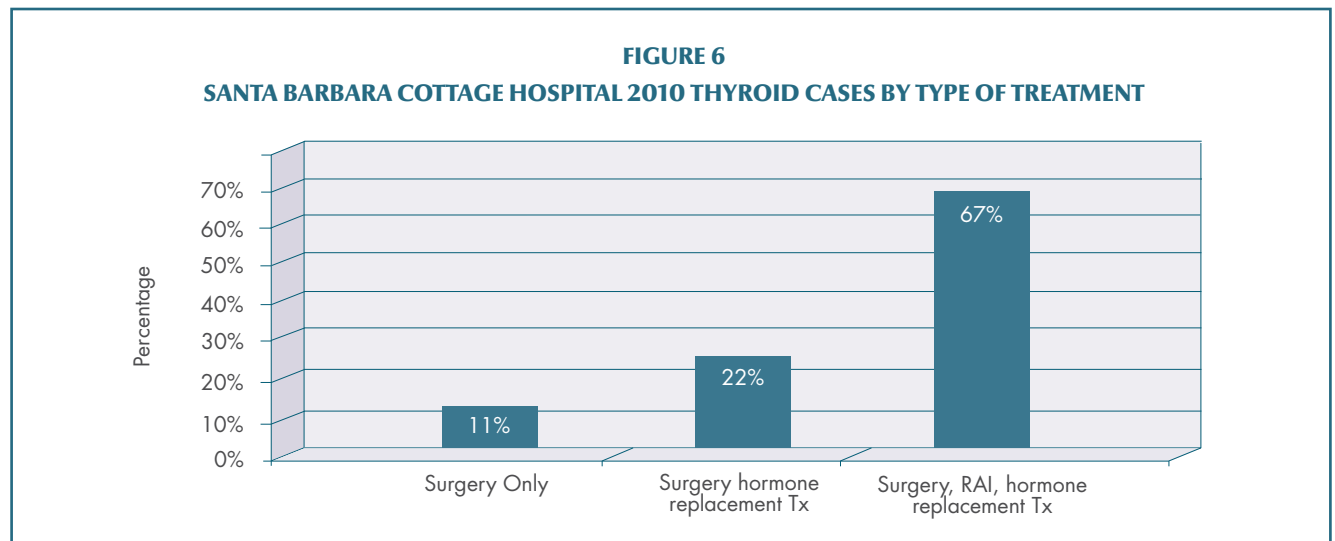
Data on the treatment of the patients treated at Santa Barbara Cottage Hospital in 2010 is presented in Figure 6. All patients received surgery to treat their disease. Two thirds were treated with radioactive iodine and 89% were treated with thyroid hormone replacement following surgery and/or radioactive iodine therapy.

MEDULLARY

Surgical therapy is the mainstay for treating medullary thyroid carcinoma. As c-cells of the thyroid do not concentrate iodine, radioactive iodine is not useful. Similar to DTC, tyrosine kinase inhibitors have shown promise in treating this more aggressive type of thyroid cancer.

ANAPLASTIC

The vast majority of anaplastic thyroid cancer is advanced and metastatic when diagnosed. It has a dismal prognosis. There are no effective therapies. Treatment is palliative.



STAGING

There are numerous staging systems for DTC. The most clinically useful are MACIS and TNM. The MACIS (metastasis, age, invasion into surrounding tissue, completeness of surgical resection and the size of the tumor) is favored by most endocrinologists, as it is more helpful in predicting prognosis, and thus helping tailor therapy. TNM classification takes into account the size of the primary tumor and whether it has invaded local tissue. describes the extent of spread to regional lymph nodes. describes the presence of distant metastasis.

TNM classification for thyroid carcinoma is presented in tabular form on page 15.

PROGNOSIS

Prognosis for DTC is largely dependent on patient age, histologic subtype, the presence of vascular invasion, the presence of metastasis outside the neck and the response of the tumor to radioactive iodine therapy. Approximately 10-15% of patients with DTC present with, or will develop, metastasis outside the neck. The most common

site of metastasis for DTC is the lungs followed by bone and the mediastinum. Less common sites include brain, adrenal glands, skin and liver. Metastasis to the lymph nodes of the neck and lungs are frequently quite treatable with radioactive iodine and/or surgery. Metastatic disease elsewhere is less responsive to therapy, and has an associated reduction in life expectancy.

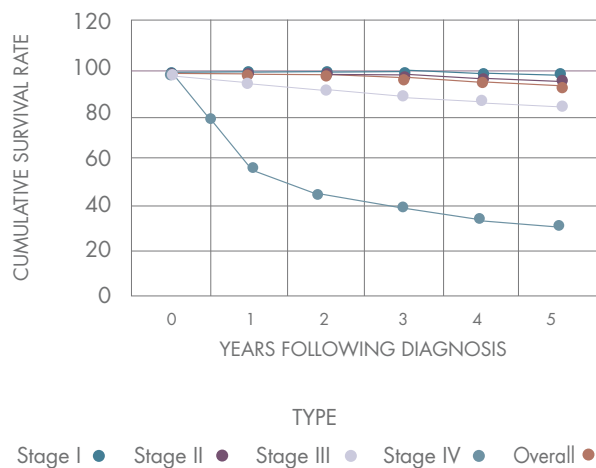
Less than 10% of patients diagnosed with DTC die of this disease. Men with thyroid cancer have an increased risk for death relative to women. However, since many more women are diagnosed with thyroid cancer, more women die of this disease.

Data is presented for survival based on TNM classification at Santa Barbara Cottage Hospital, as well as nationally (Figure 7) Survival for stage 1 disease is quite good with > 80% survival at 5 years. Conversely, 5-year survival for Stage IV disease is substantially worse with national statistics, demonstrating approximately 70% mortality.

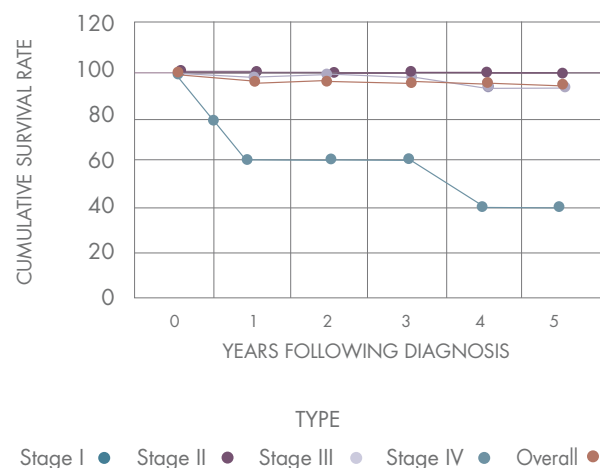
Fortunately, Stage IV disease is uncommon. No cases were observed at SBCH in 2010. Eight patients have had Stage

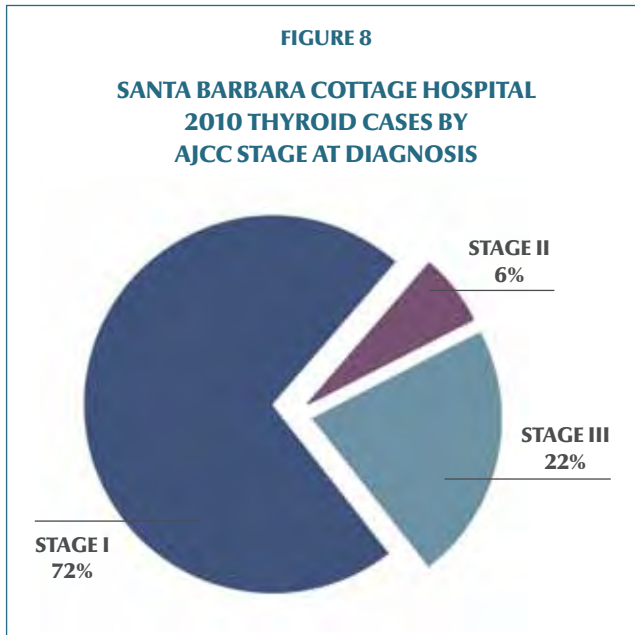
FIGURE 7

FIVE-YEAR OBSERVED SURVIVAL RATES FOR THYROID CARCINOMA CASES DIAGNOSED IN 1998 - 2002 NCDB DATA FROM 1368 PROGRAMS (NATIONAL)



FIVE-YEAR OBSERVED SURVIVAL RATES FOR THYROID CARCINOMA, SANTA BARBARA COTTAGE HOSPITAL CASES DIAGNOSED IN 1998 - 2002





IV disease at SBCH in the past nine years. See figures 8 and 9. This is comparable to national statistics.

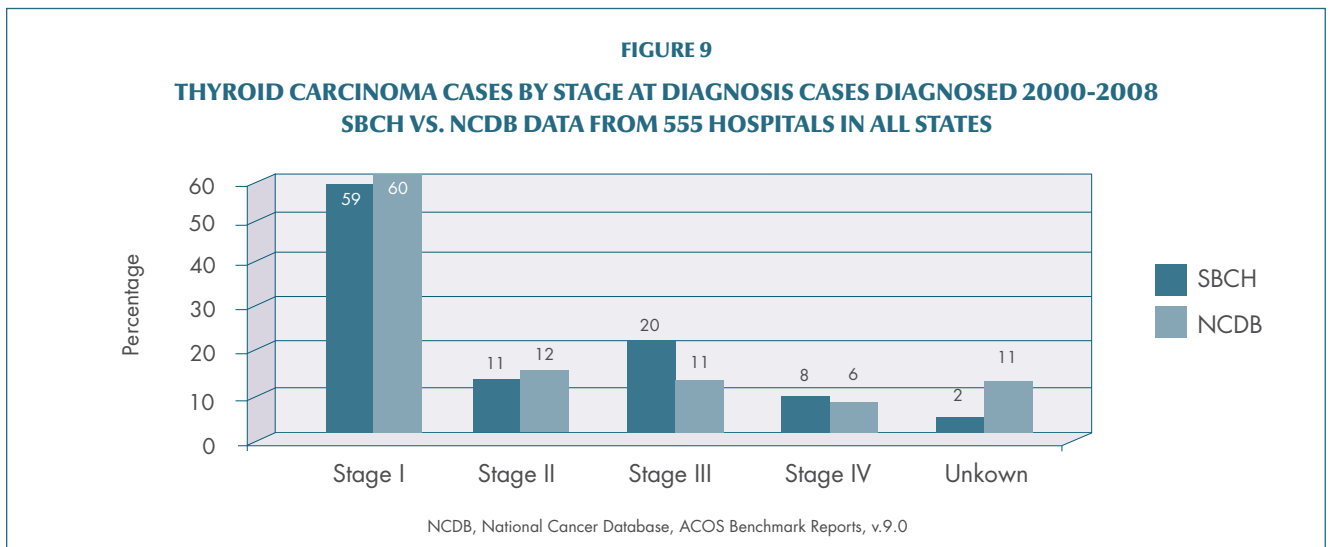
DEVELOPMENTS IN THE FIELD

There are many exciting areas of research in the field of thyroid carcinoma. Much interest has been focused on methods to distinguish benign from malignant nodules on biopsy cytology. As previously discussed, 10-20% of biopsies of thyroid nodules are indeterminant, resulting in surgery for benign lesions. There are many techniques currently being developed to more definitively classify

indeterminant biopsies, and to reduce the need for unnecessary thyroid surgery. The most promising, and closest to clinical application, is analysis of cytology for BRAF point mutations and RET proto-oncogene rearrangements. Molecular profiling, which employs gene arrays for the simultaneous analysis of many genes, is also encouraging. A therapeutic breakthrough for some patients is Sunitinib, a tyrosine kinase inhibitor. Although not FDA approved for the treatment of differentiated and medullary thyroid cancer, it is commonly used for this indication. Trials are currently under way to assess its efficacy.

SUMMARY

Papillary thyroid carcinoma is by far the most common form of thyroid cancer. Its incidence has increased dramatically over the past three decades. Thyroid cancer typically has an indolent course that is often asymptomatic for many years. When identified and treated at an early stage, it is frequently cured. Distant metastasis or tumor that invades soft tissue of the neck portends a worse prognosis. Surgery, radioactive iodine and thyroid hormone replacement are the principal therapies. More advanced disease is treated with external radiation therapy or tyrosine kinase inhibitors. Subtypes other than papillary thyroid cancer have a worse prognosis and are generally less responsive to therapy.



GLOSSARY OF TERMS

SURVIVAL ANALYSIS

Actuarial Survival Method provides a mean for the use of all follow-up information accumulated until the close of the study and provides additional information on the survival pattern of the group under study.

CLASS OF CASE

Analytic

Cases that are first diagnosed and/or receive all or part of their first course of treatment at Santa Barbara Cottage Hospital. These cases are included in all statistical reports.

Non-Analytic

Cases that have been diagnosed and have received their entire first course of treatment elsewhere and are first seen at Santa Barbara Cottage Hospital for recurrent, persistent or metastatic disease, or were first diagnosed at autopsy. These cases are not generally included in statistical reports.

First Course of Treatment

The initial cancer-directed treatments or series of treatments planned and usually initiated within the first four months following diagnosis.

AMERICAN JOINT COMMITTEE ON CANCER TNM STAGING SUMMARY

(varies with primary site)

- Stage 0** Carcinoma in situ; a tumor that fulfills all the microscopic criteria for malignancy except invasion.
- Stage I** Localized disease with no evidence of lymph node or distant spread.
- Stage II** Generally, direct extension of disease without lymph node extension.
- Stage III** Generally, lymph node extension but may have direct extension also.
- Stage IV** Generally, any tumor with distant metastasis.
- Unknown** Tumors that cannot be staged due to lack of diagnostic documentation.

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