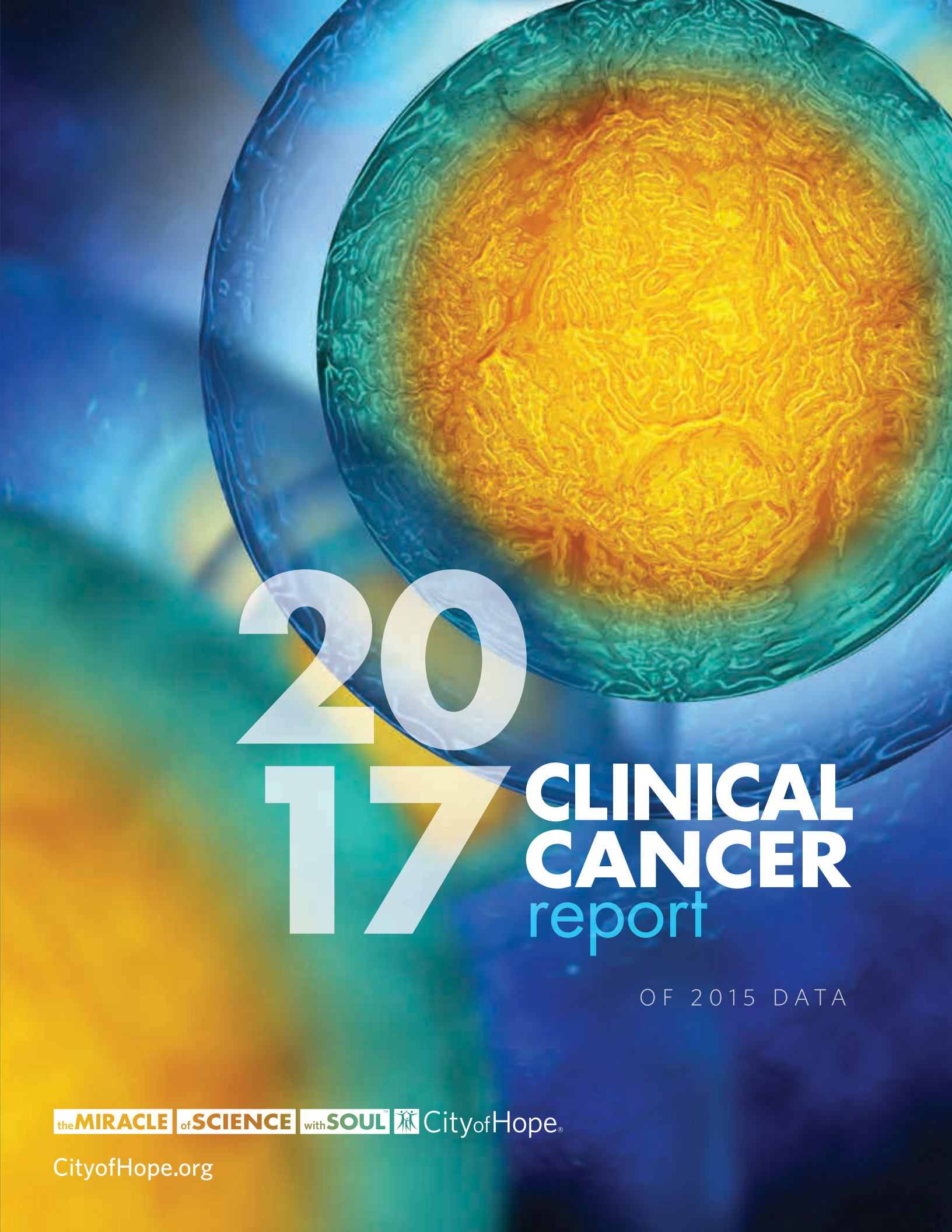

2017 CLINICAL CANCER report

OF 2015 DATA

the MIRACLE of SCIENCE with SOUL™ City of Hope®

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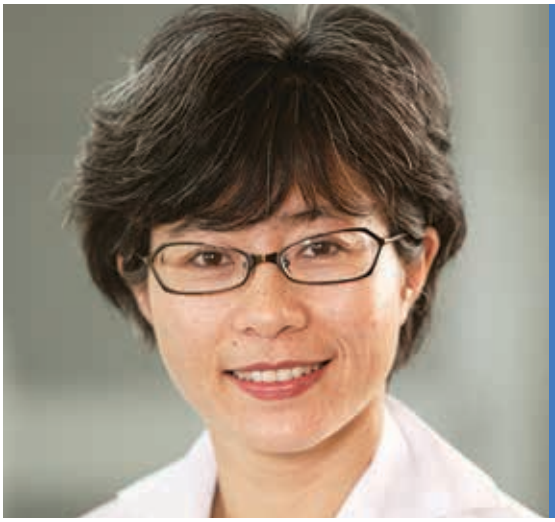
**This report reviews data gathered in 2015.*

THE CITY OF HOPE MISSION

City of Hope is transforming the future of health.

Every day we turn science into practical benefit.

We turn hope into reality. We accomplish this through exquisite care, innovative research and vital education focused on eliminating cancer and diabetes.



THE YEAR IN REVIEW

UPDATE FROM
LILY L. LAI, M.D.

Associate Clinical Professor, Division of Surgical Oncology
Chair, Clinical Cancer Committee

City of Hope is transforming the future of medicine through exquisite, compassionate care and innovative, patient-oriented research. These efforts are acknowledged in our designation as one of only 47 National Cancer Institute-designated comprehensive cancer centers nationwide and as a founding member of the National Comprehensive Cancer Network. In addition, for 12 consecutive years, City of Hope has been acknowledged by *U.S. News & World Report* as one of "America's Best Hospitals" in cancer.

Our park-like campus is situated on more than 110 acres in the San Gabriel Valley, just 20 miles from downtown Los Angeles. Prominent on the campus is our state-of-the-art clinical research hospital with 217 licensed cancer beds and 72-bed hematopoietic stem cell transplant unit. In addition, our operating rooms are technologically advanced and equipped with the latest minimally invasive instrumentation and robots to improve on surgical treatment for our cancer patients. The newly renovated radiation oncology suite combines the most advanced imaging modalities including multiparametric magnetic resonance imaging and 3-D computed tomography imaging with next generation therapy technologies enabling physicians to target cancers with greater precision and effectiveness.

Beyond the Duarte campus, other community sites have been added. These sites in Glendora, Pomona, Rancho Cucamonga, West Covina and Corona are the most recent additions of City of Hope's growing list of community practices, all of which extend the services and care to patients in their own communities. Our commitment to bringing the highest level of cancer care to surrounding communities can be seen in our state-of-the-art clinic in Antelope Valley, as well as our clinics in South Pasadena, Pasadena, Arcadia, Colton, Mission Hills, Santa Clarita and Palm Springs.

City of Hope has always recognized that innovative research leads to improved patient care, that patient oriented scientific discoveries lead to new treatments and that biological understanding of human disease leads to cures. To that end, Beckman Research Institute of City of Hope is housed on the same campus as the hospital. The collaborations between the clinicians and the scientists have led to remarkable discoveries in the past and continue to fuel the discoveries of new treatments currently. As an independent medical and research institution, we can break through the barriers that traditionally stand between scientists and physicians, accelerating the application of laboratory findings to more effective treatments.

In recognition of the imperative to advance medical care from the bench to bedside, Steven Rosen, M.D., was named provost and chief scientific officer. Under his direction, disease specific programs are now bringing together physicians, clinician scientists and basic scientists with a shared passion and expertise. The integrated approach ensures each patient is offered the full range of therapeutic possibilities in the management of his or her disease, which often includes participation in leading-edge clinical trials. Each year, City of Hope conducts 400 clinical trials, enrolling more than 6,000 patients.

Our focus on the discovery of new treatments has not detracted from our singular objective – to provide excellent and compassionate care to our patients. And patients acknowledge our achievement in clinical care. For the seventh year in a row, City of Hope has received national recognition for its top-quality patient care from Press Ganey, an independent arbiter of patient satisfaction. Both awards received by City of Hope – the Press Ganey Guardian of Excellence Award and the Pinnacle of Excellence Award – are based on patient feedback surveys.

Taken together, from the beauty of the main campus to the state-of-the art community cancer practice sites, the latest in technological innovations used in patient care, the comfort of personal human interactions, the molecular-based discoveries, and the novel treatments provided to patients with cancer or diabetes, City of Hope is at the forefront of compassionate medical care.

UPDATE FROM

ELLIE G. MAGHAMI, M.D.

The Norman and Sadie Lee Professor in Head and Neck Cancer
Cancer Liaison Physician
Chief, Head and Neck Surgery

It has been my honor and privilege to serve as cancer liasion physician since 2013. As I serve my last year in this role, I want to thank Lily Lai, M.D., chair of the City of Hope Clinical Cancer Committee for the opportunity to serve in this capacity. It has been wonderful working shoulder to shoulder with other committee members and cancer center leadership in collective reflection, problem solving and promotion of the highest standards of care. I will be succeeded by Loretta Erhunmwunsee, M.D., assistant professor of thoracic surgery. I am confident that she will make her mark in this role and will enjoy the experience as I did.

This past year best exemplified the City of Hope doctrine, "The Miracle of Science with Soul" and included the following:

- The Judy and Bernard Briskin Family Foundation endowed the new Judy and Bernard Briskin Center for Multiple Myeloma Research at City of Hope, the third named center within City of Hope's new Hematologic Malignancies and Stem Cell Transplantation Institute.

- Guido Marcucci, M.D., joined City of Hope in a key leadership role within the institution's new Hematologic Malignancies and Stem Cell Transplantation Institute. As director of the Gehr Family Center for Leukemia Research and as chief of the Division of Hematopoietic Stem Cell and Leukemia Research, Dr. Marcucci will guide research into improved treatments for leukemia and other hematologic malignancies.

- Internationally acclaimed lymphoma expert and physician Larry W. Kwak, M.D., Ph.D., joined City of Hope in a key leadership role within the institution's new Hematologic Malignancies and Stem Cell Transplantation Institute. Named one of *Time Magazine's* "100 Most Influential People" in 2010, Dr. Kwak is the director for translational research and developmental therapeutics, the director of the Toni Stephenson Lymphoma Center and the Dr. Michael Friedman Professor in Translational Medicine.

- Gene therapy pioneer John A. Zaia, M.D., was named director of the Center for Gene Therapy within City of Hope's new Hematologic Malignancies and Stem Cell Transplantation Institute. Dr. Zaia, the Aaron D. Miller and Edith Miller Chair in Gene Therapy and past chair of the Department of Virology, is also the principal investigator of the new City of Hope Alpha Clinic. The clinic is dedicated to identifying new stem cell cures for currently incurable diseases and helping those cures become a standard option for patients in need.

- City of Hope physician David Snyder, M.D., associate chair and professor in City of Hope's Department of Hematology & Hematopoietic Cell Transplantation, and his co-authors described a new drug, imetelstat, which is a telemerase inhibitor effective in improving and even correcting platelet counts in patients with essential thrombocythemia. In this disease, excessive platelet counts lead to abnormal clotting and bleeding. Findings were published in the *New England Journal of Medicine*.

- City of Hope and Fortress Biotech reached an agreement to form a new subsidiary company, DiaVax Biosciences, developing two novel vaccines against CMV (cytomegalovirus) infection, a life-threatening illness in people with weakened or underdeveloped immune systems, including cancer patients and developing fetuses.

- Don J. Diamond, Ph.D., chair of the Department of Experimental Therapeutics at City of Hope, and his team engineered a salmonella bacterium that targets a cancer cell molecule known as IDO, which camouflages cancer cells and prevents the immune system from recognizing and killing the tumor. Further work in collaboration with Vincent Chung, M.D., investigated anti-p53 vaccine therapies in combination with pembrolizumab immune therapy against recurrent solid tumors. The p53 vaccine boosts the immune system against cancer cells carrying p53 mutant protein. Pembrolizumab releases the body's immune system checkpoints to recognize and attack the cancer cells.

- A brain tumor patient was the first to be treated by the City of Hope Alpha Clinic. The trial uses patient's own modified T cells to fight the disease. The same approach is being investigated in advanced prostate cancer. Additionally, Saul Priceman, Ph.D., assistant research professor at City of Hope was awarded the Prostate Cancer Foundation Gift for his groundbreaking work applying CAR-T cell mediated immune therapy to this disease. CAR-T technology is currently under investigation for other solid tumors such as breast and head and neck cancers.

- Renowned research scientist Debbie C. Thurmond, Ph.D., the Ruth B. & Robert K. Lanman Chair in Gene Regulation and Drug Discovery Research, joined City of Hope as professor and founding chair of the Department of Molecular and Cellular Endocrinology within the new Diabetes & Metabolism Research Institute at City of Hope. Physicians in the newly launched institute, under the direction of Fouad Kandeel, M.D., Ph.D., performed islet cell transplantation to suitable candidates through a clinical trial that they believe will be the first step in a multipronged effort to permanently cure type 1 diabetes. In addition, the National Institutes of Health (NIH) awarded City of Hope a $2.2 million grant for study of epigenetics in diabetes patients. Researchers hope to ultimately identify a window of intervention for diabetes complications.

- I was honored by the receipt of a $1.5 million gift of an endowed professorship in head and neck cancer from The Norman and Sadie Lee Foundation. This gift will be used to advance research, education and clinical activities in support of head and neck cancer treatment. Established in 1978, The Norman and Sadie Lee Foundation supports organizations focused on medical research and services, culture, the arts and education.

- The NIH awarded City of Hope a five-year, $4.8 million grant to study the possible role of chemicals in the environment in the development of breast cancer during the menopausal transition in women.

- Steven T. Rosen, M.D., provost and chief scientific officer for City of Hope, received a Lifetime Achievement Award from the Israel Cancer Research Fund. The award recognizes Dr. Rosen's longstanding commitment to advancing science and medicine and providing extraordinary patient care.

- Dan Raz, M.D., M.A.S., co-director of the Lung Cancer and Thoracic Oncology Program at City of Hope, received The V Foundation Scholar Award for his work on Wnt signaling pathways in lung cancer. Dr. Raz runs the Baum Family Thoracic Oncology Laboratory, dedicated to developing new lung cancer treatments.

- City of Hope was honored by Press Ganey for excellence in inpatient care for the seventh year in a row. Both awards received by City of Hope – the Press Ganey Guardian of Excellence Award and the Pinnacle of Excellence Award – are based on patient feedback surveys.

In summary, we continue opening doors of discovery and innovation leading to novel therapies for our patients. Our mission remains strong: to serve our patients with the highest standards of care.

CLINICAL CANCER COMMITTEE

Lily Lai, M.D.
Surgical Oncology
Chair, Clinical Cancer Committee

Loretta Erhunmwunsee, M.D.
Thoracic Surgery
Cancer Liaison Physician

Steven Rosen, M.D.
Provost and Chief Scientific Officer

Warren Chow, M.D.
Medical Oncology & Therapeutics Research

P. Gerald Chu, M.D., Ph.D.
Anatomic Pathology

Dean Lim, M.D.
Medical Oncology & Therapeutics Research

Jeffrey Wong, M.D.
Radiation Oncology

Clarke Anderson, M.D.
Pediatric Hematology/Oncology

Arnold Rotter, M.D.
Diagnostic Radiology

Ricardo Spielberger, M.D.
Hematology & Hematopoietic Cell Transplantation

Kimlin Tam Ashing, Ph.D., C.C.R.A.
Center of Community Alliance for Research & Education

Kelli Olsen, M.S., C.T.R.
Cancer Registry

Nellie Garcia, M.S.W., L.C.S.W.
Social Services

Denise Economou, R.N.
Nursing Research and Education

Jennifer Hayter, M.A., O.T.R.L.
Rehabilitation Services

Pamela Giesie, M.S.N.
Chief Nursing Executive

Ashley Millhouse
Guest/American Cancer Society

Mary Mendelsohn, R.N., M.S.N., C.I.C.
Quality Risk and Resource Management

Annette Mercurio, M.P.H., M.C.H.E.S.
Patient Education

Adina Londrc
Information Sciences

Crystal Saavedra
Continuing Medical Education

Sinziana Dumitra, M.D.
Surgical Oncology Fellow

Jeffrey Weitzel, M.D.
Clinical Cancer Genetics

KELLI OLSEN, M.S., C.T.R.

Director, Cancer Registry
Cancer Registry

CLINICAL CANCER PROGRAM

CLINICAL CANCER COMMITTEE

The Clinical Cancer Committee is comprised of representatives from each of the medical departments caring for cancer patients, as well as all of the allied health departments involved in supportive care of cancer patients. The committee is responsible for overseeing the Cancer Registry and the Multidisciplinary Cancer Conference. It also is responsible for advising the Executive Committee and the cancer center of problems and priorities relating to standard, as well as investigational approaches to patient care. The committee also oversees all activities related to maintaining the Commission on Cancer Accreditation.

MULTIDISCIPLINARY AND SITE SPECIFIC CANCER CONFERENCES

Multidisciplinary and site specific cancer conferences are held for the purpose of reviewing difficult management problems in adult patients with neoplasm. This year, many of these conferences were held on a weekly basis, with others meeting approximately twice per month. Over 1,000 cases are presented annually.

The following multidisciplinary cancer conferences are held at City of Hope:

- Colorectal
- Genitourinary
- Musculoskeletal
- Pediatric
- Breast
- Gynecological
- Endocrine
- Sarcoma
- Gastrointestinal
- Chest
- Head and Neck
- Leukemia

CANCER PROTOCOL REVIEW AND MONITORING COMMITTEE

All cancer-related protocols at City of Hope are reviewed by the Cancer Protocol Review and Monitoring Committee, also known as CPRMC. Subject enrollment cannot begin until both the CPRMC and institutional review board (IRB) approvals have been obtained. The committee membership, comprised of voting members

holding an M.D., Ph.D., Pharm.D. or other advanced degree who have the necessary level of expertise within their respective scientific and biostatistical research areas, conduct a critical and fair review of all cancer research protocols. The CPRMC's responsibilities are to determine whether a protocol is scientifically sound and appropriately designed, evaluate whether the protocol accrual goals are feasible, monitor all cancer protocols for sufficient accrual and scientific progress, and to review and approve amendments to active protocols.

DATA AND SAFETY MONITORING COMMITTEE

City of Hope has implemented the establishment of a Data and Safety Monitoring Committee (DSMC) for appropriate oversight, monitoring and assurance of the safety of participants and the validity and integrity of the data for all clinical trials. The committee is comprised of voting members holding an M.D., Ph.D., Pharm.D. or other advanced degree, who have the necessary level of expertise.

Monitoring by the DSMC is commensurate with the risks involved in each study. The DSMC functions and oversight of such activities are distinct from the requirement for study review and approval by the IRB. All internal clinical investigations at City of Hope are required to develop a Data and Safety Monitoring Plan that is incorporated into the written protocol according to the risk levels of each study.

The DSMC ensures that each clinical investigation is evaluated for adverse events and reporting, protocol noncompliance and deviations, and data integrity, and may make decisions of protocol modification, continuation and suspension.

CLINICAL TRIALS AUDITING

The Clinical Trials Auditing team is responsible for conducting audits of clinical treatment protocols which are not routinely audited by outside sponsors. They also perform audits of studies, regardless of sponsor, when requested by the IRB, DSMC, a compliance officer or other administrators. The audit includes a review of eligibility, informed consent, required tests and measurements, treatment and data accuracy. Audit results and protocol deviations are presented to the DSMC for discussion. The primary goal of the auditing plan is to ensure physician and protocol management team compliance to protocol procedures.

CLINICAL TRIALS

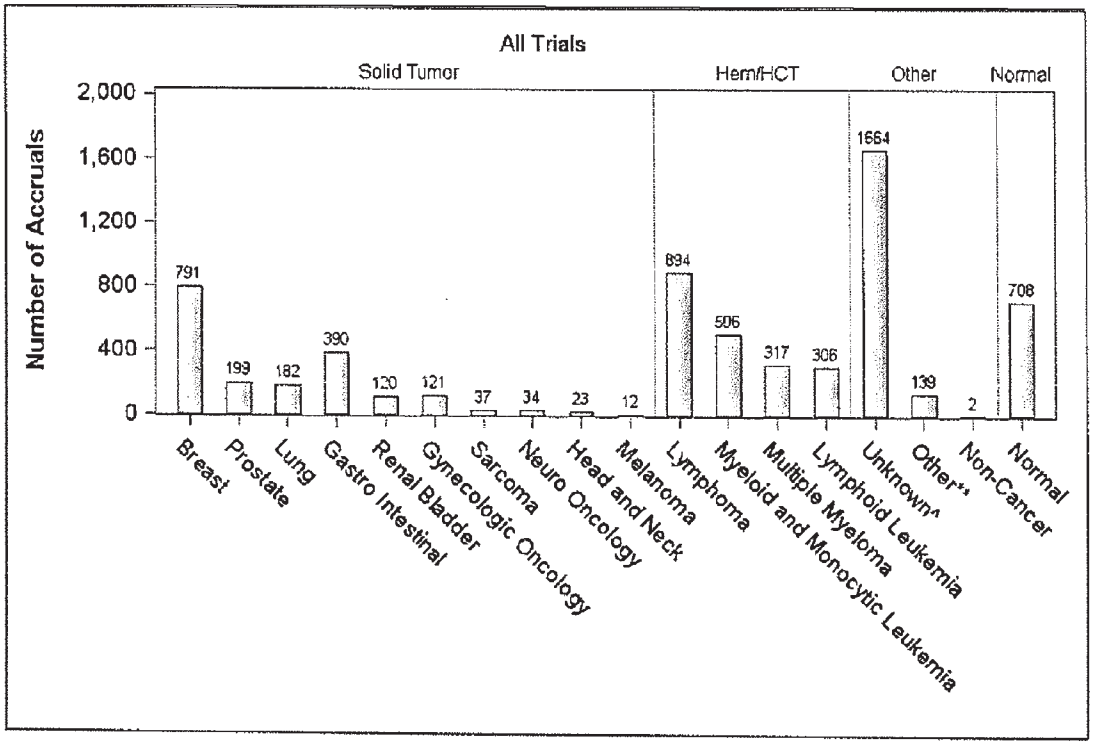
City of Hope has a robust clinical trials program. Numerous trials are offered not only at the main campus, but also through the clinic sites throughout Southern California. Part of the Commission on Cancer Accreditation Standards includes a requirement that the institution ensures that a certain percentage of its patients participate in clinical trials. City of Hope, as a National Cancer Institute-designated comprehensive cancer center, is required to ensure that 20 percent of the analytic caseload is enrolled in a trial. To receive commendation, we must ensure that 30 percent of our analytic caseload is enrolled in a trial. This year, our analytic caseload was 2,796 cases and there were 6,445 patients on trials (this includes single patients on multiple trials). Obviously, City of Hope is well above the standard required by the Commission on Cancer, showing that clinical trials are an important component of care at City of Hope.

CANCER REGISTRY

The Cancer Registry is an integral part of City of Hope's cancer program and a basic requirement for approval by the Commission on Cancer of the American College of Surgeons. City of Hope has participated in the Commission on Cancer approval of cancer programs since 1953. In March 2014, the cancer program was awarded a three-year certificate of approval with commendation. City of Hope will be surveyed again for this accreditation in February 2017.

Data Table 4 Accruals* by Diagnosis — 2015

Cancer Type	Disease Group	Trial Type: Treatment Trials	Trial Type: Non-Treatment Interventions	Trial Type: Non-Interventional Trials	Disease Group Totals
Solid Tumor	Breast	78	109	604	791
	Prostate	50	125	24	199
	Lung	67	57	58	182
	Gastro Intestinal	41	63	286	390
	Renal Bladder	62	36	22	120
	Gynecologic Oncology	35	29	57	121
	Sarcoma	10	7	20	37
	Neuro Oncology	29	.	5	34
	Head and Neck	7	4	12	23
	Melanoma	1	2	9	12
Hem/HCT	Lymphoma	139	9	746	894
	Myeloid and Monocytic Leukemia	88	20	398	506
	Multiple Myeloma	38	.	279	317
	Lymphoid Leukemia	48	32	226	306
Other	Unknown ^	13	29	1,622	1,664
	Other**	12	5	122	139
	Non-Cancer	.	.	2	2
Normal	Normal	58	120	530	708
Trial Type Totals		776	647	5,022	6,445



*Includes COH Duarte Accruals Only
**Other includes: Other Endocrine Systems, Other Hematopoietic, Unknown Sites & Ill Defined Sites
^Diagnosis is only required to be entered into MIDAS for Treatment Trials
Developed by Department of Information Sciences

An approved cancer program benefits patients, professional staff and hospital staff, as well as the community it serves. The Cancer Registry assures that all components for an approved cancer program are maintained. The program is designed to describe trends in patient and disease characteristics, modalities of therapy and patient survival. The major objective of the Cancer Registry is to make basic knowledge about the cancer experience at City of Hope available to members of the medical staff in order to evaluate the results of patient care.

Total computerization of the data collected allows the registry to provide information for reports and studies in a more accurate and timely manner. Information is also provided to the regional and state registries and is used for preparing epidemiology studies to determine causes of cancer, identifying groups of patients that might be underserved by the medical community, and trying to ensure that all persons with cancer have the best possible chance of survival.

Follow-up is conducted annually on all patients, from completion of treatment to death, to determine their cancer status, quality of life and length of survival, subsequent treatment and complete death information. Through annual follow-up of registered patients, the Cancer Registry has the capacity to remind each patient of the need for periodic checkups, if this service is requested by members of the medical staff.

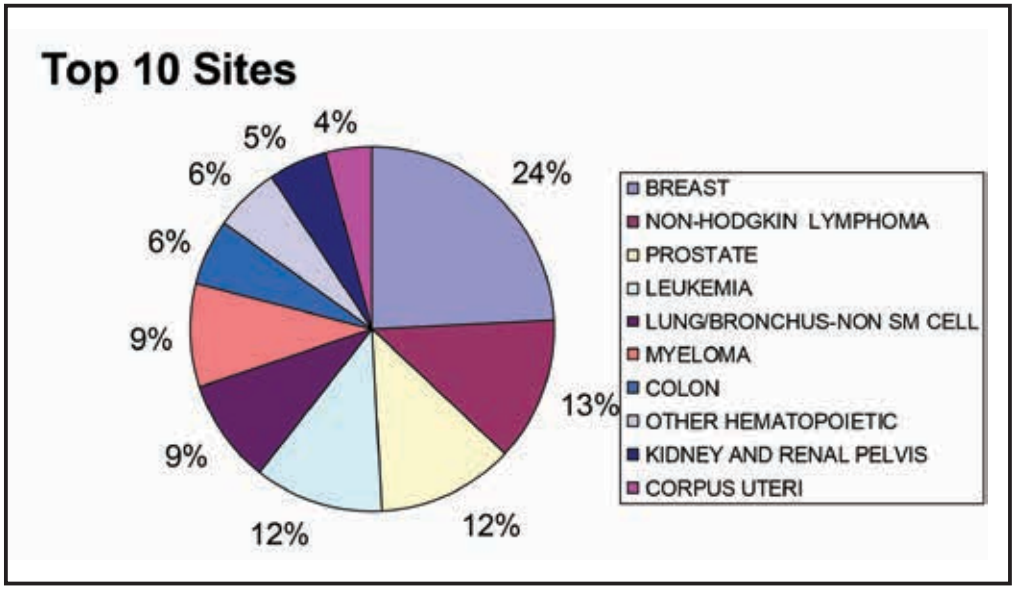
The registry also answers requests for thousands of individual cancer patients from outside hospitals.

A total of 3,828 cases were accessioned into the registry for 2015, and of those cases, 73.1 percent were analytic cases. Analytic cases are patients who were:

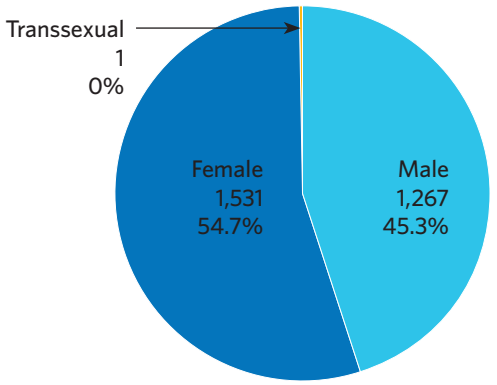
- diagnosed at City of Hope and went elsewhere for treatment
- diagnosed and treated at City of Hope
- diagnosed elsewhere and received all or part of the first course of treatment at City of Hope

Of the remaining cases, 26.9 percent were nonanalytic cases. Nonanalytic cases are those cases that are diagnosed and received all of their first course of treatment elsewhere prior to being seen at City of Hope. The No. 1 site seen at City of Hope is breast. However, as you can see from the pie chart, City of Hope is well known for its hematopoietic cancer program, with 13 percent of our caseload belonging to patients with non-Hodgkin lymphoma. The chart shows a breakdown of our top 10 sites.

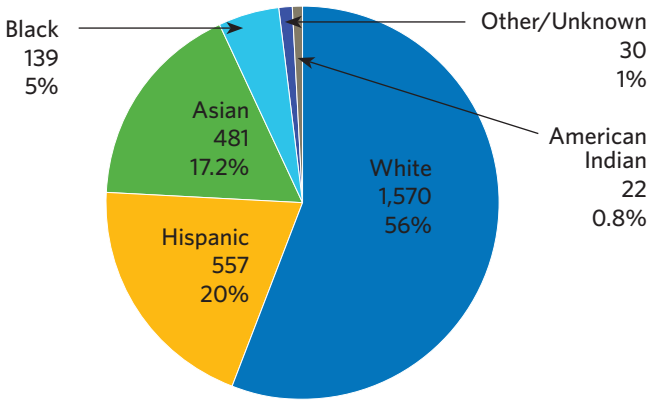
Only 80.7 percent of the analytic cases were qualified to use American Joint Committee on Cancer staging when determining the stage of disease of patients treated at City of Hope. Of those cases, 4.7 percent were Stage 0, 23.6 percent were Stage 1, 18.2 percent were Stage 2, 13.6 percent were Stage 3, 18.9 percent were Stage 4 and 1.7 percent were unknown.



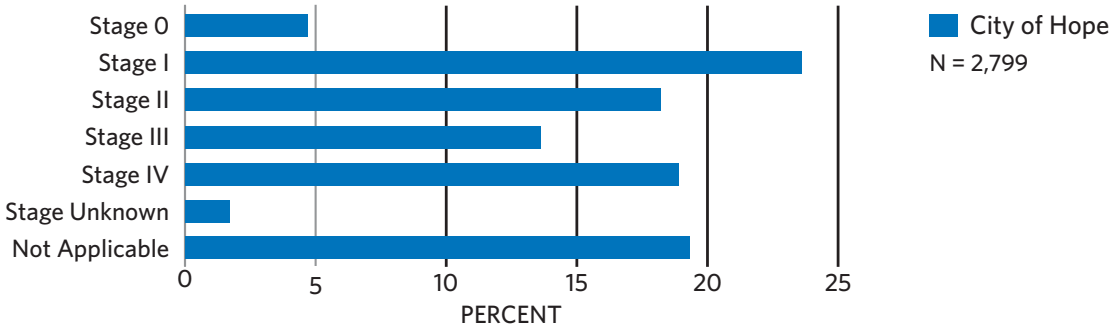
Diagnosis of *Analytic* Cases by Sex — 2015



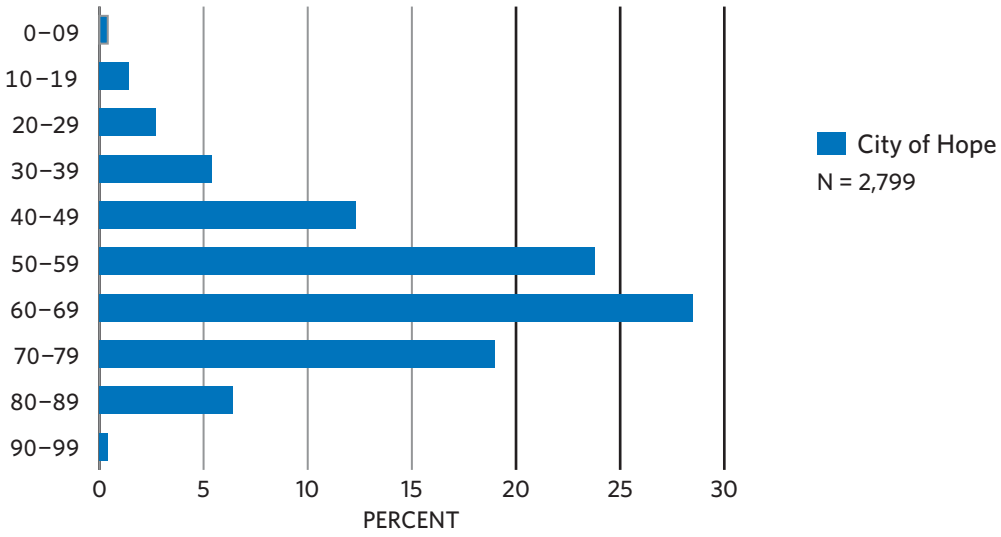
Diagnosis of *Analytic* Cases by Race — 2015



Stage at Diagnosis of Analytic Cases — 2015



Age at Diagnosis of Analytic Cases — 2015



T CELL THERAPEUTICS RESEARCH LABORATORY

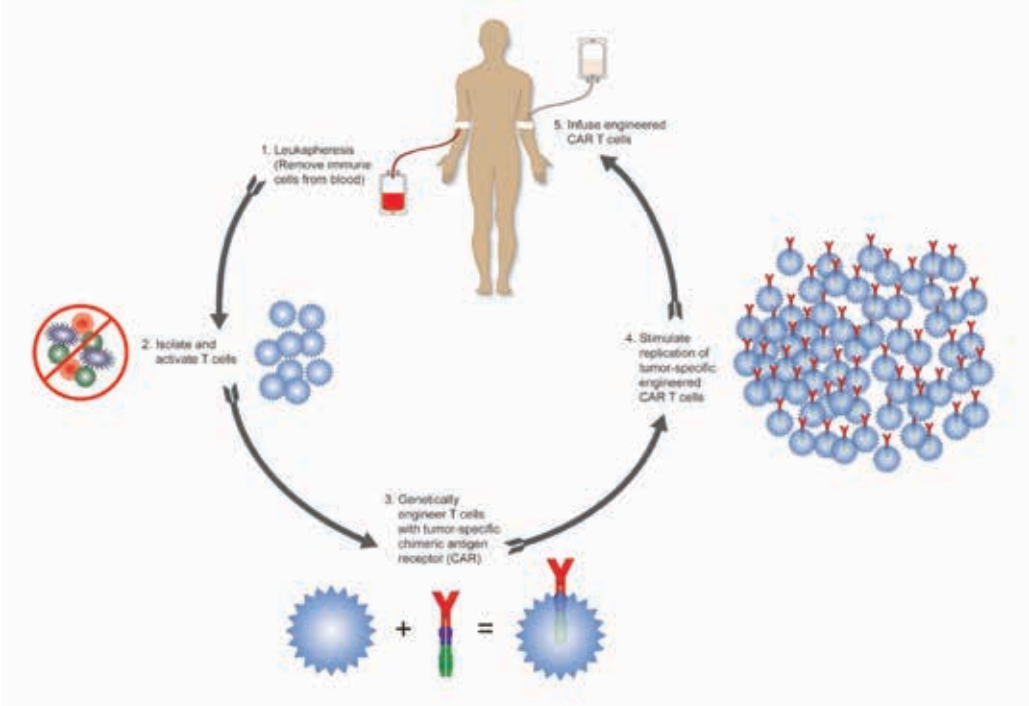
Stephen J. Forman, M.D.
Director, T Cell Therapeutics Research Laboratory

Christine Brown, Ph.D., Associate Director; Jamie Wagner, Regulatory Operations Manager; Xiuli Wang, M.D., Ph.D., Associate Research Professor; Saul Priceman, Ph.D., Assistant Research Professor and Elizabeth Budde, M.D., Ph.D., Assistant Professor

The overall goal of our laboratory is to develop antigen-specific immune therapy that can be used for treatment of patients who have either a hematologic cancer or solid tumor. The T Cell Therapeutics Research Laboratory is focused on the field of adoptive immunotherapy, which harnesses the body's natural immune defenses and reprograms them to attack specific targets on cancer cells. As shown in the diagram, our immunotherapies utilize the following principles:

1) Remove a patient's own immune cells from the blood during a leukapheresis procedure.
2) Isolate and activate T cells.
3) Genetically engineer T cells with a chimeric antigen receptor that can then target and kill cancer cells.
4) Grow up large quantities of these engineered T cells in the laboratory for therapeutic use.
5) Reintroduce the CAR-T cells into the patient's bloodstream or tumor.
6) Evaluate the response to help understand the benefits and limits of this therapy to help further improve and extend the field.

Our work is centered on studying the types of T cells that are isolated, modifications of the structure of the CAR used for the genetic engineering step and, most important, the target protein that the CAR recognizes to identify and then kill the tumor cell. In addition, our work focuses on the growth conditions that will help maximize the T cell potency, as well as their longevity once they are infused into the patient,



utilizing either local tumor regional therapy or systemic treatment. Our work covers a spectrum that begins with basic science observations and continues through the conduct of first in-human clinical trials.

1. LYMPHOMA

(Xiuli Wang, Leslie Popplewell, Tanya Siddiqi, Alex Herrera)

Our initial studies in lymphoma have been focused on augmenting the efficacy of the stem cell transplant by adding patients' CAR modified T cells to the recovering hematopoietic organ after transplant. We have utilized genetically engineered T cells that are specific for CD19, a protein that is present on the surface of B cell lymphoma cells. We have conducted three clinical trials treating patients with CD19-specific CAR-T cells and have observed changes in the peak numbers of T cells that expand in the first weeks after transplant, resulting from modifications of the CAR design derived from our basic preclinical laboratory research. The goal of these studies is to improve the efficacy of the autologous transplant by the addition of CAR-T cells to help prevent relapse in those patients for whom transplant is their best, and sometimes only, option. The CAR laboratory work is focusing now on how to extend the durability of those cells so that they become a more integral part of the recovering immune system and conducting studies in patients who have relapsed lymphoma but are not undergoing a stem cell transplant.

2. ACUTE LYMPHOBLASTIC LEUKEMIA

(Xiuli Wang, Samer Khaled)

These studies continue to build on what has been observed both at City of Hope and other institutions around the country treating patients with advanced relapsed disease and who have achieved complete remission with the use of CAR-T cells targeted to CD19. As in lymphoma, our studies are now also making the treatment safer and, ultimately, developing this therapy as one that could be used earlier in the treatment of patients with this disease, particularly those who have minimal residual disease detected after initial treatment. We are also utilizing these cells in patients who have relapsed following allogeneic transplant, where the treatment options are always few and the CD19 T cells derived from the donor have shown efficacy in inducing a remission.

3. ACUTE MYELOID LEUKEMIA AND BLASTIC PLASMACYTOID DENDRITIC CELL NEOPLASM

(Elizabeth Budde, Stephen J. Forman)

These studies are for targeting the CD123 antigen that is found on leukemia tumor cells and stem cells. This project was developed as part of a Beckman Research Institute of City of Hope graduate student (Armen Mardiros) Ph.D. thesis project in our laboratory and is now a clinical trial to test whether targeting this antigen can result in a remission in patients. At the present time, the trial is open for patients with advanced acute myeloid leukemia whose cells express CD123 either following relapse post-transplant utilizing donor cells, or for patients who have relapsed disease but have not had a transplant. The study will soon also be opened for patients with a very rare disease called blastic plasmacytoid dendritic cell neoplasm that is derived from dendritic cells that very highly express CD123. Patients with this disease have limited treatment options and our program will test the efficacy of these T cells to mediate an anti-tumor effect in this rare disease.

4. GLIOBLASTOMA MULTIFORME

(Christine Brown, Michael Barish, Behnam Badie)

One of our main focuses has been the treatment of patients with malignant brain tumors and, in particular, glioblastoma multiforme (GBM). Over a decade ago City of Hope's Mike Jensen, M.D., and Christine Brown, Ph.D., were the first to identify the IL13 receptor alpha 2 (IL13Rα2) gene that is overexpressed on the tumor in many patients with GBM. They then designed a unique CAR-T cell that utilizes the cytokine IL13 that binds to this receptor, as the targeting moiety for a CAR specific for IL13Rα2. Among the more unique things about this program has been the intracranial and intraventricular delivery of CAR cells, with one patient experiencing a complete response following intraventricular therapy. The studies conducted to date have led to modifications of the vector and the T cell population used to make CAR-T cells, which we hypothesize will make the therapy more effective for both local control and prevention of new lesions in the brain. Ultimately, our goal is to develop an immune therapy that could be used soon after

diagnosis as part of the initial therapy for this disease, targeting IL13Rα2-expressing brain tumor cells, as well as other targets such as HER-2/neu.

5. SOLID TUMOR THERAPY

(Saul Priceman, Christine Brown)

One of the major goals of the laboratory is to extend this CAR-T cell therapy beyond the initially successful targets of acute lymphoblastic leukemia and lymphoma to the more challenging solid tumors. Under the direction of Saul Priceman, Ph.D., we have developed studies for the treatment of women with HER-2/neu+ breast cancer in whom the disease can commonly involve the brain. Based on studies we performed in glioblastoma, we have developed a CAR therapy program in women with this type of breast cancer that has metastasized to the brain, and will deliver the CAR-T cells into the brain or the ventricular fluid. In this next year, we are planning to open a trial for women whose HER-2/neu+ breast cancer has involved the brain, with a view ultimately toward making a safe, systemic therapy for women with this disease.

In addition to focusing on breast cancer, Priceman and his group in the program have developed CAR-T cell therapy for men with recurrent prostate cancer whose cells express the PCSA (prostate cancer stem cell) antigen. This project collaborates with Sumanta Pal, M.D., and Marcin Kortylewski, Ph.D., and will address whether these cells can kill tumor cells and whether modifiers of the suppressive tumor microenvironment, as conceived by Kortylewski, can further augment the efficacy of the CAR-T cell therapy. It is also our goal to utilize these principles to develop treatment for pancreatic cancer (Vincent Chung, M.D.) and ovarian cancer (Mihaela Cristea, M.D.).

6. MULTIPLE MYELOMA AND AMYLOIDOSIS

(Xiuli Wang, Myo Htut, Michael Rosenzweig)

In addition to leukemia and lymphoma, Xiuli Wang, M.D., Ph.D., is leading the development of CAR-based therapies for the treatment of multiple myeloma and has developed a CAR-T cell that targets the CS1 antigen present on myeloma cells. Wang's studies have shown this to be a very good target and the preclinical models indicate that the T cells are very effective in eliminating the disease, particularly when combined with lenalidomide (Revlimid) to facilitate an immunological synapse between the T cells and the target. In addition to myeloma, the group has noted that CS1 is expressed on the plasma cells that mediate the disease amyloidosis. It is our plan to treat not only patients with myeloma, but also patients with this rare disease under a Food and Drug Administration investigational new drug.

7. VIRUS-SPECIFIC CAR-T CELLS

(Xiuli Wang, Don Diamond, Ryotaro Nakamura, Ibrahim Aldoss)

The T Cell Therapeutics Research Laboratory is unique for the diversity of its activities as it focuses on basic science and preclinical studies to understand the T cell and its interaction with the tumor and its microenvironment, but also to develop techniques that lead to the production of T cells in a more efficient way. This leads to the clinical trials and performing the correlative studies that tell us more about the therapy and how to improve it.

Given that many T cells carry memory for the antigen against which they were first made, we have conducted studies to develop CAR-T cell therapy utilizing cells that are cytomegalovirus (CMV) specific. CMV is a virus to which most people have been exposed, and thus typically have some immunologic memory cells in the blood. Our concept is to develop T cells with virus specificity that could then be expanded by vaccines against that virus, which were developed at City of Hope by Donald Diamond, Ph.D. We plan to conduct such studies in both lymphoma and leukemia. This approach represents a general principle for how CAR-T cells could be utilized in other patients, regardless of the specificity of the tumor, by utilizing the vaccine to drive expansion through the CMV T cell receptor.

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Master Table of New Cancer Cases by Primary Site — 2015

Site	Total	Class			Sex			Stage							
Group	Cases	Analytic	NA	O	M	F	O	0	I	II	III	IV	Unk	NA	Missing
ALL SITES	**3828**	**2799**	**1029**	**0**	**1785**	**2042**	**1**	**131**	**661**	**509**	**381**	**529**	**47**	**541**	
LIP	2	2	0	0	1	1	0	0	0	1	0	0	1	0	0
TONGUE	31	27	4	0	23	8	0	2	7	2	2	12	2	0	0
SALIVARY GLANDS, MAJOR	7	6	1	0	6	1	0	0	1	1	1	3	0	0	0
GUM	3	3	0	0	1	2	0	0	2	0	0	1	0	0	0
FLOOR OF MOUTH	2	2	0	0	0	2	0	0	1	0	0	1	0	0	0
MOUTH, OTHER AND NOS	7	6	1	0	4	3	0	0	4	0	0	2	0	0	0
TONSIL	13	12	1	0	9	4	0	0	1	1	0	10	0	0	0
OROPHARYNX	2	2	0	0	2	0	0	0	0	0	0	2	0	0	0
NASOPHARYNX	5	4	1	0	3	2	0	0	0	1	2	1	0	0	0
HYPOPHARYNX	4	3	1	0	3	1	0	0	0	0	1	2	0	0	0
ESOPHAGUS	11	8	3	0	8	3	0	0	2	0	3	3	0	0	0
STOMACH	75	61	14	0	43	31	1	0	14	13	14	17	3	0	0
SMALL INTESTINE	15	7	8	0	5	10	0	0	0	1	2	4	0	0	1
COLON	154	91	63	0	73	81	0	3	6	12	30	37	2	1	0
RECTUM AND RECTOSIGMOID	80	54	26	0	48	32	0	1	9	12	16	11	5	0	0
ANUS, ANAL CANAL, ANORECTUM	8	7	1	0	4	4	0	1	0	1	1	2	1	1	0
LIVER	55	34	21	0	30	25	0	0	4	4	9	7	5	5	0
GALLBLADDER	6	3	3	0	2	4	0	0	1	1	0	0	0	1	0
BILE DUCTS	12	10	2	0	5	7	0	0	1	4	0	3	1	1	0
PANCREAS	89	76	13	0	46	43	0	1	8	23	8	32	4	0	0
RETROPERITONEUM	5	3	2	0	2	3	0	0	1	1	1	0	0	0	0
PERITONEUM, OMENTUM, MESENT	10	7	3	0	2	8	0	0	1	1	2	2	1	0	0
OTHER DIGESTIVE	3	2	1	0	1	2	0	0	0	0	0	0	0	2	0
NASAL CAVITY, SINUS, EAR	2	2	0	0	1	1	0	0	0	0	0	2	0	0	0
LARYNX	12	11	1	0	10	2	0	0	3	2	0	4	1	1	0
LUNG/BRONCHUS, SMALL CELL	14	12	2	0	10	4	0	0	2	1	2	7	0	0	0
LUNG/BRONCHUS, NONSMALL CELL	244	184	60	0	109	135	0	6	46	20	29	82	0	1	0
PLEURA	5	4	1	0	3	2	0	0	0	0	2	2	0	0	0
OTHER RESPIR AND THORACIC	2	2	0	0	2	0	0	0	2	0	0	0	0	0	0
LEUKEMIA	303	184	119	0	163	140	0	0	1	3	1	3	0	176	0
MYELOMA	243	172	71	0	135	108	0	0	0	0	0	0	0	172	0
OTHER HEMATOPOIETIC	154	110	44	0	101	53	0	0	0	0	0	1	0	109	0
BONE	17	12	5	0	12	5	0	0	4	4	1	2	1	0	0

Master Table of New Cancer Cases by Primary Site — 2015 (con't.)

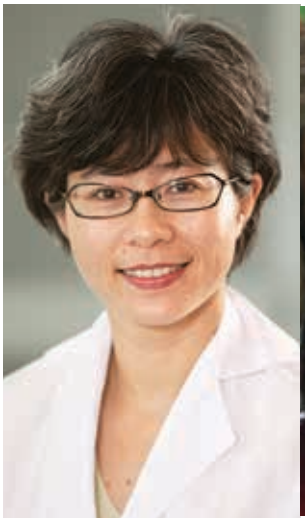
Site	Total	Class			Sex			Stage							
Group	Cases	Analytic	NA	O	M	F	O	0	I	II	III	IV	Unk	NA	Missing
ALL SITES	**3828**	**2799**	**1029**	**0**	**1785**	**2042**	**1**	**131**	**661**	**509**	**381**	**529**	**47**	**541**	
SOFT TISSUE	39	34	5	0	21	18	0	0	11	6	10	5	2	0	0
MELANOMA OF SKIN	89	73	16	0	51	38	0	12	28	14	11	4	4	0	0
OTHER SKIN CANCER	5	3	2	0	4	1	0	0	2	0	0	0	1	0	0
BREAST	640	536	104	0	5	635	0	72	180	166	71	37	10	0	0
CERVIX UTERI	31	20	11	0	0	31	0	0	8	3	6	3	0	0	0
CORPUS UTERI	109	98	11	0	0	109	0	0	67	5	14	11	0	1	0
UTERUS NOS	9	2	7	0	0	9	0	0	0	0	2	0	0	0	1
OVARY	90	55	35	0	0	90	0	0	11	5	25	14	0	0	0
VAGINA	4	4	0	0	0	4	0	0	0	2	0	1	0	1	0
VULVA	11	9	2	0	0	11	0	1	5	1	2	0	0	0	0
OTHER FEMALE GENITAL	7	6	1	0	0	7	0	0	2	0	2	1	0	1	0
PROSTATE	322	257	65	0	322	0	0	0	26	132	36	62	1	0	0
TESTIS	24	12	12	0	24	0	0	0	9	2	1	0	0	0	0
PENIS	2	2	0	0	2	0	0	2	0	0	0	0	0	0	0
BLADDER	106	85	21	0	81	25	0	28	21	19	5	12	0	0	0
KIDNEY AND RENAL PELVIS	137	111	26	0	87	50	0	1	67	9	17	17	0	0	0
URETER	5	2	3	0	5	0	0	1	0	0	0	1	0	0	0
OTHER URINARY	2	2	0	0	1	1	0	0	0	0	1	1	0	0	0
EYE	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
BRAIN	53	36	17	0	29	24	0	0	0	0	0	0	0	36	0
OTHER NERVOUS SYSTEM	12	7	5	0	1	11	0	0	0	0	0	0	0	7	0
THYROID	96	83	13	0	30	66	0	0	44	5	14	19	1	0	0
OTHER ENDOCRINE	13	9	4	0	7	6	0	0	0	2	0	0	0	7	0
HODGKIN DISEASE	67	23	44	0	36	31	0	0	3	10	6	4	0	0	0
NON-HODGKIN LYMPHOMA	337	190	147	0	200	137	0	0	56	19	31	82	1	1	0
UNKNOWN OR ILL-DEFINED	22	17	5	0	11	11	0	0	0	0	0	0	0	17	0

Cancer Cases by Primary Site and Year — 2011 TO 2015

PRIMARY SITE	2011	2012	2013	2014	2015
Head and Neck	65	59	53	73	76
Esophagus	17	19	21	19	11
Stomach	69	55	68	67	75
Colon	122	116	117	161	154
Rectum	81	68	58	87	80
Pancreas	67	58	70	61	89
Other Gastrointestinal	79	62	68	110	99
Larynx	18	11	17	14	12
Lung	190	232	209	229	258
Bone/Soft Tissue	52	44	62	62	56
Malignant Melanoma	64	75	60	79	89
Other Skin	20	7	5	7	5
Breast	522	598	760	668	640
Cervix-Invasive	26	36	39	26	31
Uterus	80	69	55	91	118
Ovary	62	46	65	72	90
Other Female Genitalia	21	17	18	16	22
Prostate	766	617	530	487	322
Other Male Genitalia	21	20	13	29	26
Bladder	79	79	73	90	106
Other Urinary/Kidney	94	105	105	123	144
Brain	36	33	28	35	53
Thyroid	49	61	73	81	96
Unknown Primary	24	18	29	25	22
Lymphoma (Non-Hodgkin)	219	249	247	239	337
Hodgkin Lymphoma	46	67	44	57	67
Multiple Myeloma	156	165	168	121	243
Leukemia	214	229	246	237	303
Miscellaneous	83	138	167	183	204
NEW CASES	**3342**	**3353**	**3468**	**3549**	**3624**

Race Distribution of All Cancer Cases — 2015

Race	# of Cases	Percent
White	2120	55.4
Black	209	5.5
Hispanic	796	20.8
Asian	640	16.7
American Indian	28	0.7
Other/Unknown	35	0.9
TOTAL	**3828**	**100**



GOALS, QUALITY STUDIES AND QUALITY IMPROVEMENT: STRIVING FOR EXCELLENCE

Lily Lai, M.D.
Chair, Clinical Cancer Committee

Mary Mendelsohn, R.N., M.S.N. , C.I.C.
Senior Director, Quality, Patient Safety and Risk

Each year, the Cancer Committee establishes, implements and monitors at least one clinical and one programmatic goal for endeavors related to cancer care at City of Hope. This year, the Cancer Committee focused on eight goals. In addition, quality studies and quality improvement projects were endorsed by the Cancer Committee to further understand and act on opportunities for improvement. One such set of quality studies includes data submitted to the Centers for Medicare and Medicaid Services (CMS) which is made available to the public to compare oncology care at the 11 dedicated cancer centers across the United States. Ongoing review by various committees at City of Hope is undertaken to identify and address gaps in quality care in the spirit of continuous performance improvement.

CANCER COMMITTEE CLINICAL GOALS

Four clinical goals were identified and addressed this year.

Over the last 10 years, City of Hope has developed a unique electronic tool to determine patient-reported and patient-centered physical and psychosocial concerns. The system, *SupportScreen*, enables patients and/or their caregivers to respond to questions on a touchscreen tablet specifically developed along the trajectory of their cancer journey. Patients are encouraged to use the touchscreen tablets while waiting for their appointments. The patient responses are uploaded in real time to the patient electronic health records and allow for immediate response and follow-up by care providers if needed. Patients can specify if they want written materials and/or to speak to providers regarding areas of concern. The almost immediate transmission of patient responses to the multidisciplinary team not only ensures timely responses to specific patient needs, but also in the manner designated by the patient. Currently, *SupportScreen* is made available to patients on iPads and City of Hope is working on making it available on other platforms. *SupportScreen* is available in Spanish and traditional Chinese, as well as in English. More than 6,000 screenings were completed in 2015.

Clinical Goal 1: Expand use of *SupportScreen* to outpatient Surgical Clinics.

One of our goals this year was to target expansion of *SupportScreen* to the outpatient surgical clinics. Engaging patients and their families in the patient's care is essential to the partnership desired for excellent oncology care. Soliciting patient input in this way allows each patient to reflect on their needs, priorities and preferred response while providing the care team with this patient specific data in an efficient way. This way, care can be better individualized and focused to address specific patient needs.

Clinical Goal 2: Coordinate provider response to issues identified by *SupportScreen* use.

Our second clinical goal was to enhance the surgical provider team response to issues identified by *SupportScreen* use. To facilitate a prompt review of the patient's responses, results are sent to the electronic medical record in real time and are also printed in the clinic for the staff to read and create a plan of care to address the needs identified. This plan of care is communicated with the surgeon, the clinical nurse, the social worker and other members of the team depending on the nature of the response. Some barriers to implementation of a coordinated effort to respond to the data collected through *SupportScreen* in the surgical clinics include: time management, financial issues for referrals to other professional members of the health care team, and continuity of care and follow-up to evaluate the effectiveness of the interventions. City of Hope is working with the nursing care coordinators to overcome these barriers.

Clinical Goal 3: Implement Cancer Staging Module into City of Hope's Clinical Information System.

The third clinical goal was to implement and improve use of the **staging module** in the electronic medical record. The Clinical Information System (CIS) team rolled out staging to the Department of Surgery in fall 2015. A select group of surgeons worked with the system and provided critical feedback to the CIS team to make the module usable by City of Hope physicians. The staging module was included in preoperative orders to ensure completion of staging prior to treatment. The overall uptake in use of the staging module was limited for several reasons including: ability to bypass the staging module, inability to find the staging module since it was part of surgical orders and ongoing instability of the current CIS system implemented. Given the organization's decision to convert to an entirely different electronic health record system with a robust staging module, the current staging module will not be advanced and made mandatory for all surgeons.

Clinical Goal 4: Develop Lung Cancer Screening Program.

Our fourth goal was to expand City of Hope's lung cancer screening. Dan Raz, M.D., M.A.S., co-director of City of Hope's Lung Cancer and Thoracic Oncology Program talked about the program in this video **www.cityofhope.org/tests-and-treatments/lung-cancer-screening**. The benefits of lung cancer screening, as discussed in the video, include increasing the chance of diagnosing lung cancer at an early stage when it is more likely to be cured and leading to identification of other treatable tobacco-related disease such as emphysema and heart disease. Lung cancer screening combines clinical risk assessment and a high resolution computed tomography (CT) scan of the chest with tobacco cessation counseling and education. City of Hope offers these services as part of a comprehensive program integrating screening low dose CT scans with clinical expertise in diagnostic procedures and a tobacco cessation program. During the year, the website was developed and a multidisciplinary team was assembled to ensure the success of this program and to provide services to as many patients as possible. There were 136 patients screened. In addition to identifying cancer, screening of patients identified other problems such as emphysema and coronary artery calcifications. The team was then able to direct the patients to correct and timely follow-up.

CANCER COMMITTEE PROGRAMATIC GOALS

Four programmatic goals were identified and addressed this year.

Program Goal 1: Initiate a new multidisciplinary conference in neuroendocrine tumors.

A Multidisciplinary Neuroendocrine Tumor Board was organized and initiated in June of this year. Although rare in incidence, the excellent clinical outcomes of patients with these tumors result in a growing prevalence of patients treated for neuroendocrine tumors. Because of the innovations in treatment of neuroendocrine tumors across disciplines, management of these cancers now require multidisciplinary approach for cure and for palliation. The newly established multidisciplinary conference, the Neuroendocrine Tumor Board, meets monthly to review patient cases, discuss specific data and images, and collectively define the best plan of care for these patients. Over the last year, there have been 12 meetings with over 50 patients presented and discussed.

Program Goal 2: Implement care coordinator role.

More than 16 care coordinators were hired in the spring/summer of this year to facilitate the growth of the solid organ cancer program. Hematology care coordinators were also identified by the end of the year. The expressed goals of the care coordinators were to assist in the development, completion and distribution of the patient Treatment Summaries and Survivorship Care Plans (TSSCPs). These care coordinators completed training on the use and completion of the TSSCPs and the program continues to evolve.

Program Goal 3: Develop a Dermatological Program.

Expertise in this arena was expanded with the recruitment of Jonathan Cotliar, M.D., former chief and associate clinical professor, Division of Dermatology, Department of Surgery. His interest in graft-versus-host disease led to the initiation of a specialized clinic to deal with these complications of care. Jae Y Jung, M.D., Ph.D., assistant professor of dermatology, collaborated with Patient Education to create a "Skin Care During Chemotherapy" booklet to enhance efforts to educate patients and their families on the prevention of skin side effects commonly seen during chemotherapy and to educate these patients to report skin eruptions that may otherwise be deemed unimportant by the patient but are critical for the clinician to gauge safe use of chemotherapeutic agents.

Program Goal 4: Expand the Interventional Pain Program.

To improve on palliation of pain, Andrew Leitner, M.D., assistant clinical professor, Department of Anesthesiology, was recruited to expand City of Hope's ability to offer alternative pain management solutions. Dr. Leitner and Christine Chang, M.D., assistant clinical professor, Department of Supportive Care Medicine, coordinated efforts to formalize the intrathecal pain pump program with the creation of comprehensive policy/procedures and R.N. training.

PUBLIC REPORTING

The Centers for Medicare and Medicaid Services (CMS) **Oncology Metrics** have continued to expand each year. By mid-2013, the 11 exempt cancer centers were required to begin data submission on the first five oncology core measures. Previously, the Prospective Payment System (PPS)-exempt centers, of which City of Hope is one, were excused from submitting CMS Core Measure data. Metrics chosen to be "oncology core measures" were reviewed by the NQF (National Quality Forum), NHSN (National Healthcare Safety Network) and other groups to ensure their validity. Below is a grid outlining the current oncology core metrics. All 11 PPS-exempt cancer centers are required to report data routinely. Data from three of these metrics are available to the public at the Medicare Hospital Compare website, while the PPS-exempt hospital data are displayed separately at the following website: **www.medicare.gov/hospitalcompare/cancer-measures.**

Metric/Indicators — Reporting Time Period Initiated: 2014

NHSN Central Line-Associated Bloodstream Infection (CLABSI)

NHSN Catheter-Associated Urinary Tract Infections (CAUTI)

Adjuvant Chemotherapy is considered or administered within four months (120 days) of surgery to patients under the age of 80 with AJCC III (lymph node positive) colon cancer (NQF 223)

Combination Chemotherapy is considered or administered within four months (120 days) of diagnosis for women under 70 with AJCC T1c, or Stage II or III hormone receptor negative breast cancer (NQF 559)

Adjuvant Hormonal Therapy for hormone receptor positive breast cancer (NQF 220)

Reporting Time Period Initiated: 2015

NHSN Healthcare-Associated Infection (HAI) Measure: Surgical Site Infection (SSI) (NQF 753)

Reporting Time Period Initiated: 2016

Surgical Care Improvement Project (SCIP) metrics. All SCIP measures were retired in late 2015.

SCIP – Inf 1: Prophylactic Antibiotics received within 1 Hour Prior to Surgical Incision (NQF #0527)

SCIP – Inf 2: Prophylactic Antibiotic Selection for Surgical Patients (NQF #0528)

SCIP – Inf 3: Prophylactic Antibiotic Discontinuation within 24 Hours after Surgery End Time (NQF #0529)

SCIP – Inf 9: Urinary Catheter Removed on Post-Operative Day 1 or Post-Operative Day 2 with Day Surgery being Day Zero (NQF #0453)

SCIP – Card 2: Surgery Patients on Beta Blocker Therapy Prior to Admission Who Received a Beta Blocker during the Perioperative Period (NQF #0284)

SCIP – VTE 2: Surgical Patients who Received Appropriate VTE Prophylaxis within 24 Hours prior to Surgery to 24 Hours after Surgery End Time (NQF #0218)

Multiple Myeloma-Treatment with Bisphosphonates (NQF #0380)

Radiation Dose Limits to Normal Tissues (NQF #0382)

Plan of Care for Pain (NQF #0383)

Pain Intensity Quantified (NQF #0384)

Prostate Cancer-Avoidance of Overuse Measure-Bone Scan for Staging Low-Risk Patients (NQF #0389)

Prostate Cancer-Adjuvant Hormonal Therapy for High-Risk Patients (NQF #0390)

HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) is a national survey that asks patients about their experiences during a recent hospital stay. Use the results shown here to compare hospitals based on 11 important hospital quality topics.

Reporting Time Period Initiated: 2017

External Beam Radiotherapy for Bone Metastases

Reporting Time Period Initiated: 2018

CDC NHSN Facility-Wide Inpatient Hospital-Onset Clostridium difficile (C. difficile) Infection (CDI) Outcome Measure (NQF #1717)

CDC NHSN Facility-Wide Inpatient Hospital-Onset Methicillin-Resistant Staphylococcus Aureus (MSRA) Bacteremia Outcome Measure (NQF #1716)

CDC NHSN Influenza Vaccination Coverage Among Healthcare Personnel (HCP) Measure (NQF #0431) (CDC NHSN HCP Measure)

QUALITY STUDIES/QUALITY IMPROVEMENT/ PERFORMANCE IMPROVEMENT

Ongoing data collection in a wide variety of areas allows City of Hope to assess performance and focus on select areas for improvement. Performance improvement is a process where changes in procedures or practice are implemented to improve the patient experience, quality of care and patient safety. The projects described below represent only a small fraction of the projects underway.

Studies of Quality

Published studies 2015 — Many studies on outcomes of our cancer patients were published by City of Hope staff.

Health care acquired infections focused on central line associated bloodstream nfection (CLABSI), Clostridium Difficile (C Difficil) infection and surgical site infections (SSI)

- Readmissions
- Venous Thromboembolism Events
- Advance Directives
- Pain Assessment and Response
- Call Center Response to Calls

Health Care Associated Infections: C Difficile, CLABSI and SSI

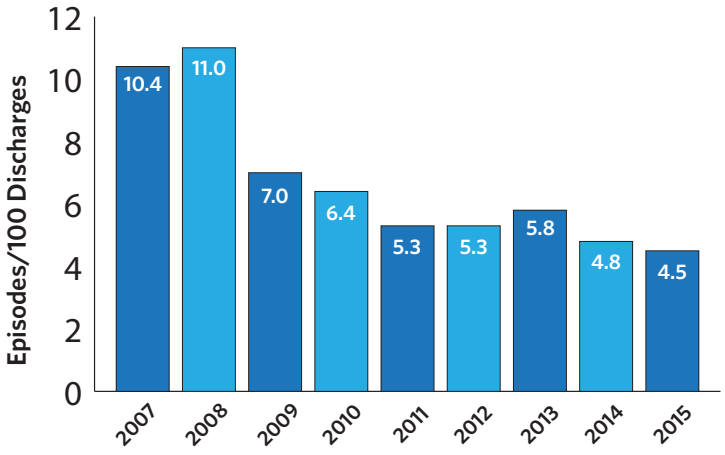
Because prevention of infections in the immunocompromised population seen at City of Hope is a high priority, numerous projects focused on the prevention of health care associated infections (HAIs).

Multiple projects led to the successful reduction of HAIs overall to the lowest level in the past decade.

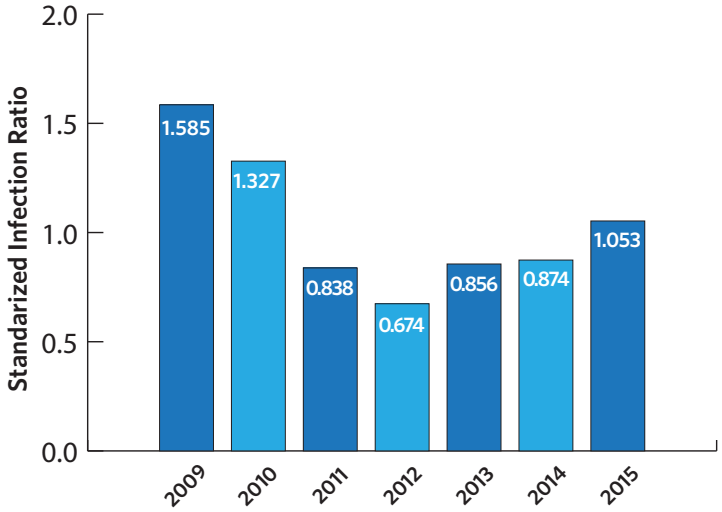
CLABSI

One of the most challenging of the HAIs is the central line associated bloodstream infection (CLABSI) which can contribute to significant morbidity and mortality. The City of Hope patient group most at risk and most affected by CLABSI is the population treated with hematopoietic stem cell transplantation (HSCT). As the total number of HSCTs increased in 2015, so too did the CLABSI rate. To address the increase in CLABSI, a multitude of projects were planned for 2016 for completion in 2016. These projects included extensive staff training, a hand-hygiene project to provide feedback to staff members at point of service, and a renewed look at technology and best practices implemented by other cancer centers.

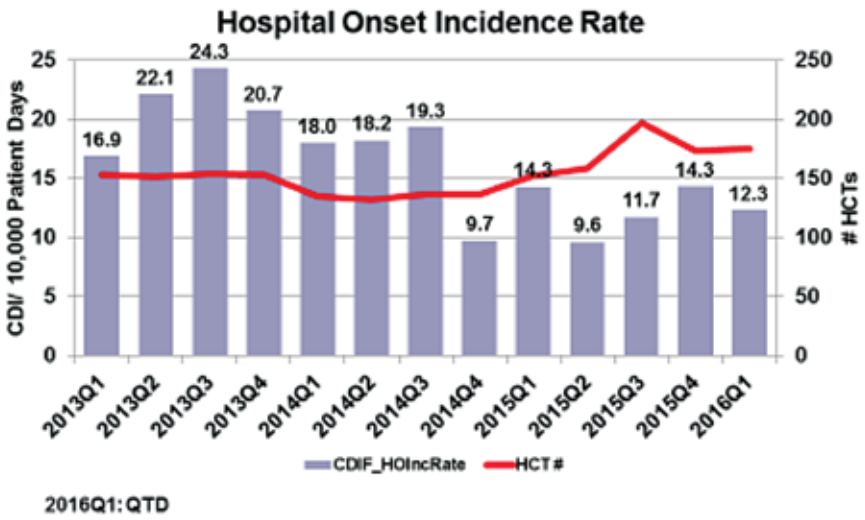
Hospital Associated Infection (HAI)



NHSN Central Line Associated Blood Stream Infection (CLABSI)



NHSN *C difficile* Rates



Clostridium Difficile Infection (CDI)

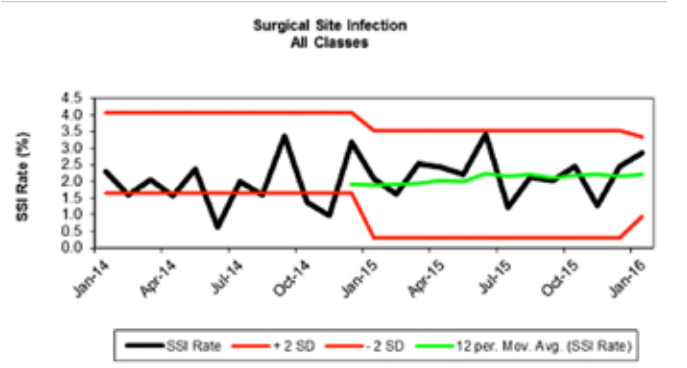
According to the Centers for Disease Control and Prevention (CDC), one type of HAI, caused by the bacteria ***Clostridium Difficile (C. Diff.)***, was estimated to cause almost half a million infections in the United States in 2011, with 29,000 patients dying within 30 days of the initial diagnosis. The groups at highest risk of CDI are patients who are older, patients on antibiotics, and patients who are already receiving medical care. For additional information see: **www.cdc.gov/HAI/organisms/cdiff/Cdiff_infect.html.**

At City of Hope, our hematopoietic stem cell transplant (HSCT) patients are at the greatest risk of CDI. To counteract this and as part of CDI prevention, new policies were initiated in September 2014, including contact isolation of patients at the first sign of diarrhea. If laboratory studies later revealed no infectious etiology, only then was the patient taken off contact isolation. These efforts were successful with **decreased rates of hospital onset CDIs** despite increasing numbers of HSCTs. This success was maintained throughout 2015 and beyond.

SSI

Surgical site infections (SSI) make up the third major HAI at City of Hope. Complex and long surgeries increase the risk of a postoperative infection. The Surgical Care Improvement Program (SCIP) metrics were tracked to assure patients received appropriate antibiotic prophylaxis, proper hair removal and that patient temperatures were maintained throughout the perioperative period as these have been shown to be best practices in the prevention of SSIs. Efforts to reduce SSIs were successful in lowering the overall percentage of SSIs. The improvement in rate of SSI was sustained throughout 2015. Efforts to further reduce SSIs remain a focus of the Infection Control Committee and the Infection Prevention Program.

SSI CONTROL CHART



Readmissions

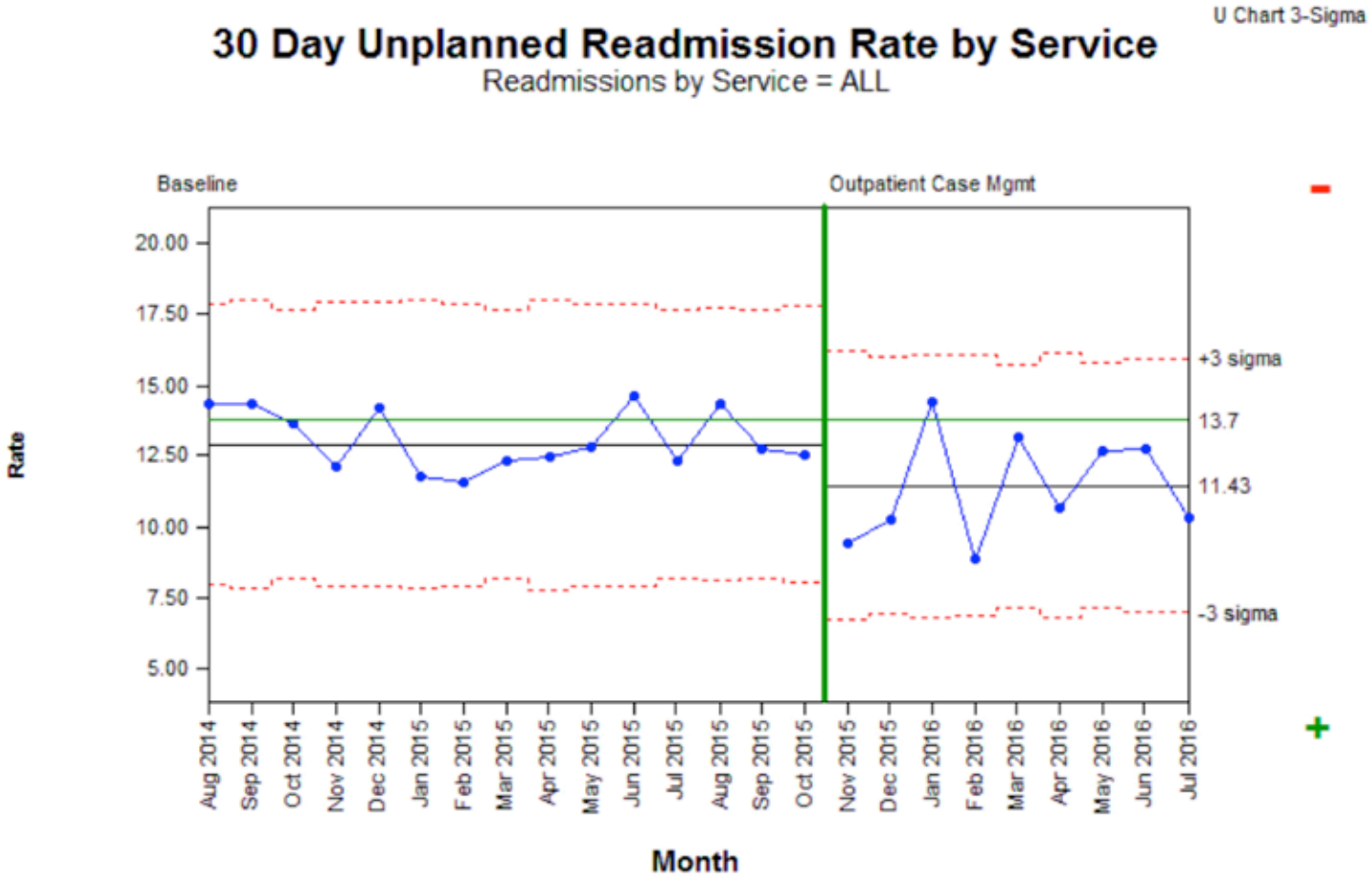
The CMS "all cause" readmission metric is a measure that does not produce actionable data for oncology patients. Cancer care is unique and facilities dedicated to cancer care must partner with external agencies to ensure measures chosen to judge quality

are realistic, actionable and meaningful within the cancer patient population. To this end, City of Hope worked with the Comprehensive Cancer Centers Consortium for Quality Improvement (C4QI) group to design an oncology readmission metric that allows facilities to focus efforts on preventable readmissions and to gauge the success of those interventions. The C4QI Readmission Team continued to meet to prepare data to present to Medicare (CMS) for consideration as a future oncology core measure. This project was embraced by the Alliance for Dedicated Cancer Centers (ADCC) quality group who worked throughout 2014 with CMS. 2014 was the official alpha and beta testing period and the revised metric was presented to the NQF Measures Application Partnership committee in late 2014. By 2015, the final reports on risk adjustment were submitted with plans to further discuss the readmission rate metric among cancer centers which occurred in early 2016. Unfortunately, the measure was not accepted by CMS and the future of a standardized oncology readmission metric remains unsettled.

Overall, there has not been a decline in readmission rates in 2015. To improve on the readmission rates, the Case Management Department planned a program to be initiated in 2016 that included identification of high risk patients and post discharge phone calls. Results to date are promising.

Venous Thromboembolism

Venous thromboembolism (VTE) is a disease that includes both deep vein thrombosis and pulmonary embolism. It is a common, lethal disorder that affects hospitalized and nonhospitalized patients, recurs frequently, is often overlooked and results in long-term complications. Patients with cancer are at increased risk of developing VTEs. To reduce the occurrence of VTE postdischarge, City of Hope initiated an Anticoagulation Outpatient Clinic in 2013. Over the two years since the program's inception, there has been a continued increase in the patients managed by the clinic as depicted in the graph below. The clinic filled a need for patients requiring anticoagulation to be managed with greater oversight after discharge from the hospital. The goal is to keep these patients clot-free, to ensure appropriate level of anticoagulation, and to prevent unnecessary hospitalizations. Work

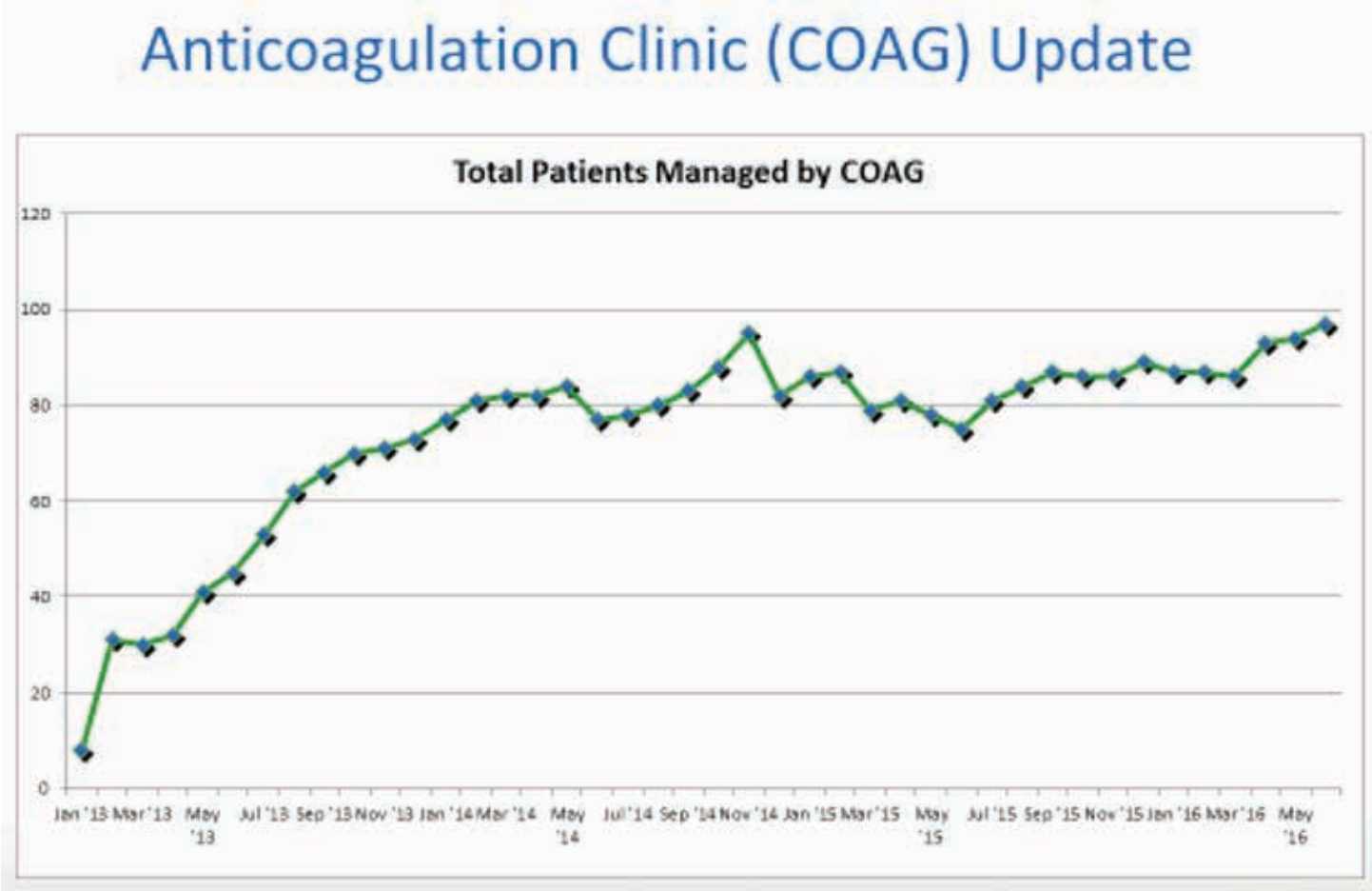


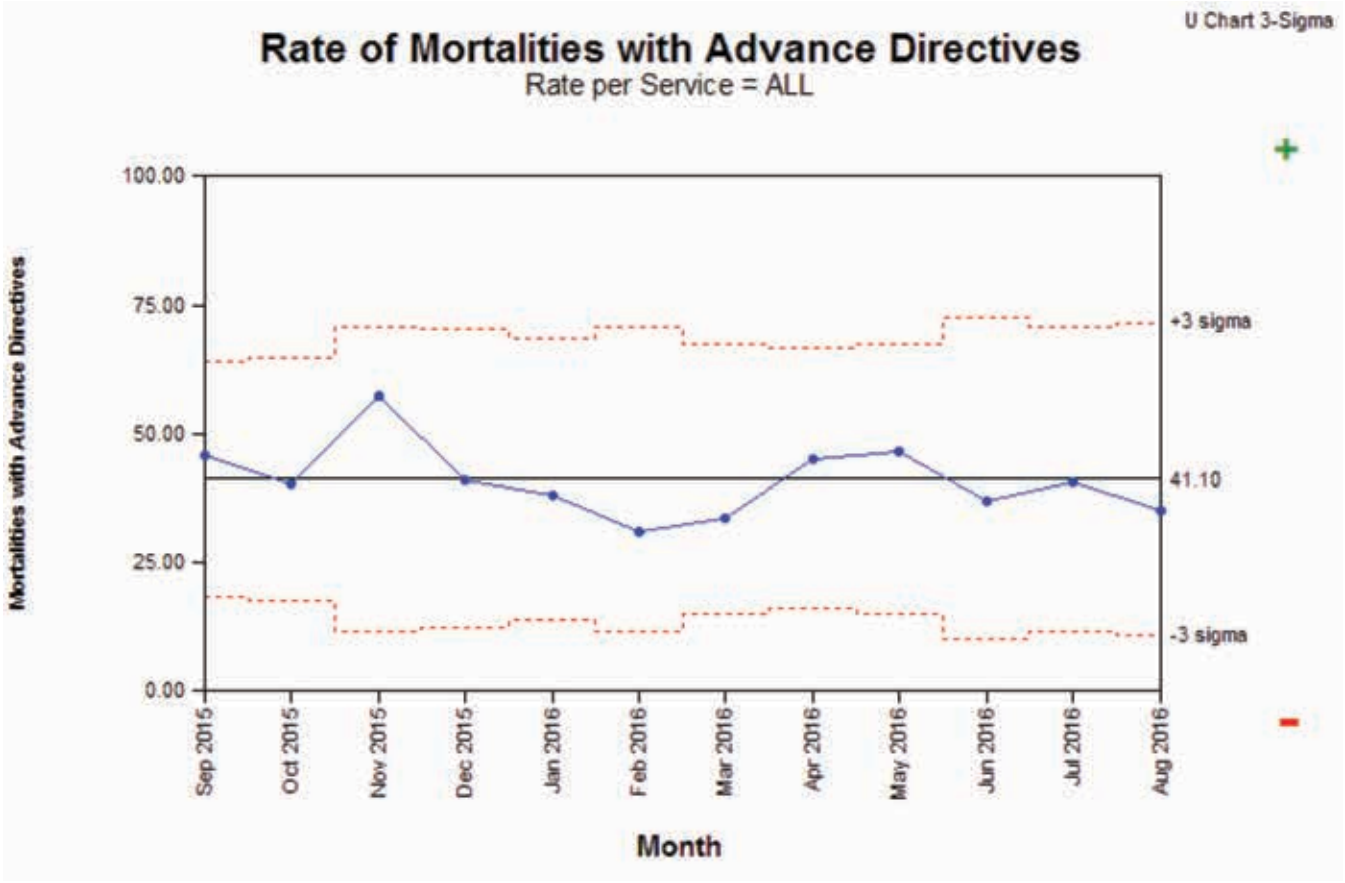
to prevent VTE events both in the inpatient and outpatient population continues to be the focus of a dedicated multidisciplinary performance improvement team.

Advance Directives

Only 41 percent of patients who die at City of Hope have chosen to execute an advance directive. Although multiple projects have been implemented to increase patients completing an advance directive, less than 50 percent of the patients choose to do so. This reluctance to consider death and be explicit about one's wishes is not unique to City of Hope patients. A 2013 article, *End-of-Life Care Issues: A Personal, Economic, Public Policy, and Public Health Crisis* by Dan K. Morhaim, M.D., and Keshia M. Pollack, Ph.D., M.P.H. found "that more than 60 percent of individuals aged 18 years and older want their end-of-life wishes to be respected; however, only about a third of them had completed advance directives. People had given thought to the question of end-of-life care, but a majority had not completed the forms."

In 2015, several concrete actions were undertaken to improve acceptance and completion of advanced directives by City of Hope patients. One such effort was to provide information, forms, and free notary services in one centralized location. The Sheri & Les Biller Patient and Family Resource Center on campus was chosen. Advance directives were translated into Chinese and Spanish to remove language barriers for our patient population. Efforts to find comfortable and effective ways to hold advanced care planning and advance directive discussions continue to be explored by the staff in City of Hope's Department of Supportive Care Medicine





Quality Improvement Projects

A multitude of performance improvement projects are constantly in process. A few were chosen to highlight below.

- Chemotherapy consents were initiated. A focused consent ensures patients and their families understand the intent and process of chemotherapy and engages them in the decision making in a new way.
- Empiric contact isolation for patients with diarrhea resulted in reduced health care associated C Difficile infections. This was introduced in late 2014 and continues to be effectively utilized to prevent the transmission of C difficile to other patients.
- Advance directives were offered in English, Spanish and Chinese
- VTE prevention order sets were revised to include CAPRINI and IMPROVE scoring to help providers assess risk for their patients concurrently.
- Nursing developed a training program to reduce and properly identify and treat medical adhesive related skin injuries.
- A closed system marrow harvest device was implemented to further reduce exposure and contamination of harvested marrow utilized in bone marrow transplants.

Caregivers at City of Hope continuously seek to improve patient outcomes. Data allow City of Hope to focus and measure the effectiveness of our efforts but we know excellence is more than performing well on metrics. It is evidence-based care and best practices delivered with compassion in ways that engage our patients and their families. City of Hope caregivers remain dedicated to that goal.

Perfection is not attainable, but if we chase perfection we can catch excellence. — ***Vince Lombardi***

CANCER QUALITY IMPROVEMENT PROGRAM (CQIP)

City of Hope is proud to have our cancer program accredited by the American College of Surgeons Commission on Cancer (CoC). The CoC was established in 1922 as a consortium of professional organizations dedicated to improving survival and quality of life for cancer patients. To achieve this goal, the group set standards in which cancer programs were to meet in order to be accredited by this prestigious body. All cancer programs that wish to be accredited undergo a survey process every three years in order to document compliance to these standards. City of Hope underwent such a survey in January 2014 and was awarded three years Accreditation with Commendation. The next survey will be conducted in March 2017. In addition to the survey process, each cancer program must also submit its data annually to the National Cancer Database (NCDB). This database is a nationwide oncology database with more than 1,500 CoC-accredited U.S. cancer programs. The NCDB is a rich resource for investigators to get the data they need for their important research. It also serves as a tool to monitor the cancer programs and determine if they are indeed providing high quality care with favorable outcomes. Starting with 2011 data, the NCDB and the CoC put together a new program called the Cancer Quality Improvement Program. This was a way to communicate back to the cancer programs what kind of data the NCDB was obtaining from each facility. The CoC provided valuable outcomes data including survival graphs, as well as data regarding compliance to quality measures.

The following graphs and tables are included in that report and are reproduced with the consent of the American College of Surgeons.

Insurance Status

It is important to know what population a medical center is serving. That is no different for City of Hope. When you look at the data and compare City of Hope to all CoC facilities, it is clear that half of our patient population is those patients that have private insurance, with the remaining bulk of the patients being those covered by Medicare.

Migration

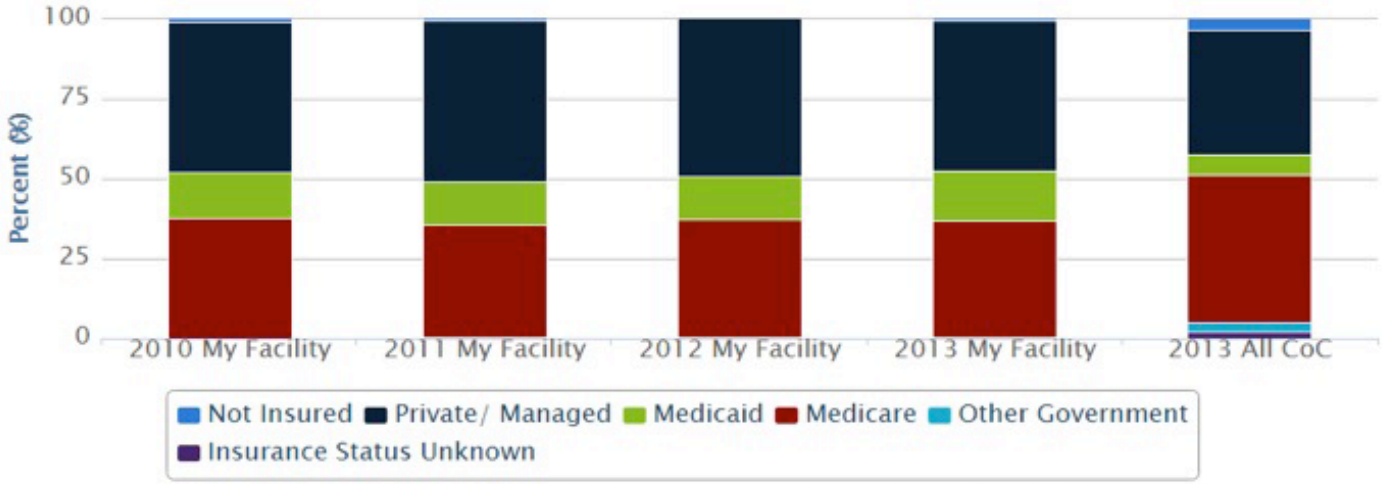
What is also important to know is where your patients are coming from. City of Hope is a specialty center, dealing primarily with cancer and also treating diabetes. Most patients that City of Hope serves are therefore often diagnosed outside of City of Hope, but then referred here for treatment, as is evident by the graph regarding migration.

Quality Measures

The most important data are those which measure quality and survival. The following graphs and tables illustrate the different quality measures that each cancer program had to adhere to and report on and their results. City of Hope is proud to note that all of our performance rates were considered compliant at the time of survey. And in those areas that showed a need for improvement, the Cancer Committee had put top on the agenda of areas that need attention.

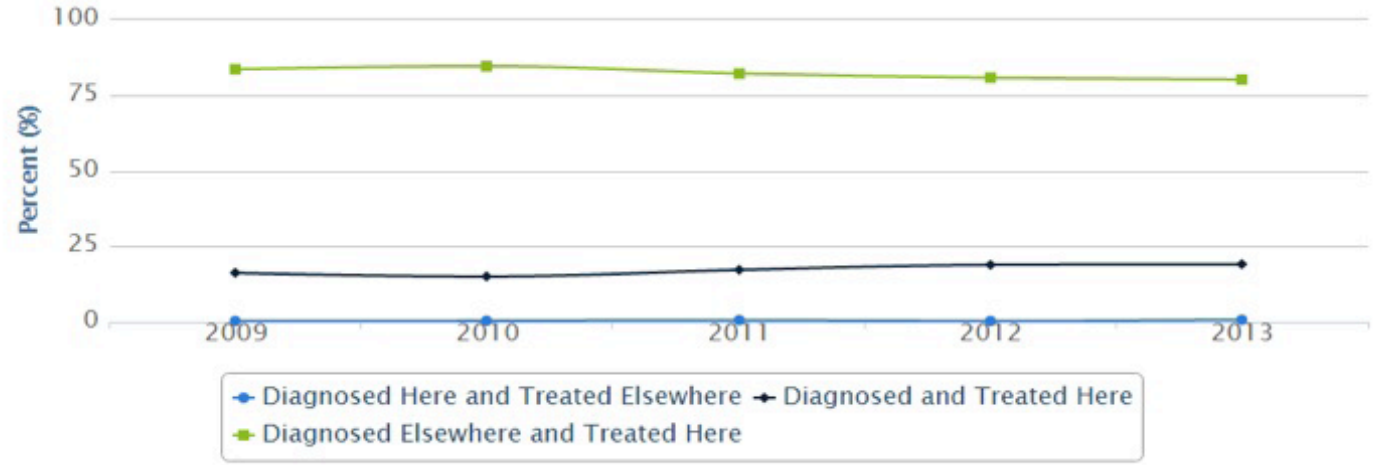
Following sections include 2013 CQIP data, the most current available.

Insurance Status, 2010 – 2013 – My Facility vs. All CoC



	2010 My Facility	2011 My Facility	2012 My Facility	2013 My Facility	2013 All CoC
Not Insured	0.7 % (n=21)	0.3 % (n=8)	0.2 % (n=6)	0.3 % (n=9)	3.5 % (n=44003)
Private/ Managed	46.9 % (n=1319)	50.3 % (n=1372)	49.2 % (n=1308)	46.9 % (n=1214)	38.8 % (n=482169)
Medicaid	14.4 % (n=405)	13.7 % (n=374)	13.4 % (n=356)	15.9 % (n=413)	6.3 % (n=77733)
Medicare	37.7 % (n=1061)	35.1 % (n=958)	36.8 % (n=979)	36.5 % (n=946)	46.4 % (n=576033)
Other Government	0.2 % (n=5)	0.5 % (n=14)	0.5 % (n=12)	0.3 % (n=9)	2.8 % (n=35364)
Insurance Status Unknown	0 % (n=1)	0 % (n=0)	0 % (n=0)	0 % (n=0)	2.1 % (n=26364)

Total In/Out Migration, 2009-2013 – My Facility



	2009	2010	2011	2012	2013
Diagnosed Here and Treated Elsewhere	0.3 % (n=8)	0.4 % (n=11)	0.6 % (n=15)	0.3 % (n=8)	0.7 % (n=19)
Diagnosed and Treated Here	16.2 % (n=465)	15 % (n=423)	17.2 % (n=470)	18.9 % (n=502)	19.1 % (n=494)
Diagnosed Elsewhere and Treated Here	83.6 % (n=2406)	84.6 % (n=2378)	82.2 % (n=2241)	80.8 % (n=2151)	80.2 % (n=2078)

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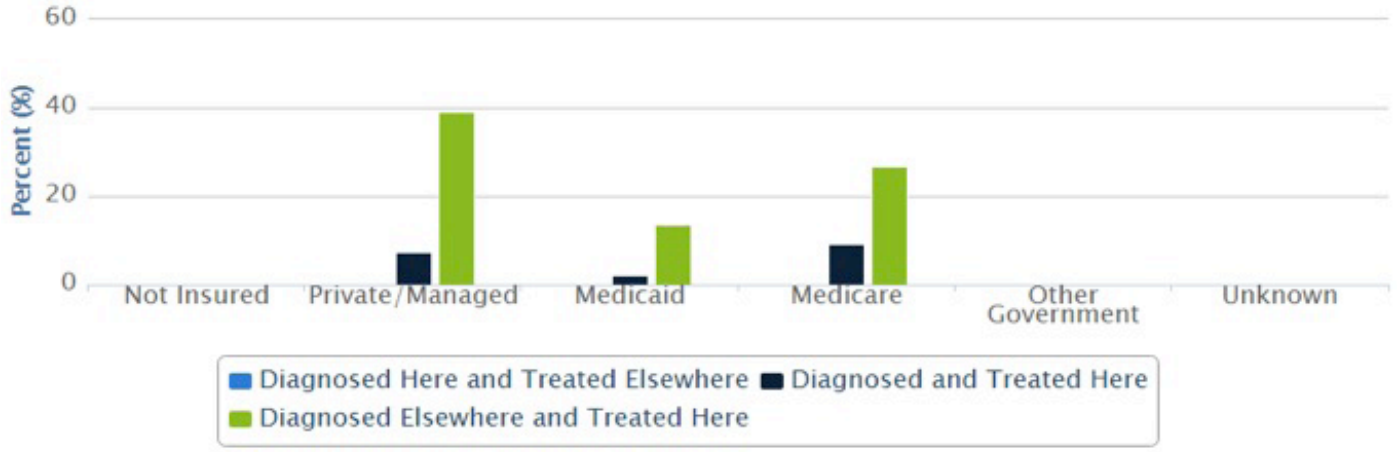
In/Out Migration by Insurance Status, 2013 – My Facility



	Not Insured	Private/Managed	Medicaid	Medicare	Other Government	Unknown
Diagnosed Here and Treated Elsewhere	0 % (n=1)	0.2 % (n=6)	0 % (n=1)	0.4 % (n=11)	0 % (n=0)	0 % (n=0)
Diagnosed and Treated Here	0 % (n=1)	7.4 % (n=193)	2.3 % (n=59)	9.3 % (n=240)	0 % (n=1)	0 % (n=0)
Diagnosed Elsewhere and Treated Here	0.3 % (n=7)	39.2 % (n=1015)	13.6 % (n=353)	26.8 % (n=695)	0.3 % (n=8)	0 % (n=0)

Quality Measure Reports

ACCOUNTABILITY MEASURE

- Considered the current standard of care based on clinical trial evidence Commission on Cancer Standard 4.4.

QUALITY IMPROVEMENT MEASURE

- Demonstrates good practice based on consensus. Usually not based on clinical trial evidence. Commission on Cancer Standard 4.5 addresses compliance with quality improvement.

SURVEILLANCE MEASURE

- Used at the community, regional and/or national level to monitor patterns and trends of care in order to guide policymaking and resource allocation.

Cancer Program Practice Profile (CP3R) Estimated Performance Rates

- **BREAST (6)**
- **COLON (2)**
- **GASTRIC (1)**
- **OVARY (1)**
- **CERVIX (3)**
- **ENDOMENTRIUM (2)**
- **NON-SMALL CELL LUNG (3)**
- **RECTUM (1)**

Extensive assessment and validation of the measures were performed using cancer registry data reported to the National Cancer Database (NCDB).

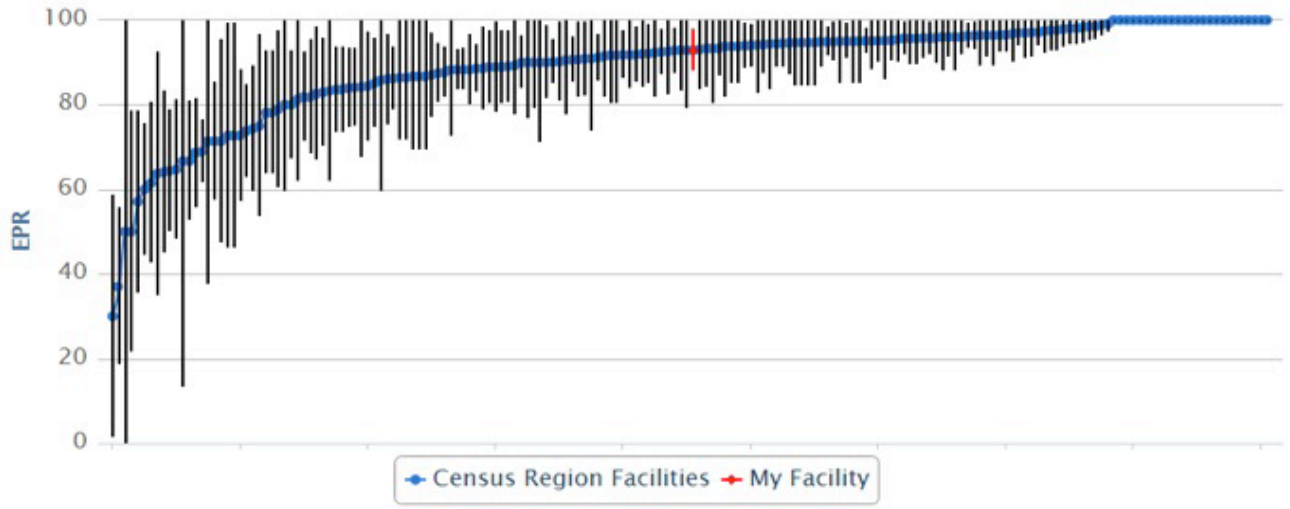
Disclaimer: All measures are designed to assess performance at the hospital or systems-level, and are not intended for application to individual physician performance.

Quality Measure Reports - Breast

- **BCSRT**: Breast radiation after breast conserving surgery (NQF 0219 – Accountability)
- **MAC:** Combination chemotherapy for hormone receptor negative breast cancer (NQF 0559 – Accountability)
- **HT:** Adjuvant hormonal therapy for hormone receptor positive breast cancer (NQF 0220 – Accountability)
- **BCS:** Breast conserving surgery rate (Surveillance)
- **MASRT:** Radiation therapy recommended or administered following mastectomy within one year of diagnosis for women with four or more positive regional lymph nodes (Accountability)
- **nBx:** Image or palpation-guided needle biopsy (core or FNA) is performed for the diagnosis of breast cancer (Quality Improvement)

NQF = National Quality Forum Endorsed Measure

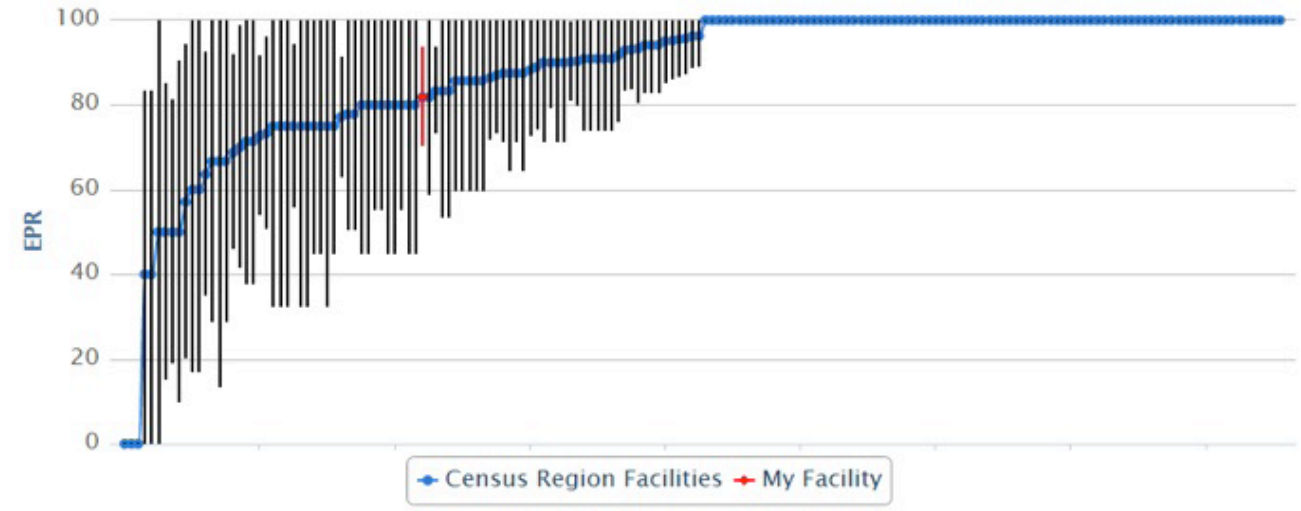
BREAST, 2013, BCSRT: Breast radiation after breast conserving surgery (NQF 0219 - Accountability)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	92.9 %	89.1 %	90.7 %	89.1 %	91.4 %	91.5 %
Denominator	126	4519	6967	4519	16927	52944
95 % CI	(88.4,97.4)	(88.2,90.0)	(90.0,91.4)	(88.2,90.0)	(91.0,91.8)	(91.3,91.7)

Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer. (CP3R data as of 11/02/2015)

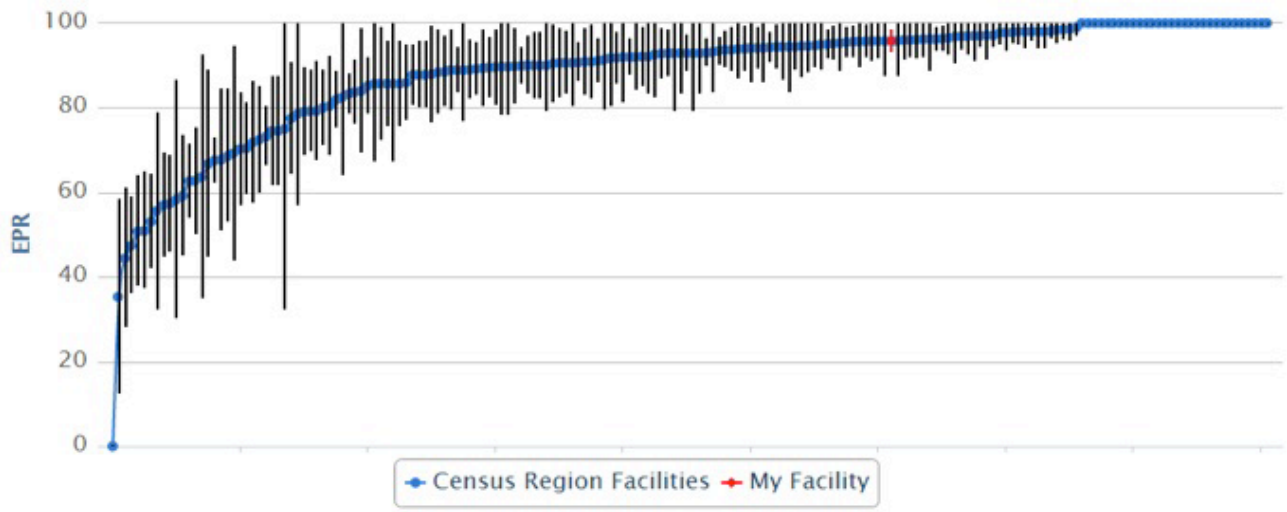
BREAST, 2013: Combination chemotherapy for hormone receptor negative cancer (NQF 0559 - Accountability)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	81.8 %	87.4 %	90.1 %	87.4 %	91.4 %	92.3 %
Denominator	44	923	1359	923	4227	12397
95 % CI	(70.4,93.2)	(85.3,89.5)	(88.5,91.7)	(85.3,89.5)	(90.6,92.2)	(91.8,92.8)

Combination chemotherapy is recommended or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1cN0M0, or Stage II or III hormone receptor negative breast cancer. (CP3R data as of 11/02/2015)

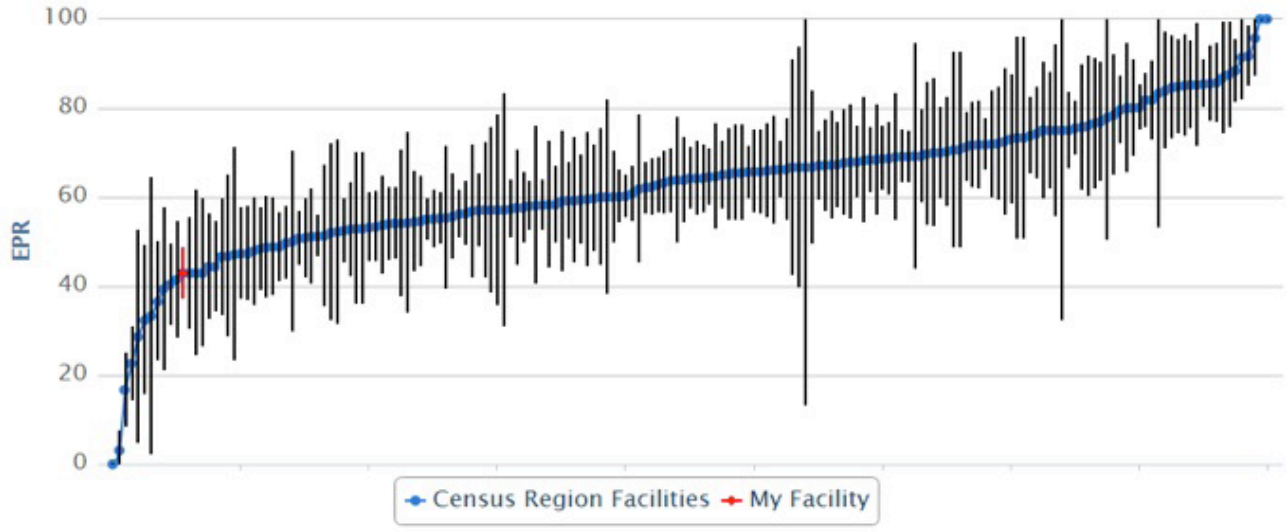
BREAST, 2013, HT: Adjuvant hormonal therapy for hormone receptor positive breast cancer (NQF 0220 - Accountability)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	95.8 %	87.6 %	90.1 %	87.6 %	91.4 %	91.2 %
Denominator	262	6584	10220	6584	23188	74509
95 % CI	(93.4,98.2)	(86.8,88.4)	(89.5,90.7)	(86.8,88.4)	(91.0,91.8)	(91.0,91.4)

Tamoxifen or third generation Aromatase inhibitor is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0, or stage IB - III hormone receptor positive breast cancer. (CP3R data as of 11/02/2015)

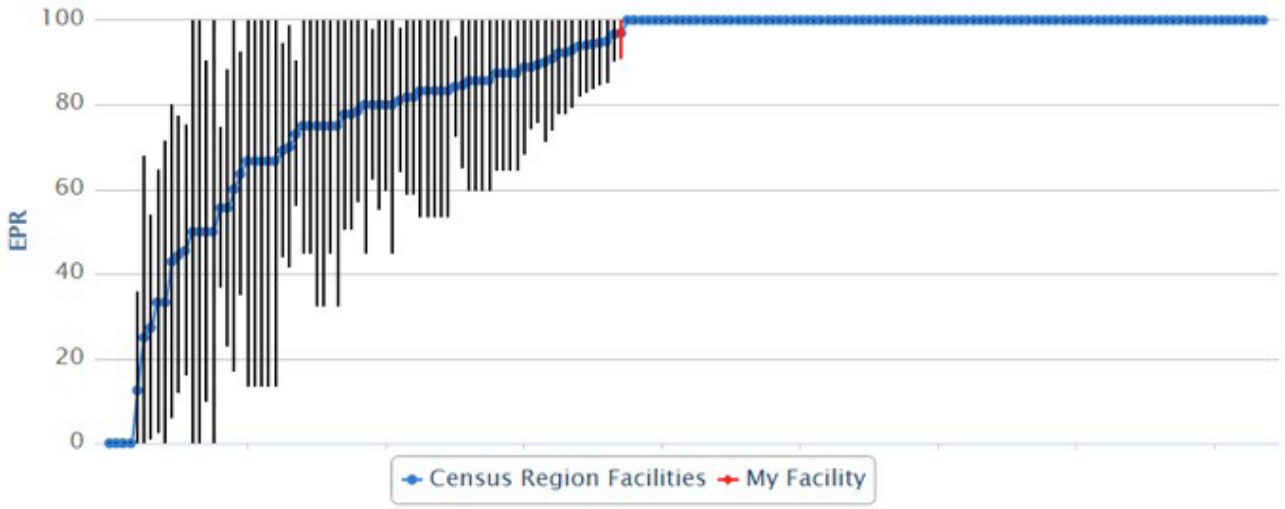
BREAST, 2013, BCS: Breast conserving surgery rate (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	42.9 %	60.8 %	61.3 %	60.8 %	61.7 %	62.6 %
Denominator	312	9494	15029	9494	36550	120267
95 % CI	(37.4,48.4)	(59.8,61.8)	(60.5,62.1)	(59.8,61.8)	(61.2,62.2)	(62.3,62.9)

Breast conservation surgery rate for women with AJCC clinical stage 0, I, or II breast cancer. (CP3R data as of 11/02/2015)

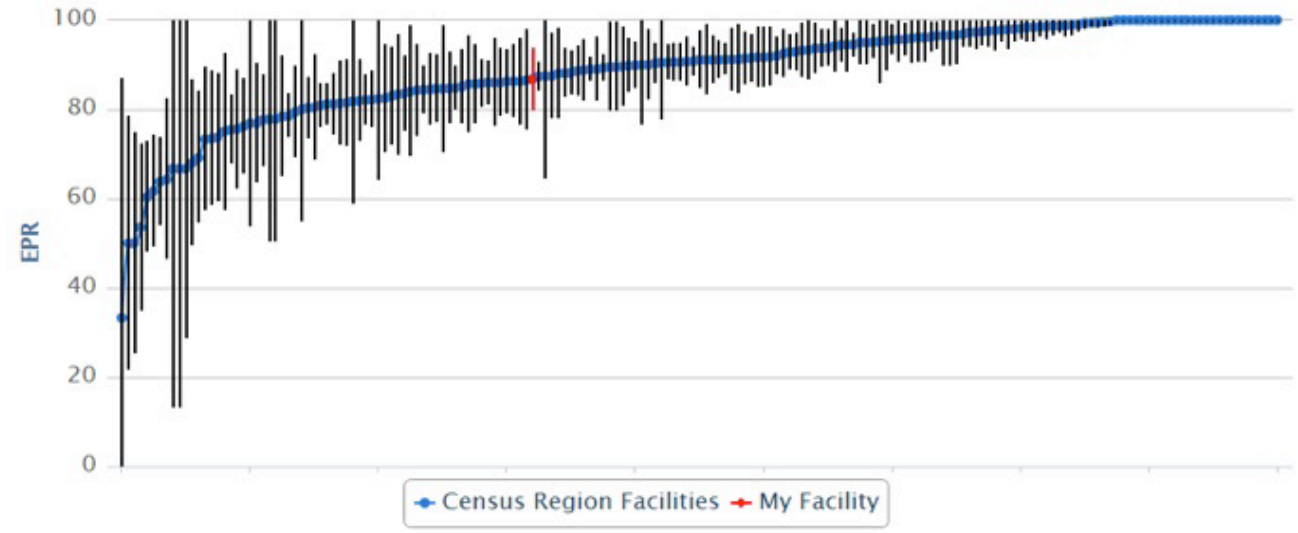
BREAST, 2013, MASRT: Post-mastectomy radiation for women with 4 or more positive regional lymph nodes (Accountability)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	96.9 %	83.5 %	86.2 %	83.5 %	88.1 %	87.6 %
Denominator	32	671	983	671	2507	7473
95 % CI	(90.9,100.0)	(80.7,86.3)	(84.0,88.4)	(80.7,86.3)	(86.8,89.4)	(86.9,88.3)

Radiation therapy is recommended or administered following any mastectomy within 1 year (365 days) of diagnosis of breast cancer for women with >= 4 positive regional lymph nodes. (CP3R data as of 11/02/2015)

BREAST, 2013, nBx: Image or palpation-guided needle biopsy (core or FNA) is performed for the diagnosis of breast cancer (Quality Improvement)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	86.7 %	91.3 %	90.9 %	91.3 %	91.1 %	90.3 %
Denominator	98	9932	15788	9932	34190	126851
95 % CI	(80.0,93.4)	(90.7,91.9)	(90.5,91.3)	(90.7,91.9)	(90.8,91.4)	(90.1,90.5)

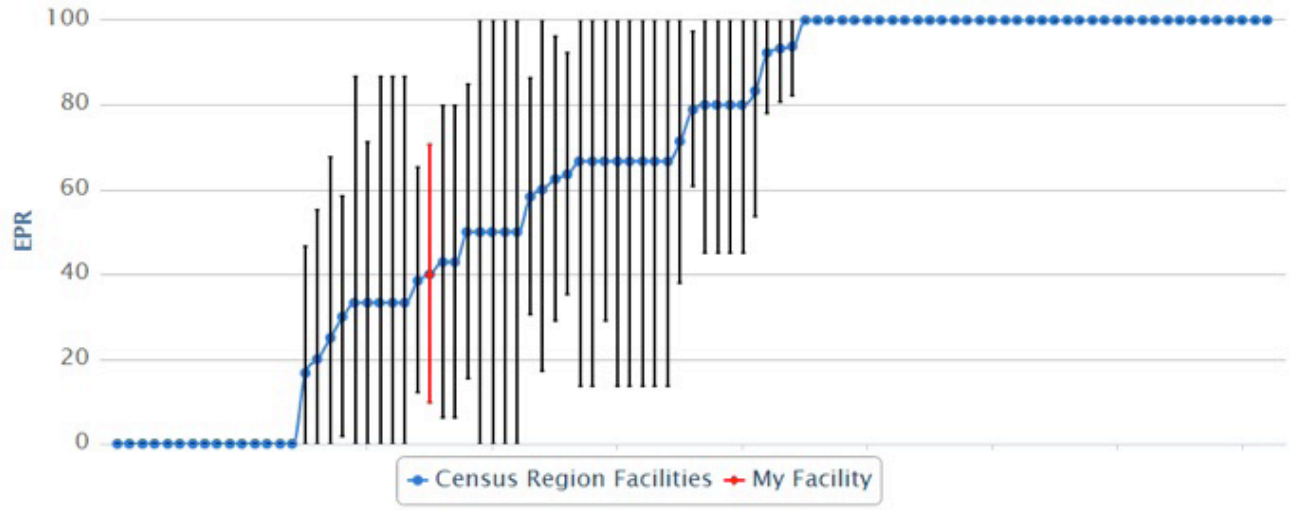
Image or palpation-guided needle biopsy (core or FNA) is performed to establish diagnosis of breast cancer. (CP3R data as of 11/02/2015)

CBRRT: Use of brachytherapy in patients treated with primary radiation with curative intent in any stage of cervical cancer (Surveillance)

CERRT: Radiation therapy completed within 60 days of initiation of radiation among women diagnosed with any stage of cervical cancer (Surveillance)

CERCT: Chemotherapy administered to cervical cancer patients who received radiation for stages IB2-IV cancer (Group 1) or with positive pelvic nodes, positive surgical margin, and/or positive parametrium (Group 2) (Surveillance)

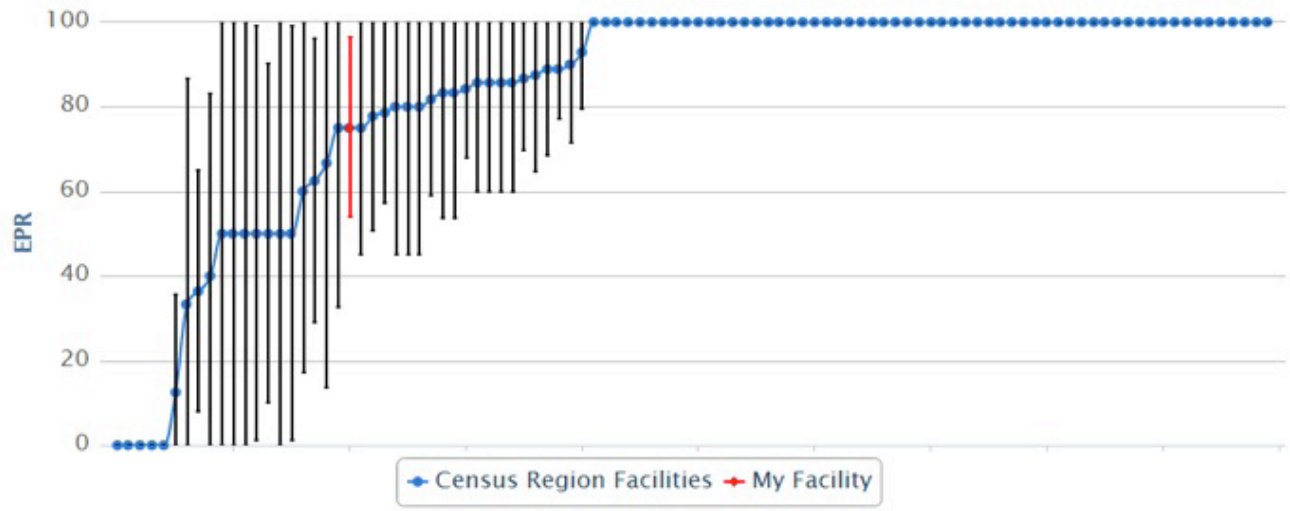
CERVIX, 2013, CBRRT: Brachytherapy in cervical cancer patients treated with primary radiation (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	40 %	74.4 %	70.2 %	74.4 %	76.6 %	72.5 %
Denominator	10	246	352	246	1391	2855
95 % CI	(9.6,70.4)	(68.9,79.9)	(65.4,75.0)	(68.9,79.9)	(74.4,78.8)	(70.9,74.1)

Use of brachytherapy in patients treated with primary radiation with curative intent in any stage of cervical cancer. (CP3R data as of 11/02/2015)

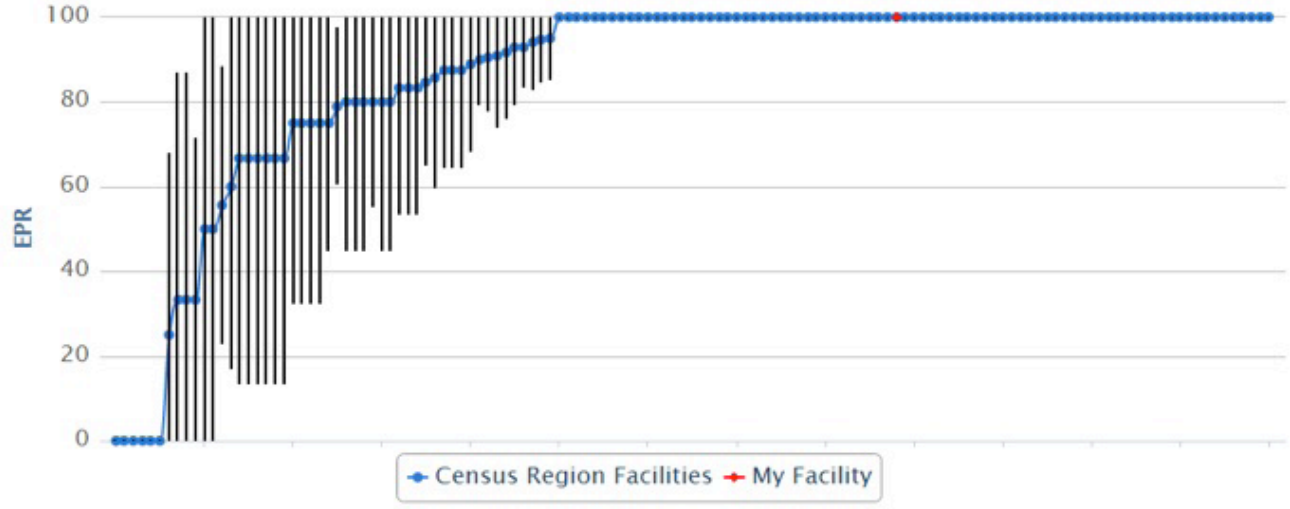
CERVIX, 2013, CERRT: Radiation therapy completed within 60 days among women diagnosed with cervical cancer (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	75 %	79.2 %	82.2 %	79.2 %	79.5 %	79.7 %
Denominator	16	255	370	255	1273	2701
95 % CI	(53.8,96.2)	(74.2,84.2)	(78.3,86.1)	(74.2,84.2)	(77.3,81.7)	(78.2,81.2)

Radiation therapy completed within 60 days of initiation of radiation among women diagnosed with any stage of cervical cancer. (CP3R data as of 11/02/2015)

CERVIX, 2013, CERCT: Chemotherapy for cervical cancer patients who received radiation (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	100 %	88 %	88.2 %	88 %	88.8 %	88.2 %
Denominator	16	343	490	343	1756	3770
95 % CI	(100.0,100.0)	(84.6,91.4)	(85.3,91.1)	(84.6,91.4)	(87.3,90.3)	(87.2,89.2)

Chemotherapy administered to cervical cancer patients who received radiation for stages IB2-IV cancer (Group 1) or with positive pelvic nodes, positive surgical margin, and/or positive parametrium (Group 2) (CP3R data as of 11/02/2015)

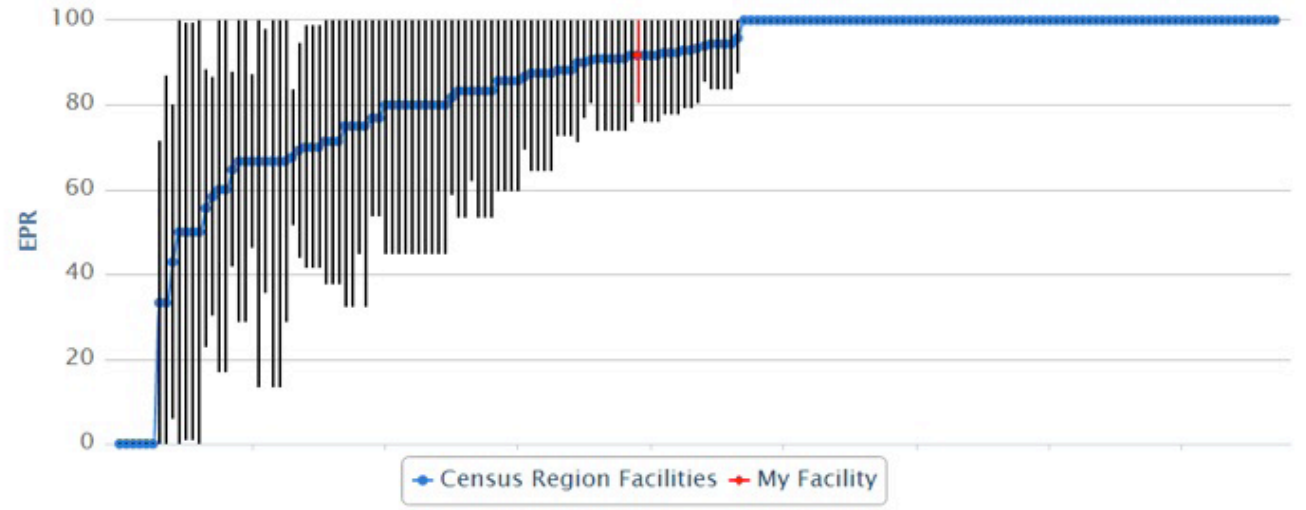
Quality Measure Reports - Colon

ACT: Adjuvant chemotherapy for lymph node positive colon cancer (NQF 0223 – Accountability)

12RLN: At least 12 lymph nodes are removed and examined as part of primary colon cancer resection (NQF 0225 – Quality Improvement)

NQF = National Quality Forum Endorsed Measure

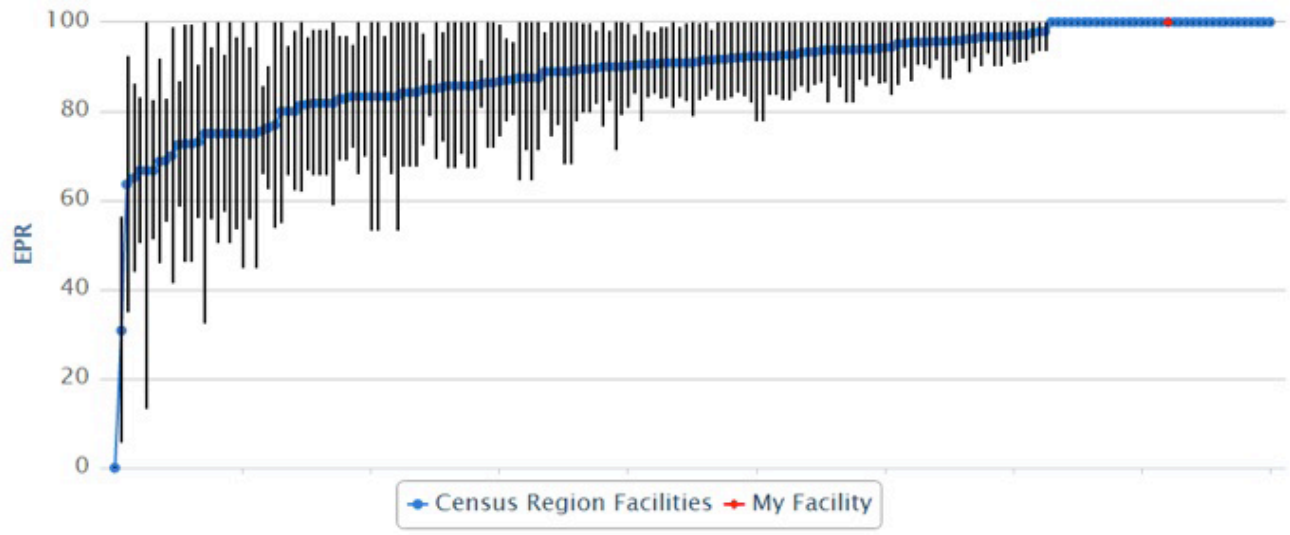
COLON, 2013, ACT: Adjuvant chemotherapy for lymph node positive colon cancer (NQF 0223 - Accountability)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	91.7 %	85.3 %	87.7 %	85.3 %	88.9 %	89.3 %
Denominator	24	730	1134	730	2752	9718
95 % CI	(80.7,100.0)	(82.7,87.9)	(85.8,89.6)	(82.7,87.9)	(87.7,90.1)	(88.7,89.9)

Adjuvant chemotherapy is recommended 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. (CP3R data as of 11/02/2015)

COLON, 2013, 12RL: At least 12 regional lymph nodes removed and pathologically examined for resected colon cancer (NQF 0225 - Quality Improvement)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	100 %	89.2 %	90.3 %	89.2 %	92.3 %	89.9 %
Denominator	38	3075	4729	3075	10526	40959
95 % CI	(100.0,100.0)	(88.1,90.3)	(89.5,91.1)	(88.1,90.3)	(91.8,92.8)	(89.6,90.2)

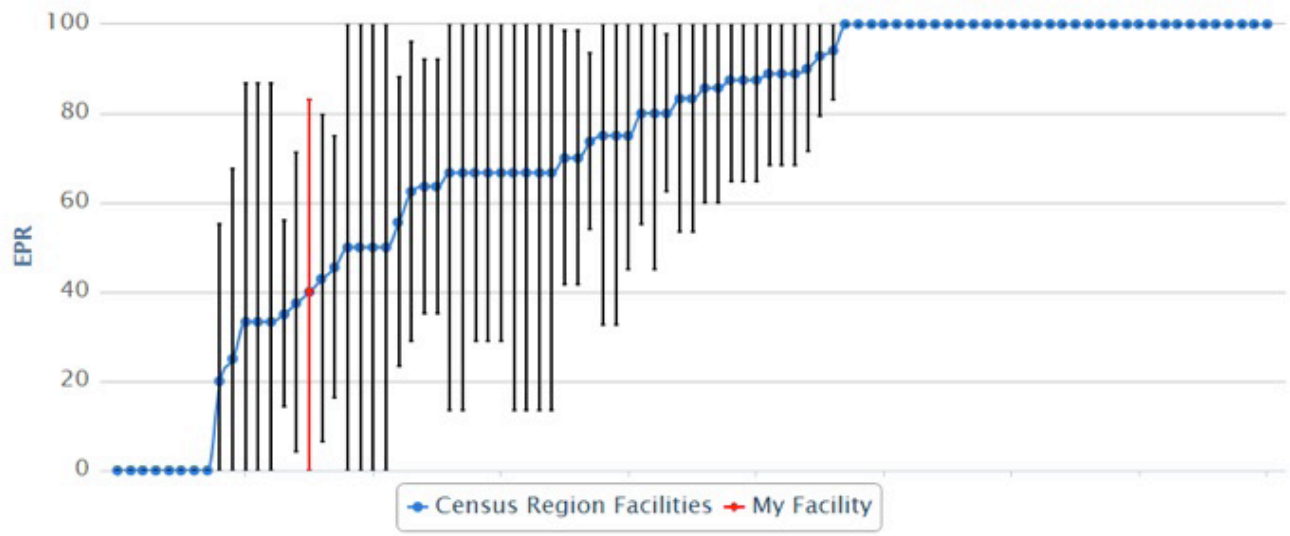
At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer. (CP3R data as of 11/02/2015)

Quality Measure Reports - Endometrium

ENDCTRT: Chemotherapy and/or radiation administered to patients with Stage IIIC or IV endometrial cancer (Surveillance)

ENDRLC: Endoscopic, laparoscopic or robotic surgery performed for all endometrial cancer (Surveillance)

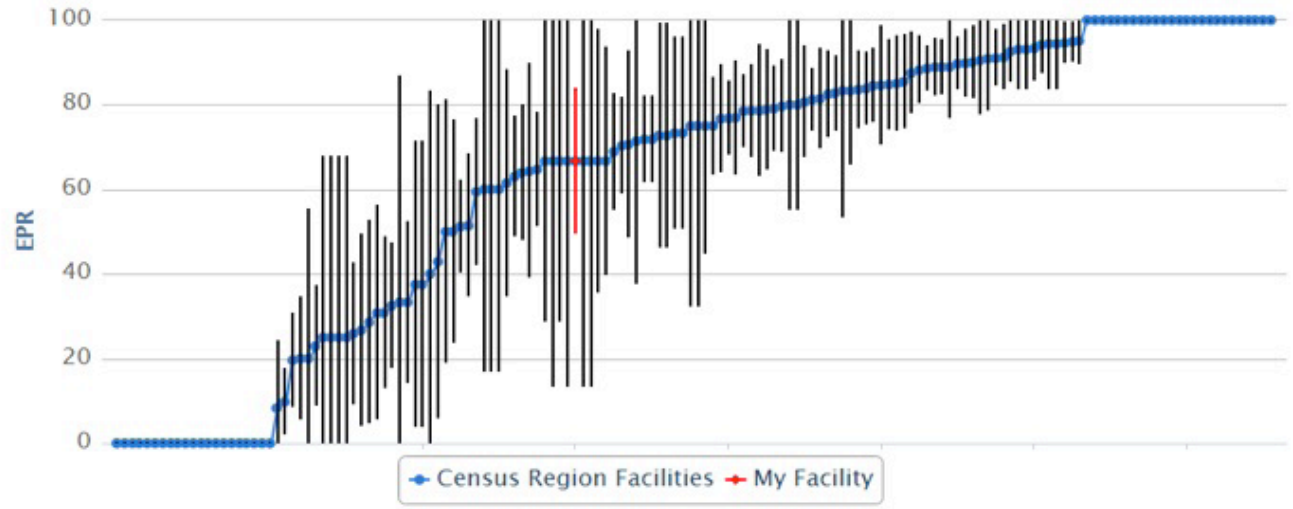
ENDOMETRIUM, 2013, ENDCTRT: Chemotherapy and/or radiation administered to patients with endometrial cancer (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	40 %	70.9 %	75.1 %	70.9 %	82.1 %	79.8 %
Denominator	5	251	353	251	1179	2394
95 % CI	(0.0,82.9)	(65.3,76.5)	(70.6,79.6)	(65.3,76.5)	(79.9,84.3)	(78.2,81.4)

Chemotherapy and/or radiation recommended to patients with Stage IIIC or IV Endometrial cancer. (CP3R data as of 11/02/2015)

ENDOMETRIUM, 2013, ENDLRC: Endoscopic, laparoscopic or robotic surgery performed for all endometrial cancer (Surveillance)

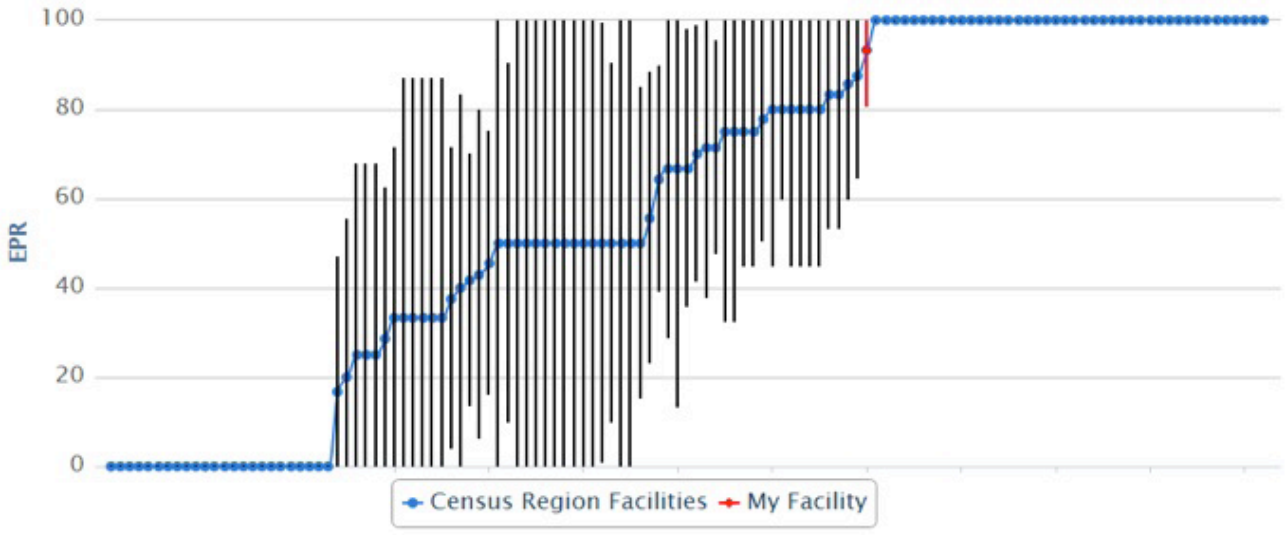


	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	66.7 %	68.7 %	73.7 %	68.7 %	69.3 %	72.3 %
Denominator	30	2234	3434	2234	11711	26531
95 % CI	(49.8,83.6)	(66.8,70.6)	(72.2,75.2)	(66.8,70.6)	(68.5,70.1)	(71.8,72.8)

Endoscopic, laparoscopic, or robotic surgery performed for all Endometrial cancer (excluding sarcoma and lymphoma), for all stages except stage IV. (CP3R data as of 11/02/2015)

G15RLN: At least 15 regional lymph nodes are removed and pathologically examined for resected gastric cancer (Quality Improvement)

GASTRIC, 2013, G15RLN: At least 15 regional lymph nodes are removed and pathologically examined for resected gastric cancer (Quality Improvement)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	93.3 %	63.8 %	63.6 %	63.8 %	62.2 %	54.3 %
Denominator	15	279	396	279	1276	2846
95 % CI	(80.6,100.0)	(58.2,69.4)	(58.9,68.3)	(58.2,69.4)	(59.5,64.9)	(52.5,56.1)

At least 15 regional lymph nodes are removed and pathologically examined for resected gastric cancer. (CP3R data as of 11/02/2015)

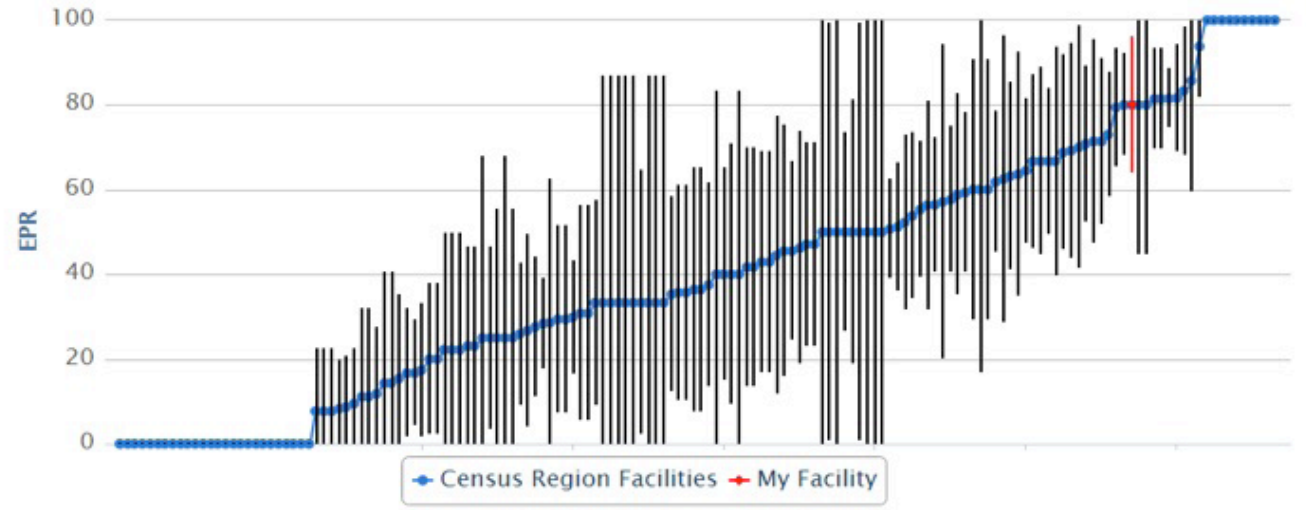
Quality Measure Reports - NonSmall Cell Lung

10RLN: At least 10 regional lymph nodes removed and pathologically examined for AJCC Stage IA, IB, IIA, and IIB resected NSCLC (Surveillance)

LCT: Systemic chemotherapy is administered or recommended within four months prior to surgery or within six months postoperatively for surgically resected cases with pathologic, lymph node-positive (pN1) and (pN2) NSCLC (Quality Improvement)

LNoSurg: Surgery is not the first course of treatment for cN2, M0 cases (Quality Improvement)

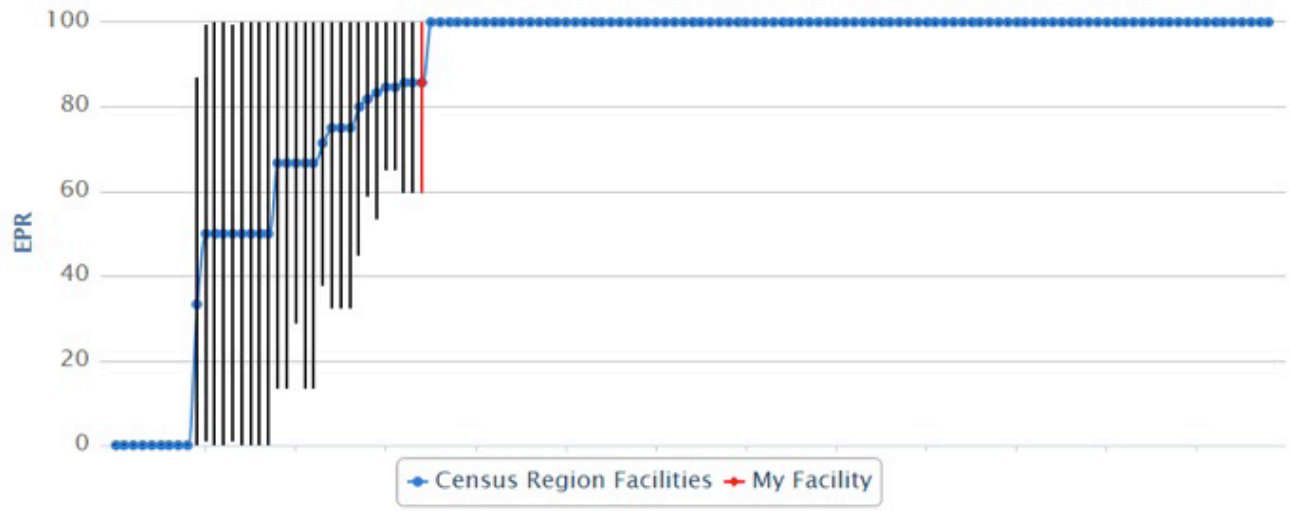
NSCLC, 2013, 10RLN: At least 10 regional lymph nodes removed and pathologically examined for resected NSCLC (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	80 %	42.9 %	47.1 %	42.9 %	48 %	41 %
Denominator	25	1147	1886	1147	7775	20055
95 % CI	(64.3,95.7)	(40.0,45.8)	(44.8,49.4)	(40.0,45.8)	(46.9,49.1)	(40.3,41.7)

At least 10 regional lymph nodes are removed and pathologically examined for AJCC stage IA, IB, IIA, and IIB resected NSCLC. (CP3R data as of 11/02/2015)

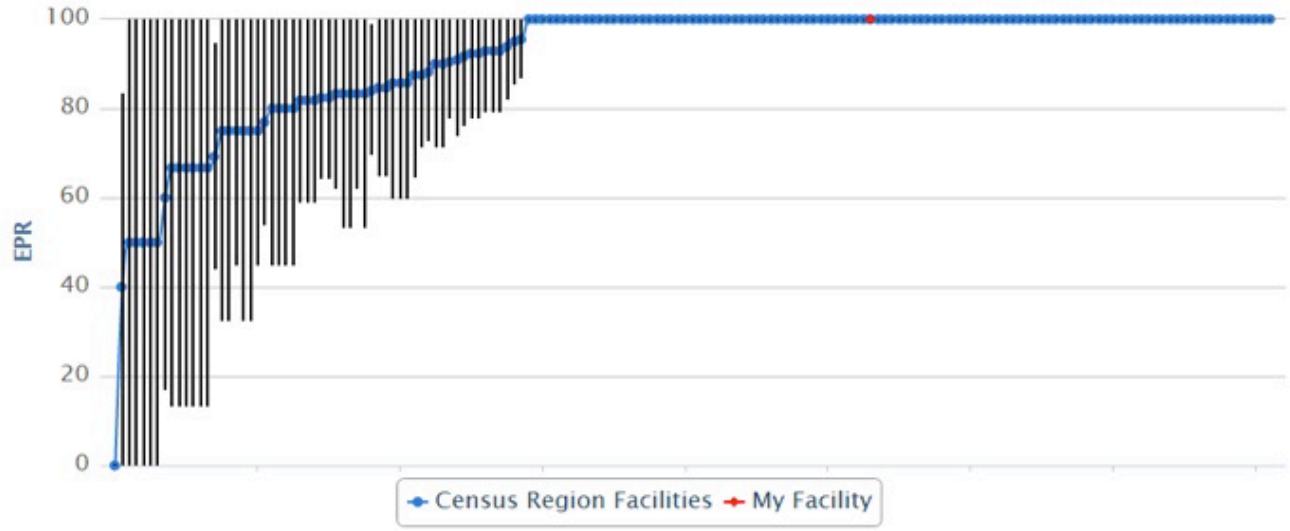
NSCLC, 2013, LCT: Systemic chemotherapy administered or recommended for pre or postoperatively resected NSCLC (Quality Improvement)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	85.7 %	86.4 %	89.7 %	86.4 %	89.6 %	89.6 %
Denominator	7	214	360	214	1594	4231
95 % CI	(59.8,100.0)	(81.8,91.0)	(86.6,92.8)	(81.8,91.0)	(88.1,91.1)	(88.7,90.5)

Systemic chemotherapy administered within 4 months to day preoperatively or day of surgery to 6 months postoperatively, or it is considered for surgically resected cases with pathologic, lymph node-positive (pN1) or (pN2) NSCLC.(CP3R data as of 11/02/2015)

NSCLC, 2013, LNoSurg: Surgery is not the first course of treatment for NSCLC (Quality Improvement)

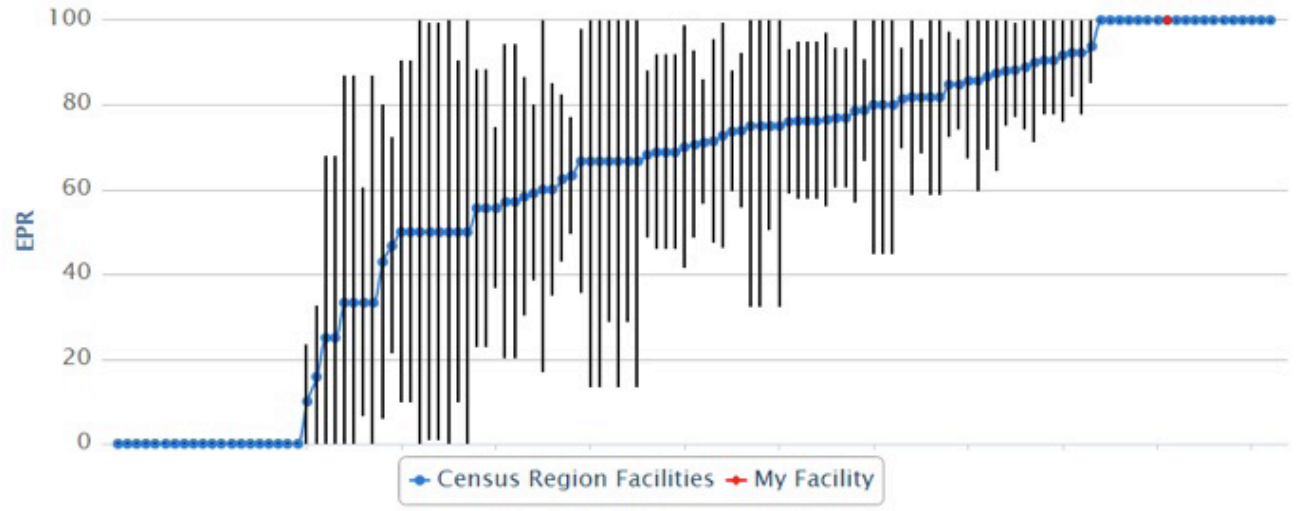


	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	100 %	92 %	92.7 %	92 %	92 %	92 %
Denominator	4	503	906	503	2947	9692
95 % CI	(100.0,100.0)	(89.6,94.4)	(91.0,94.4)	(89.6,94.4)	(91.0,93.0)	(91.5,92.5)

Surgery is not the first course of treatment for cN2, M0 cases. (CP3R data as of 11/02/2015)

OVSAL: Salpingo-oophorectomy with omentectomy, debulking; cytoreductive surgery, or pelvic exenteration in Stages I-IIIC ovarian cancer (Surveillance)

OVARY, 2013, OVSAL: Salpingo-oophorectomy with omentectomy, debulking; cytoreductive surgery, or pelvic exenteration for ovarian cancers (Surveillance)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	100 %	72.6 %	72 %	72.6 %	72.2 %	70.5 %
Denominator	16	784	1141	784	3822	8240
95 % CI	(100.0,100.0)	(69.5,75.7)	(69.4,74.6)	(69.5,75.7)	(70.8,73.6)	(69.5,71.5)

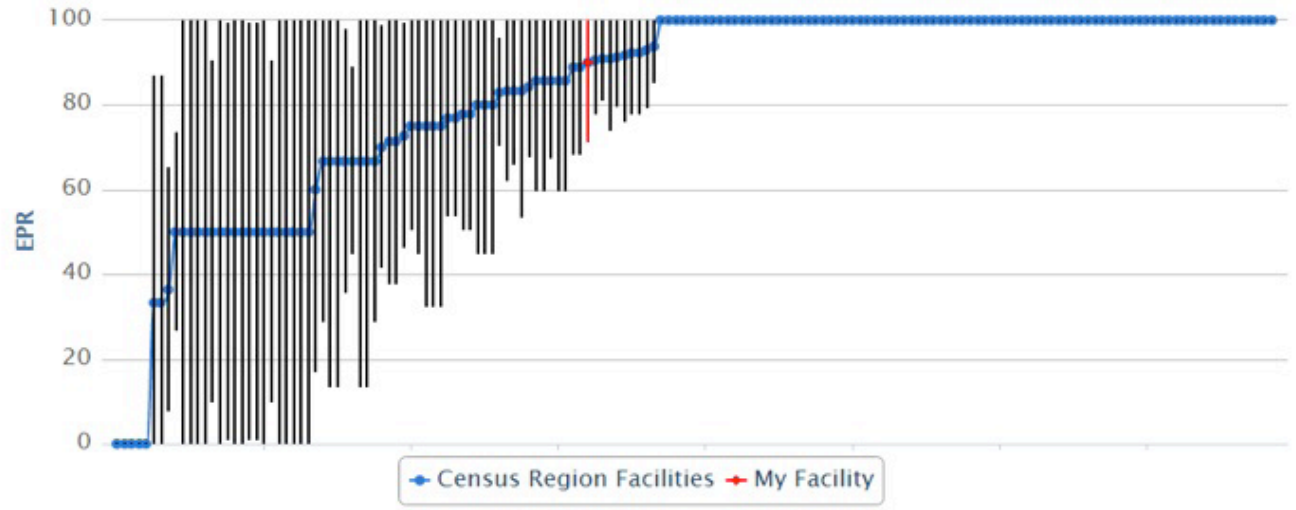
Salpingo-oophorectomy with omentectomy, debulking; cytoreductive surgery, or pelvic exenteration in Stages I-IIIC Ovarian cancer. (CP3R data as of 11/02/2015)

Quality Measure Reports - Rectum

RECRT: Radiation therapy is administered as a component of therapy along with surgical resection (Surveillance)

RECRTCT: Chemo and radiation therapy is administered or recommended for resected rectal cancers (Quality Improvement)

RECTUM, 2013, RECRTCT: Chemo and Radiation therapy is administered or recommended for resected rectal cancers (Quality Improvement)



	My Program	My State (CA)	My Census Region (Pacific)	My ACS Division (California)	My CoC Program Type (ACAD)	All CoC Programs
Performance Rate	90 %	83.2 %	85.9 %	83.2 %	86.1 %	86.3 %
Denominator	10	452	743	452	2100	5807
95 % CI	(71.4,100.0)	(79.8,86.6)	(83.4,88.4)	(79.8,86.6)	(84.6,87.6)	(85.4,87.2)

Preop CT & RT for clin AJCC T3N0, T4N0, or Stage III;or Postop CT & RT within 180 days of diagnosis for clin AJCC T1-2N0 with path AJCC T3N0, T4N0, or Stage III; or recommended; for patients < age 80 resected rectal cancer. (CP3R data as of 11/02/2015)

GLOSSARY OF ABBREVIATIONS

A	Analytic
ALL	Acute Lymphoblastic Leukemia
AML	Acute Myelogenous Leukemia
BMT	Bone Marrow Transplantation
CHEMO	Chemotherapy
CLL	Chronic Lymphocytic Leukemia
CML	Chronic Myelogenous Leukemia
CS	Collaborative Stage
Immuno	Immunotherapy
LIQ	Lower Inner Quadrant
LOQ	Lower Outer Quadrant
n	Total Sample Size
NCDB*	National Cancer Database
N/A	Non-analytic
NSCLS	Nonsmall Cell Lung Cancer
NOS	Not Otherwise Specified
NR	Not Recorded
RAD	Radiation Therapy
RX	Treatment
SCLC	Small Cell Lung Cancer
SURG	Surgery
UIQ	Upper Inner Quadrant
UOQ	Upper Outer Quadrant

** The NCDB is a nationwide oncology outcomes database for over 1,500 hospitals in 50 states.*

GLOSSARY OF TERMS

Analytic: Cases which were first diagnosed and/or received all or part of their first course of treatment at City of Hope.

Nonanalytic: Cases first seen at City of Hope at least four months following initial diagnosis. These include cases of recurrence, metastasis, residual disease and cases diagnosed at autopsy.

First Course of Treatment: The initial tumor-directed treatment or series of treatments, usually initiated within four months of diagnosis.

Second Opinion: Cases seen at City of Hope for consultation for the purpose of diagnosis and/or treatment. Patient is then referred back to referring physician for care.

Stage of Disease: Describes the extent of disease based on all diagnostic and therapeutic evidence available by the end of the first course of therapy, or within four months after beginning treatment.

Not Recorded/Unknown: The stage of disease cannot be determined from the information available in the medical record or from a medical authority.

AJCC (TNM) Stage: A tumor classification scheme developed by the American Joint Committee on Cancer.

T The size and extent of the primary tumor

N The absence or presence and extent of regional lymph node metastases

M The absence or presence of distant metastases

For each applicable site, a combination of T, N and M elements gives a classification of Stage 0, I, II, III, IV and Unk (unknown)

Survival Rate: Survival curves are plotted using the Product-Limit Method of Kaplan and Meier (1958). The cumulative probability of survival decreases whenever there is a death and remains constant until the next death, resulting in a "step" curve rather than a smooth line. The size of the decrease depends on the number of remaining patients when the death occurs. Losses to follow-up over time or limited follow-up length for patients, reduces the sample size without causing a drop in the survival curve.

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