CANCER SERVICES ANNUAL REPORT 2017

PROSTATE CANCER

"YOUR JOURNEY IS OUR MISSION"

Glendale Adventist Medical Center

Adventist Health

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KEVIN A. ROBERTS
President and CEO

Welcome to the 2017 Cancer Services Annual Report

A message from Kevin A. Roberts and Sharon Correa

In the greater Glendale area, during the past decade, the number of patients with primary cancers treated at Glendale Adventist Medical Center (GAMC) has grown by more than 25 percent. Local demands for cancer treatment are increasing each year. To help meet this critical need we have invested in significant technology upgrades in radiation therapy systems in our Cancer Center, along with extensive interior renovations.

Further, Glendale Adventist Medical Center is working to be among those medical centers that provide the finest cancer care, not only in our region but across the country.

Our mission is to share God's love with our community and provide whole person care. When it's delivered in a holistic, loving, body, mind-and-spirit package, along with great technology and by great mission-minded professionals, patients are going to have a world-class experience. They are going to know they're in the right place.

TECHNOLOGY CENTERPIECE

The new Varian TrueBeam Linear Accelerator technology is the centerpiece of the Cancer Center's renovation. It is currently GAMC's highest investment priority — not only due to the critical impact it can have on patients — but because of the sheer volume of patients who need the service while avoiding the possible rigors of traveling outside the community. Based on current patient statistics, we calculate that within the first year of operating the new linear accelerator, the medical staff will treat more than 275 patients who live or work in GAMC's immediate service area.

Patients can drive somewhere else for cancer treatment outside of Glendale but we want to give them a good reason — the right place — to come to Glendale Adventist Medical Center. Radiation treatments may require numerous visits, so upgrading our technology is in our patients' best interests. We want to ensure that our patients have the best of both worlds, highest quality service and care, located close to home.

CANCER SERVICES UPDATE

Navigation – The Cancer Center is adding a lead navigator and further developing the navigation program serving all cancer patients, ensuring that every patient is followed and supported through the continuum of cancer care. At the heart of navigation is patient safety and wellness. The goal is a seamless journey throughout treatment, providing whatever is needed depending on the patient's diagnosis. We are holding true to our message to our patients, "Your Journey is Our Mission."

Medical Staff – **Ami Patel**, MD, board-certified hematologist-oncologist, is a significant recent addition to our medical staff. Dr. Patel served as a primary care physician at GAMC for many years and is now practicing with medical oncologist **Mihran Shirinian**, MD.
GAMC will continue to recruit world-class providers to our hospital, ensuring our patients have access to the best in care.

Advanced Technology – The Varian TrueBeam Linear Accelerator is one of the most advanced radiation therapy systems yet developed for safe, effective treatment of cancers. GAMC is the only medical center in our service area currently to invest in this latest technology.

Cancer Services Center Renovation – In addition to the Varian TrueBeam technology, the $4.34-million project covers a redesign of the center's interior for a more welcoming and comfortable environment. Projected completion is Fall 2017. During construction, patients are continuing to receive a full range of services, including radiation therapy, in a temporary facility adjoining the center.

Lung Health Screening – With lung cancer being the leading cause of cancer-related death in Glendale, this new low-dose screening program will identify and follow up on patients who present with lung nodules that may or may not develop over the course of their lives. Once baseline measurements are taken, patients will receive future monitoring. Early detection of lung cancer is imperative to increasing chances for survival.

Growth – Analytic caseload has grown significantly during the past year. Integral to this growth is the strong support of our medical staff and affiliates in GAMC's award-winning Comprehensive Community Cancer Program. We are privileged to serve as colleagues to those who are devoting their careers in the fight against a disease that affects so many individuals and families in our community.

SHARON CORREA
Vice President and Chief Information Officer

Cancer Committee Chairman's Message

I am proud to present the Glendale Adventist Medical Center Cancer Services Annual Report for 2017, reflecting 2015 data and 2016 activities.

BORIS BAGDASARIAN, DO
Hematology and Oncology, Chairman of the Cancer Committee

Our cancer center continues its commitment to provide comprehensive, quality, multidisciplinary and patient-oriented care to those diagnosed with cancer. The program provides clinical services adept in the prevention, education, early diagnosis, optimal treatment, surveillance for recurrent disease, support services, palliative and end-of-life care for our patients.

The institution continues to see a steady annual rise in the number of cancer cases over the years. Every physician who is involved in patient care is a highly skilled, board-certified specialist. We conduct weekly multidisciplinary tumor boards to review prospective cases in a collegial and consultative setting. All treatment cases are compliant with National Comprehensive Cancer Network (NCCN) guidelines and patients are evaluated to determine if they meet the criteria for participating in meaningful and novel clinical trials.

The cancer committee is a multidisciplinary team comprised of representatives from physician specialties, nursing, administration, quality services and the cancer registry. The group meets at least quarterly to ensure cancer program elements are in place and functioning as required by the American College of Surgeons Commission on Cancer (ACoS). The goal of the cancer committee is to encourage plans for improvement and change, evaluate all cancer-related activities and further strengthen services available to our cancer patients. We had two continuing medical education lecture series held on colon and breast cancer with great support from our cancer care team. 2017 will be a survey year for the GAMC Cancer Center. We are looking forward to continued success and excellence in the evaluation of the program.

Thank you to our ACoS Cancer Center Coordinators for 2016: Quality Improvement Coordinator **Dennis Quagliani**, director of cancer services; Cancer Registry Quality Coordinator **Denise Cleveland**, cancer registry manager; Community Outreach Coordinator **Tracey Sanders**, Ingeborg's Place Apart; Clinical Research Representative/Coordinator **Lily Villalobos**, clinical trials; Psychosocial Services Coordinator **Cynthia Klinger**, MFT; **Sam Carvajal**, MD, physician liaison; ACoS; and **Boris Bagdasarian**, DO, cancer conference coordinator.

We are proud of our highest outcomes in cancer care and treatment. We are fully committed to putting our knowledge, experience and energy forward to ensure the best possible outcome for each patient. We understand our responsibility as the humble servants of those who seek our assistance.

Cancer Care Guild President's Message

Glendale Adventist Medical Center's Cancer Care Guild helps bring awareness to our community and focuses on raising funds to provide free support services to cancer patients and their families, regardless of where they are treated.

It's heartwarming to witness the dedication of our board of directors who volunteer in support of this important cause.

2016 was another eventful year for our Guild. We celebrated survivorship at the annual Cancer Survivors Luncheon, an inspirational and emotional time to witness cancer patients' strength and faith.

We hosted our fourth annual Laugh 4 A Cause comedy night at the Alex Theatre with more than 1,000 guests and supporters who helped generate over $85,000 in ticket sales and sponsorships. We also enjoyed a shopping day at Bloomingdale's Glendale, our annual membership reception, a Cancer Center tour and the festive holiday celebration at Oakmont Country Club.

The Guild is pleased to contribute to the Cancer Center's acquisition of a new state-of-the-art linear accelerator—the latest technology in radiation therapy treatment.

These past three years have been a wonderful experience serving as Guild president. Volunteering alongside a generous and compassionate group, in addition to the highly skilled staff of professionals representing the Cancer Center and Healthcare Foundation, has been my honor and privilege. I will cherish the memories.

Please join me in welcoming Anita Aghajanian, 2017 incoming president.

2016 Cancer Care Guild Board (not all members are pictured).

TINA PARSEGIAN, CFS®, RFC®,
Cancer Care Guild President,
2014-2016

ANITA AGHAJANIAN
2017 Incoming President

Spotlight on Urologists

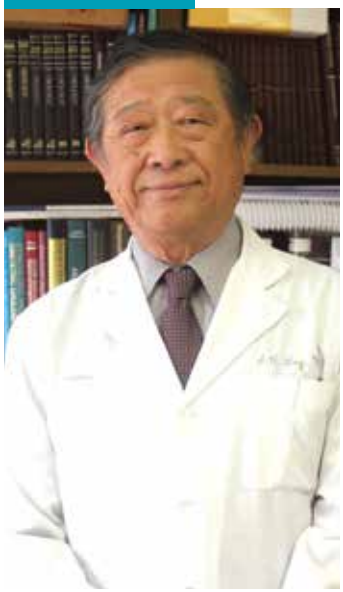
Nationally-recognized urologists at Glendale Adventist Medical Center are board-certified experts and innovators in their fields. These top physicians are leading the way in providing groundbreaking techniques and procedures that truly change the quality of life for their patients and their families.

Ben B. Shenassa, MD, FACS
Board-Certified, Urology

Dr. Shenassa received his undergraduate degree from the University of California, Los Angeles, in cybernetics with an emphasis on biological sciences. He went on to complete his medical degree at Tulane University School of Medicine in New Orleans, Louisiana, where he subsequently completed his residency in urology at Tulane Medical Center.

Dr. Shenassa is an active member of the American Urologic Association (AUA), the Western Section AUA, the American Association of Clinical Urologists and the Los Angeles County Medical Association.

Currently, Dr. Shenassa performs advanced surgical procedures treating urological cancers, prostate disease, stone disease and incontinence. He is also experienced in incorporating laparoscopic and robotic techniques when indicated. He is conversant in English, Spanish and Farsi. His office staff collectively are able to provide care for Armenian, Spanish, Russian and Tagalog-speaking patients.



Sze-Ching Lee, MD, FACS
Board-Certified, Urology

Dr. Lee received his medical degree from Loma Linda University School of Medicine and went on to complete his residency in urology at White Memorial Medical Center in Los Angeles, California. During this time he completed additional training in general surgery.

Dr. Lee has been a member of the American Board of Urology since 1978. He is also a member of the American Urological Association and the American College of Surgeons, among other highly notable associations.

Currently, Dr. Lee is the urology representative for the department of surgery at Glendale Adventist Medical Center. Dr. Lee also volunteers his time and efforts to aid the Cancer Center staff in their annual community prostate screening. He is a highly experienced specialist with over 40 years of practice in the field. Dr. Lee performs radical prostatectomies and other urological procedures.

Kamyar Ebrahimi, MD
Board-Certified, Urology

Dr. Ebrahimi completed his bachelor's degree at the University of California, Los Angeles, and received his medical degree from the University of California, San Diego, with honors. He completed his residency in urology at Loma Linda University, where he also received his fellowship training in robotics urologic surgery. He has been practicing in Glendale since 2010, where he has been an active member of the community and the medical staff.

Dr. Ebrahimi treats a wide variety of urologic diseases using minimally invasive techniques. His passion for treatment of urinary stones has led him to develop a technique where they can be treated with no X-ray exposure to the patient. His mission has always been to bring an academic level of urologic care to the community setting, a commitment he led while at Loma Linda. He works closely with the other urologists at Glendale Adventist Medical Center.

TRACEY SANDERS
Positive Image Coordinator

2016 Community Outreach Programs

Glendale Adventist Medical Center cancer services reaches out to our community by hosting and participating in a number of health-related activities, cancer prevention and screenings.

Highlights included:

Nutrition and Brain Health-March 10, 2016. The Employee Well-Being Program, along with guest speaker Tamar Apelian, held a class to learn about healthy cognitive functioning and promotion of a happy, stress-free brain. Healthy snacks were provided.

Bras for a Cause-April 16, 2016. This annual Soroptimist of Glendale-sponsored event raises money and awareness for breast cancer. Supported by cancer services, a group of cancer patients and survivors submitted an entry for Bras for a Cause and attended the fundraiser dinner.

Cancer Survivors' Day-June 17, 2016. The "Winning the Game: A Celebration of Life,"-themed event was attended by over 200 cancer survivors and their caregivers. Keynote speaker was cancer survivor and presenter Lee Tomlinson. The "Flame of Hope" award was presented to Tina Parsegian, outgoing Cancer Care Guild president. A special feature of this event included a musical performance by Al, Zin and Jetsun Jacobs.

Good Nutrition during Cancer Treatment-July 11 and December 12, 2016. GAMC dietician Julie Ji provided guidance to identify opportunities to improve survivors' dietary behaviors.

Prostate Screening-October 13, 2016. A prostate cancer screening was held at the Cancer Center with 65 participants. Occult blood testing kits were distributed to 58 participants for colon cancer screening. Physicians and family medicine residents volunteered as well as many employees. Participating physicians were Sze-Ching Lee, MD; Sara Kim, MD; Kamyar Ebrahimi, MD; and family medicine residents Sara Lopez, MD; Gloria Vo, MD; and Yudler Pelaez, MD.

Relay For Life-October 22-23, 2016. Cancer services provides information regarding this event to our patients and donates snacks to this yearly event. Relay For Life is a community-based fundraising event to raise funds to improve cancer survival, decrease the incidences of cancer and improve the quality of life for cancer patients and their caretakers.

Laugh 4 A Cause-October 30, 2016. Supported by the GAMC Cancer Care Guild, Laugh 4 A Cause is a night of comedy presented to the Glendale community with proceeds going to support free services provided to cancer patients at the GAMC Cancer Center and raise funds for a new linear accelerator.

PINKtober-October 2016. Throughout the month of October, community leaders, staff and physicians promoted breast cancer awareness in the community. Cancer services displayed the Glendale Police pink cruiser on October 26, 2016, so that patients and employees could take pictures and sign the hood with messages of hope. Other events included a PINKtober decorating kickoff contest, outreach at the Glendale Galleria, Zumba for Pink and Pray for Pink activities.

Pampered in Pink! A Mammogram Night-October 25, 2016. An evening of pampering, education and support while women receive free mammograms. Fourteen women received free mammograms throughout the month.

Christmas Party-December 19, 2016. An annual Christmas party at the cancer center featured wonderful music, food and the opportunity to celebrate the season with staff, fellow patients and survivors. The cancer services staff hosted the event with the spirit and joy of giving and helping patients during the holidays and throughout the year.

Laugh 4 A Cause Comedy Night Has Audience in 'Stitches'

Comedian Maz Jobrani

Audience members who attended the Healthcare Foundation Cancer Care Guild's fourth annual Laugh 4 A Cause hailed the evening of comedy as "the best yet."

More than 1,000 guests and supporters gathered at the Alex Theatre on Sunday, October 30, for two hours of laughter, and to celebrate cancer survivors as well as physicians, nurses and others who are dedicating their careers to fighting cancer at GAMC.

Ticket sales and generous sponsorships raised more than $85,000 toward the cause of supporting free support services and programs at GAMC's Cancer Center, offered to cancer patients as a courtesy, regardless of where they are treated.

Headliner **Maz Jobrani**, along with warmup comedians **Don Friesen** and **Omid Singh**, led a talented cast in a two-hour show of solo stand-up comedy and ensemble skits, produced by **Vahik (Vic) Pirhamzei**.

Guild President **Tina Parsegian** presided over the evening, which featured an impressive finale highlighting cancer survivors across the stage with messages of hope and faith.

Reflecting on the comedy routines, a guest was overheard after the show, saying, "What a great evening…they really kept us in stitches!"

Community Support

Free Classes and Services at GAMC Cancer Services

Positive Image Center/Ingeborg's Place Apart
Wigs, hair cuts, caps and scarves provided free of charge. Services are provided from a licensed cosmetologist. Appointments are encouraged.

Chair Yoga
Learn gentle yoga movements and relaxation techniques. Good for any level of fitness. Held Mondays and Wednesdays from 5:30PM-6:30PM at the staff training center on the GAMC campus. Wear comfortable clothing.

Knitting Class
Learn the art of knitting. No previous experience required. Needles, yarn and instruction are provided. Classes are every Monday from 11:00AM-1:00PM in the Cancer Center conference room.

Fun with Art
Express your creativity with other survivors. Classes are the second and fourth Friday of each month from 11:00AM-1:00PM in the Cancer Center conference room.

Jewelry Making Class
Learn to design and create jewelry. Supplies are provided. Classes are held the third Friday of each month from 12:00PM-2:00PM in the Cancer Center conference room.

Look Good Feel Better
Cope with skin changes and hair loss using cosmetics and skin care products donated by the cosmetic industry. A trained volunteer cosmetologist gives individual consultations on the proper application of makeup. This class is sponsored by the American Cancer Society.
Registration is required to attend.

Fitness Classes
Recapture strength and balance during and after treatment and recovery. Classes held at the GAMC Therapy & Wellness Center, Tuesdays and Thursdays from 10:00AM-11:00AM. Mandatory assessments are required prior to first class.

Free Support Groups, Counseling, Classes and Imaging Services at GAMC Cancer Services

Cancer Support Group
This support group is designed for cancer survivors at any stage of cancer, from the newly diagnosed to those with years of survivorship. Caregivers are welcome.

Meetings are held every Wednesday from 11:00AM-12:30PM in the Cancer Center conference room.

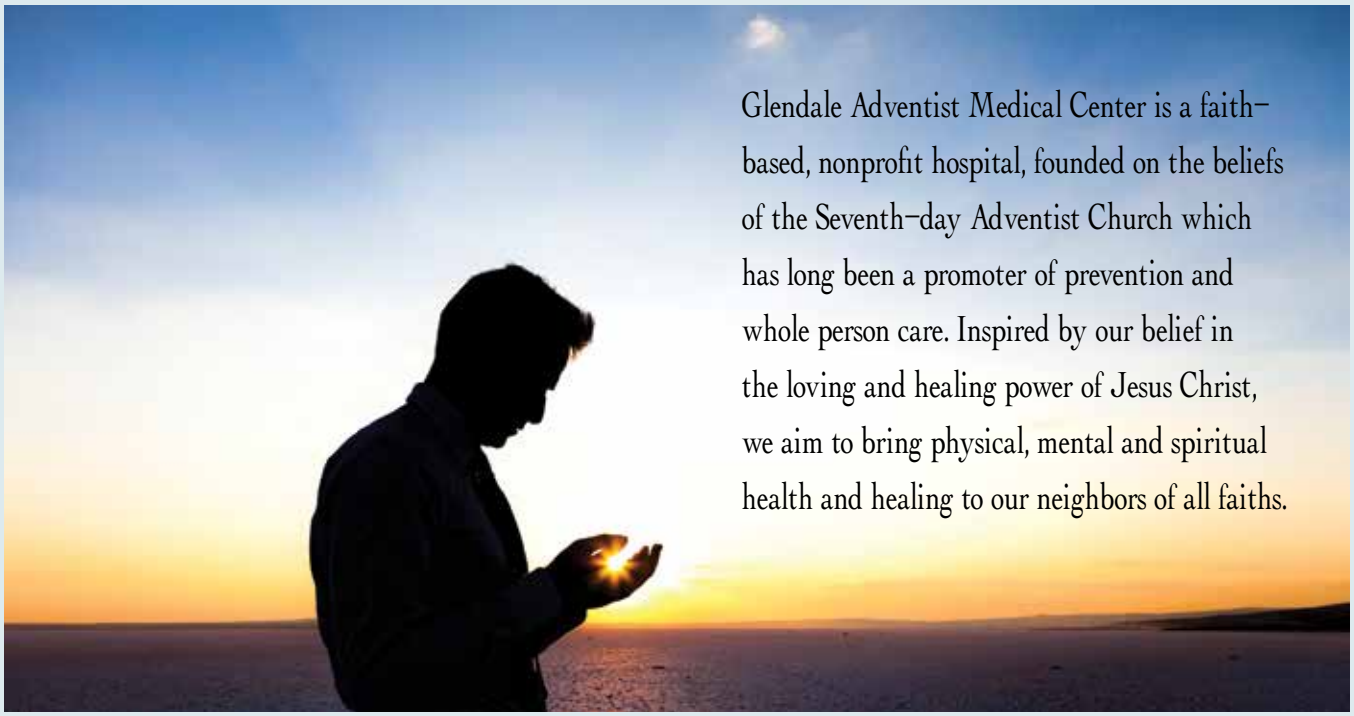
Cancer Grief and Loss Support Group
This support group is open to survivors and anyone affected by cancer loss. Meetings are held the second and fourth Wednesday of each month from 6:00PM-7:30PM in the Cancer Center conference room.

Brain Tumor Support Group
This support group is open to people with primary brain tumors and brain metastases. Caregivers are welcome. Meetings are held the first and third Wednesday of each month from 6:00PM-7:30PM in the Cancer Center conference room.

Individual and Family Counseling
Individual and family counseling for cancer survivors provided at no charge. Counseling allows participants to explore issues related to the cancer experience.

Fighting Prostate Cancer With Hope

A spiritual message from Al Garcilazo



The American Cancer Society tells us that prostate cancer is the most common cancer among men, but it can often be treated successfully. In fact, there are over 2 million men in the United States who are prostate cancer survivors.

The first step in fighting the disease is early detection. That's why getting screened is so important. But this is a decision that should be made in consultation with your health care provider. Because of my age I've gone through the screening process, which includes a simple blood test and a digital rectal exam (DRE). So far I show no signs of prostate cancer. Yet, I must admit, I never look forward to the DRE. I get it every time I have my annual physical and am always nervous. But once it's over I'm pretty relieved.

The second step in fighting the disease is to cling to hope. Hope is always future-oriented and focuses on the belief that you can expect a positive outcome. You can hope that the screening process will reveal no signs of prostate cancer. But even if it does, you can hope that the medical team will do everything they can to help you fight the disease. You can even hope that you will have the support of family and friends. This will give you strength and confidence as you look towards the future. If hope doesn't come easy for you, then I suggest you find it through spirituality or religion.

Of course, we can only do so much when it comes to our health. We eventually must leave the rest in God's hands. Allow me to share one of my favorite Bible texts: "Don't be afraid, for I am with you. Don't be discouraged, for I am your God. I will strengthen you and help you; I will uphold you with my victorious right hand." (Isaiah 41:10, New Living Translation).

This is my prayer for you.

AL GARCILAZO
Senior Chaplain

American Cancer Society

Making an Impact in the Fight to End Cancer

CHRISSY KIM
American Cancer Society

As a global grassroots force of more than 2.5 million volunteers, the American Cancer Society is fighting to end all cancers. As the largest, private, not-for-profit investor in cancer research, the Society has contributed to a 23 percent decline in overall cancer death rates in the United States since the early 1990s and a 50 percent drop in smoking rates. That means there are 14.5 million cancer survivors alive today in the United States. We're finding cures as the nation's largest private not-for-profit investor in cancer research, ensuring people facing cancer have the help they need and continuing the fight for access to quality health care, lifesaving screenings, clean air and more.

The American Cancer Society was instrumental in the passage of the $1.8 billion 21st Century Cures Act, and in response to the White House's Cancer Moonshot Initiative, the Society has pledged to double its research spending to $210 billion by 2021. The Society currently funds 66 prostate cancer research grants across the country for almost $43 million, including:

- **John Wilkinson**, PhD, is studying how a protein called apoptosis-inducing factor (AIF) and its cellular partners work together to help prostate cancer cells grow. With this information, the hope is new drugs could be designed to more effectively target and kill prostate cancer cells.
- **Ilir Agalliu**, MD, ScD, is examining the complex role of insulin and insulin-like growth factors in aggressive prostate cancers. He is looking at the part they play in cancer progression and recurrence. Such insights could lead to biological markers that predict who's at risk for aggressive prostate cancer and possibly targets for new drugs to prevent and treat the disease.
- **Andrew Hsieh**, MD, has discovered how a protein called mTOR goes haywire and helps prostate cancer cells grow and invade healthy tissues, a process called metastasis. Current mTOR inhibitors have been unable to fully block mTOR, so researchers are now testing experimental drugs to more completely stop mTOR from working.
- Researchers funded by the Society are also searching for ways to outsmart prostate cancer cells that become resistant to hormone therapy. For instance, **Scott Dehm**, PhD, is studying the changes that occur in the target of hormone therapy – the androgen receptor – that allow it to develop an intractable resistance to hormone-blocking drugs. The goal is to develop new hormone-targeted drugs that work better and longer to suppress prostate cancer growth.

At this time, there is insufficient evidence to recommend for or against routine prostate cancer screening for men of average risk. For this reason, the American Cancer Society does not recommend routine screening for prostate cancer. Rather, the Society recommends average-risk men, beginning at age 50, have the opportunity to make an informed decision about prostate cancer screening after discussing the potential limitations and benefits of prostate cancer early detection testing with a health care professional. Men at higher risk, including African-Americans and men with a first-degree relative diagnosed with prostate cancer before age 65, should have this conversation with their doctor beginning at age 45. Men at even higher risk (because they have several first-degree relatives diagnosed with prostate cancer at an early age) should have this discussion with their doctor beginning at age 40. If a man chooses to be tested, the recommended test is the prostate specific antigen test (PSA) with or without a digital rectal exam.

The American Cancer Society's free patient and caregiver services programs include multilingual support 24/7 at 1 (800) 227-2345 and at cancer.org, assistance with local transportation and with lodging for patients who must travel long distances for treatment. Through the Society's many programs, there are numerous volunteer opportunities, such as driving patients to treatment, helping mobilize community members to participate in Relay For Life as well as donating and shopping at Discovery shops and much more. Call your American Cancer Society at 1 (800) 227-2345 or visit cancer.org for more information.

The American Cancer Society could not accomplish its lifesaving mission without the dedication of committed partners like Glendale Adventist Medical Center. Together we are creating a world with less cancer and making an impact in the fight to end all cancers.

Continuing Medical Education 2016

April 6, 2016

Diagnosis and Treatment of Colon Cancer

This two-session series included the discussion of colon cancer from diagnosis by endoscopy and endoscopic ultrasound and findings radiologically by **Mehdi Khorsandi**, MD, gastroenterology, and **Linh Chen**, MD, diagnostic radiology.

April 13, 2016

Diagnosis and Treatment of Colon Cancer

Discussion continued to definitive treatment with speakers **Sam Carvajal**, MD, general surgery; **Boris Bagdasarian**, DO, hematology/oncology; and **Sara Kim**, MD, radiation oncology.

October 26, 2016

Benign and Pre-malignant Breast Disease

Discussion regarding identifying current trends on the early detection and treatment of benign and pre-malignant tumors. Diagnosis and treatment were discussed from **Linh Chen**, MD, diagnostic radiology; **Michele Cosgrove**, MD, pathology; **Sam Carvajal**, MD, general surgery; **Boris Bagdasarian**, DO, hematology/oncology; and **Sara Kim**, MD, radiation oncology.

November 2, 2016

Malignant Breast Tumors: Diagnosis and Treatment

Discussion ensued regarding identifying current trends on the early diagnosis and treatment of malignant breast tumors. Diagnosis and treatment were discussed from **Linh Chen**, MD, diagnostic radiology; **Chandrika Seneviratne**, MD, pathology; **Sam Carvajal**, MD, general surgery; **Peter Ashjian**, MD, plastic surgery; **Mihran Shirinian**, MD, medical oncology; **Ami Patel**, MD, medical oncology; and **Sara Kim**, MD, radiation oncology.

December 7, 2016

State-of-the-Art Palliative Care

Lecture content consisted of a patient's eligibility for referral to palliative care or consult; hospice and palliative care services and benefits; and the issues that may delay or prevent referrals to hospice programs. Speakers included **Steven Pantilat**, MD, professor of Clinical Medicine, **Alan M. Kates** and **John M. Burnard**, endowed chair in Palliative Care director, Palliative Care Program and Palliative Care Leadership Center Department of Medicine, University of California, San Francisco.

DENISE CLEVELAND, RHIT, CTR
Cancer Data Manager

Multidisciplinary Tumor Conferences

Multidisciplinary Surgical & Breast Tumor Board Conferences: A forum that provides our cancer specialists an opportunity for meaningful discussion relating to the treatment of cancer on an individual patient basis. This promotes excellence in cancer patient care.

2015 PRIMARY SITES DISCUSSED	CASES
AMPULLA	2
BILIARY TRACT	1
BLADDER	8
BONE MARROW	2
BRAIN	1
BREAST	31
CERVIX, UTERINE	1
COLO-RECTAL	6
ESOPHAGUS	3
GALLBLADDER	1
INTESTINE – SMALL	1
KIDNEY	5
LIVER	1
LUNG	3
LYMPHOMA	2
MESOTHELIOMA	1
OVARY	1
PANCREAS	10
PROSTATE	6
RECTUM	2
SALIVARY GLAND	1
SKIN-Squamous Cell	1
SKIN – Melanoma	4
SOFT TISSUE	5
STOMACH	7
TESTIS	1
THYROID	3
UTERINE	2
UNKNOWN PRIMARY	4
TOTAL:	**116**

This total reflects sites presented. Some were represented at following meetings for further discussion and outcome.

Glendale Adventist Medical Center Multidisciplinary Tumor Board Conferences are held weekly, Wednesdays at 7:00AM in Committee Rooms A/B.

The breast tumor board is designated for the first and third Wednesday of the month and co-moderated by a radiologist specializing in mammography, breast MRI and disease relating to the breast. Non-breast cases are not refused at these meetings when treatment decisions are needed.

The surgical tumor boards are designated for the second and fourth Wednesdays. Breast cases are not refused at these meetings when treatment decisions are needed.

The cancer registry staff gathers the information required for discussion including: Medical history and pertinent pathology and radiology materials for review. Multidisciplinary tumor boards are moderated by a surgeon, medical oncology or radiation oncologist. Both prospective and retrospective cases are discussed. Sometimes a case may be represented for further follow-up education and to report outcome. Physicians are encouraged to bring any and all cases they feel treatment discussions would be of benefit to both them and their patients for further care.

Tumor boards provide the presenting physicians with the opportunity to obtain treatment information from the multidisciplinary perspective. Physicians take with them the treatment recommendations to advise their patients accordingly of their treatment options.

The American College of Surgeons requires that the number of cases presented annually is proportional to 15 percent of the analytic caseload and represents the institution's case mix. Our 2015 analytic caseload was 732 and 16 percent of this caseload was presented at the tumor board conferences.

Total cases presented at tumor board are both analytic and non-analytic. Some of these cases are analytic from neighboring hospitals that may not have tumor boards.

Primary Sites Comparison*

Primary Site	2007	2008	2009	2010	2011	2012	2013	2014	2015
ALL SITES	547	567	578	624	627	609	564	618	731
ORAL CAVITY/PHARYNX	9	12	15	20	17	21	24	14	8
ESOPHAGUS	3	5	2	8	5	2	3	2	3
STOMACH	19	11	23	18	20	17	14	17	26
COLON	46	51	55	57	56	59	44	49	64
RECTUM & RECTOSIGMOID	21	23	23	21	16	18	18	14	27
PANCREAS	15	11	16	21	14	19	14	15	16
LUNG	45	53	65	82	62	63	57	79	65
LEUKEMIA MYELOMA, & HEMATOPOIETIC	22	24	22	26	27	23	24	26	29
SOFT TISSUE	4	1	3	4	3	6	4	5	5
MELANOMA OF THE SKIN	10	7	6	7	11	14	5	14	13
BREAST	88	120	101	91	120	115	103	131	178
CORPUS UTERI	17	14	21	15	21	18	17	23	19
OVARY	5	11	8	10	16	17	11	6	7
PROSTATE	38	30	29	43	40	33	32	32	36
BLADDER	30	21	25	32	40	26	32	29	52
KIDNEY/RENAL	8	21	7	10	12	14	16	15	13
BRAIN/NERVOUS SYSTEM	47	49	36	55	47	29	27	33	42
ENDOCRINE	32	26	41	34	39	35	36	26	47
LYMPHATIC SYSTEM	28	28	32	27	27	29	33	40	34
UNKNOWN PRIMARY	9	7	8	14	4	9	10	5	13

* Includes analytic cases only (diagnosed and/or received first course treatment at GAMC).

2015 Primary Site Table: Sorted from Most to Least Common

Site Group	Total Cases	Class		Sex		Stage					Unknown	Not Applicable
		Analytic	NonAn	M	F	Stage 0	Stage I	Stage II	Stage III	Stage IV		
ALL SITES	800	732	68	333	467	55	168	119	100	116	72	101
BREAST	194	179	15	0	194	35	48	47	22	2	24	0
COLON	67	64	3	36	31	4	11	14	16	12	7	0
LUNG/BRONCHUS-NON SM CELL	61	57	4	35	26	1	10	3	12	30	1	0
BLADDER	57	52	5	43	14	13	22	12	1	1	3	0
PROSTATE	45	36	9	45	0	0	3	15	5	6	7	0
NON-HODGKIN'S LYMPHOMA	34	33	1	20	14	0	7	4	7	11	4	0
THYROID	31	29	2	7	24	0	19	2	5	3	0	0
RECTUM & RECTOSIGMOID	29	27	2	19	10	1	4	5	4	5	8	0
STOMACH	27	26	1	16	11	0	8	3	2	6	7	0
OTHER NERVOUS SYSTEM	27	26	1	6	21	0	0	0	0	0	0	26
CORPUS UTERI	20	19	1	0	20	0	9	0	6	2	2	0
PANCREAS	17	16	1	9	8	0	1	4	0	7	4	0
KIDNEY AND RENAL PELVIS	17	13	4	14	3	0	5	0	3	4	1	0
OTHER ENDOCRINE	16	14	2	6	10	0	0	0	0	1	0	13
MELANOMA OF SKIN	15	13	2	12	3	0	4	4	3	2	0	0
BRAIN	15	14	1	8	7	0	0	0	0	0	0	14
LEUKEMIA	13	13	0	6	7	0	0	0	1	1	0	11
UNKNOWN OR ILL-DEFINED	13	12	1	6	7	0	0	0	0	0	0	12
MYELOMA	12	11	1	7	5	0	0	0	0	0	0	11
OVARY	11	7	4	0	11	0	3	0	1	3	0	0
LIVER	9	9	0	7	2	0	3	1	1	2	1	1
BILE DUCTS	9	9	0	5	4	0	2	1	2	2	0	2

2015 Primary Site Table:

(Continued)

Site Group	Total Cases	Class		Sex		Stage					Unknown	Not Applicable
		Analytic	NonAn	M	F	Stage 0	Stage I	Stage II	Stage III	Stage IV		
LUNG/BRONCHUS-SMALL CELL	9	8	1	2	7	0	1	0	2	4	1	0
SOFT TISSUE	7	5	2	4	3	0	1	2	2	0	0	0
OTHER HEMATOPOIETIC	6	5	1	3	3	0	0	0	0	0	0	5
CERVIX UTERI	6	6	0	0	6	0	3	1	0	2	0	0
ESOPHAGUS	4	3	1	4	0	0	0	0	0	3	0	0
OTHER DIGESTIVE	4	4	0	0	4	0	0	0	0	0	0	4
GALLBLADDER	3	2	1	2	1	0	0	0	1	1	0	0
TONGUE	2	2	0	2	0	0	0	0	0	1	1	0
FLOOR OF MOUTH	2	2	0	2	0	0	1	0	1	0	0	0
TONSIL	2	2	0	0	2	0	0	0	1	1	0	0
ANUS, ANAL CANAL, ANORECTUM	2	2	0	1	1	0	0	0	1	0	1	0
LARYNX	2	2	0	1	1	1	1	0	0	0	0	0
VULVA	2	1	1	0	2	0	0	1	0	0	0	0
OROPHARYNX	1	1	0	1	0	0	0	0	0	1	0	0
HYPOPHARYNX	1	1	0	1	0	0	0	0	0	1	0	0
PERITONEUM, OMENTUM, MESENT	1	1	0	0	1	0	0	0	1	0	0	0
PLEURA	1	1	0	1	0	0	0	0	0	1	0	0
BONE	1	1	0	1	0	0	0	0	0	1	0	0
OTHER SKIN CA	1	1	0	0	1	0	0	0	0	0	0	1
UTERUS NOS	1	0	1	0	1	0	0	0	0	0	0	0
OTHER FEMALE GENITAL	1	1	0	0	1	0	1	0	0	0	0	0
TESTIS	1	1	0	1	0	0	1	0	0	0	0	0
OTHER URINARY	1	1	0	0	1	0	0	0	0	0	0	1

Cancer Clinical Trials: Bio-Banking Makes Biomarker Discovery and Investigation Possible

LILY VILLALOBOS, MHA, CCRC
Clinical Research Director

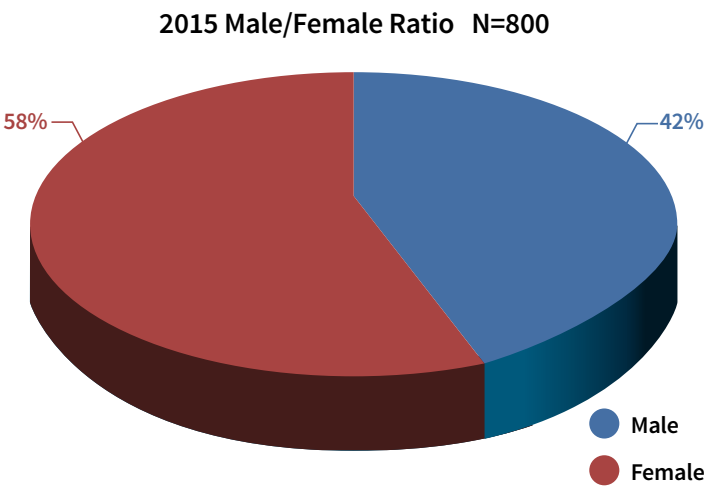
The identification of clinically significant biomarkers is an expanding area of research which will extend diagnostic capabilities.

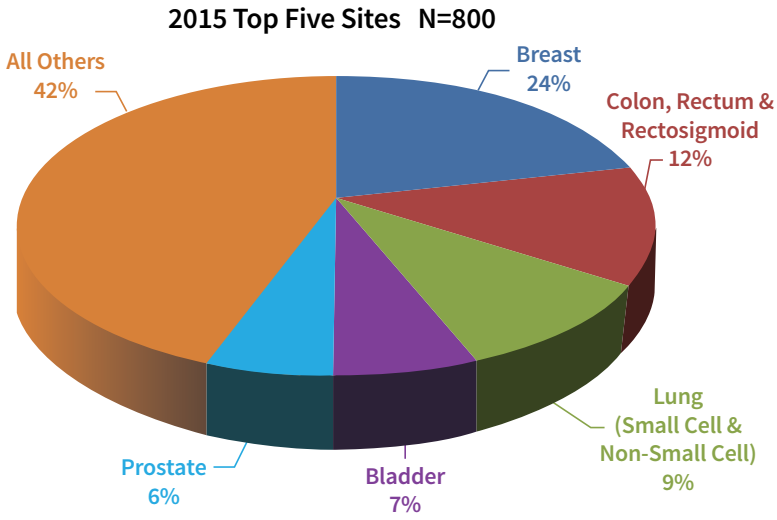
Biorepositories can be designed for therapeutics or research or both. Research biorepositories are key to biomarker discovery and investigation. They ensure access to collections of tissues that allow researchers to conduct basic and translational research into human disease. Glendale Adventist Medical Center's Office of Integrated Research (OIR) participates in bio-banking efforts to contribute to the national nurturing of such an invaluable resource.

As part of the exceptional standards that accompany the accreditation awarded to GAMC's Cancer Center by the American College of Surgeons/Commission on Cancer as a Community Hospital Comprehensive Cancer Program, we are able to effectively coordinate cancer research activities involving the various applications of treatments among surgeons, medical and radiation oncologists, diagnostic radiologists, pathologists and other cancer specialists, resulting in improved patient care. Some of the most common types of cancer treated in our community are breast cancer, prostate cancer, colon cancer and lung cancer. Building relationships within the oncology research community has helped to expand our research activities, thereby offering patients treatment options that include innovative therapies targeted at reducing the burden of cancer.

Clinical trials conducted through the OIR support the hospital's mission, "To share God's love with our community by promoting healing and wellness for the whole person." In addition to bio-banking activities, other ongoing clinical trials being conducted at GAMC include breast cancer studies. Expansion of the types and number of cancer clinical trials is underway. If you are interested in participating in clinical research trials at GAMC, please contact the Office of Integrated Research at (818) 409-8009.

Facts & Figures





Measure Description

BL2RLN – Bladder Measure: At least two lymph nodes are removed in patients under the age of 80 undergoing partial or radical cystectomy.

Criteria:

- Primary site = Bladder, Invasive
- Age = 18 to 79
- Number of previous cancers =/< 1
- Histology = 8050, 8120, 8130, 8131
- Stage at Diagnosis = c2-c4b
- Analytical = All or part of 1st course of treatment performed at reporting facility
- Cystectomy performed at this facility (partial-radical)
- Charlson-Deyo Score <3 (co-morbidities)

Experience at Adventist Health Glendale 2010 to 2015

Seven cases between 2010 to 2015 had either partial or radical cystectomy, meeting the above criteria.

Of these seven partial or radical cystectomies, one had only one lymph node removed. (Other tissue believed to be lymph node was determined to be fibrovascular tissue, negative for tumor).

Finding:

6/7 partial/radical cystectomies met standard in sampling a minimum of 2 lymph nodes, 86% compliance.

- Cancer Program practice Profile Reports (CP3R)

Varian TrueBeam Linear Accelerator

Latest in Cancer Fighting Technology Coming to GAMC

One of the most advanced radiation therapy technologies yet developed for the treatment of cancer is coming to Glendale Adventist Medical Center.

The Varian TrueBeam Linear Accelerator, currently scheduled to begin service in Fall 2017, is able to destroy cancer cells with more precision and greater accuracy, and often in less time and with fewer treatments, according to **Sara Kim**, MD, director of GAMC's Radiation Oncology program.

"This is the latest cancer-fighting technology available," Dr. Kim said, "and having it located in our cancer center will be a significant benefit to patients in Glendale and surrounding communities."

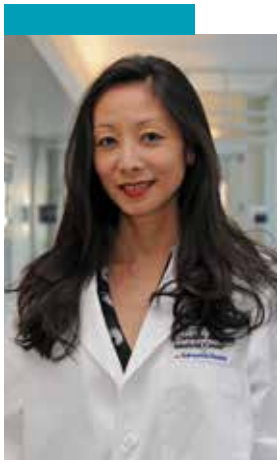
The new linear accelerator is a valuable addition to GAMC's Comprehensive Cancer Program, recognized by the American College of Surgeons and past recipient of the highly competitive Outstanding Achievement Award. No other hospital in Glendale currently offers this advanced level of radiation therapy equipment.

"We are a comprehensive community cancer program that is among the very best in the country," said **Boris Bagdasarian**, DO. "We pride ourselves in having the top of the line technology and expert physicians. This new linear accelerator will provide the most advanced care for our patients."

The Cancer Services Center, which will house the new linear accelerator, also is being renovated to create a more functional and comfortable environment for patients.

Imaging of Prostate Cancer

The standard approach to the diagnosis of prostate cancer consists of prostate-specific antigen (PSA) screening, digital rectal examination and random transrectal biopsy. Imaging plays an important role in the detection, localization and staging of prostate carcinoma and in carrying out biopsies for histopathologic diagnosis. In particular MRI has emerged as a new, powerful imaging modality.



LINH CHEN, MD
Diagnostic Radiology,
Medical Director of
Women's Imaging

Transrectal ultrasound (TRUS) is widely available, well tolerated by patients and relatively inexpensive. The prostate is imaged with a high-frequency ultrasound probe, demonstrating division of the gland into an isoechoic peripheral zone and a more heterogeneous central gland. Prostate cancers are usually hypoechoic nodules within the peripheral zone, although they can have a variable appearance. The sensitivity and specificity of TRUS is far too low for sonographic prostate cancer screening. The main roles of TRUS are measuring the prostate volume (for estimation of the prostate-specific antigen [PSA] density) and providing guidance for biopsy of the prostate. Peripheral zone tumors that contact the fibromuscular rim surrounding the prostate may be associated with extracapsular invasion. TRUS can demonstrate bulges of the prostate capsular outline or overt extracapsular extension. Nevertheless, the TRUS accuracy in the staging of localized prostate cancer has been inconsistent. [1]

Computed tomography (CT) has limited value in demonstrating intraprostatic pathology and in local staging. Its main utility is in detecting metastatic disease, such as lymph node involvement or bone metastases. Both CT and MRI depict lymph node enlargement and have similar accuracy for the evaluation of nodal metastases based on size assessment. [2] However, neither CT nor MRI can demonstrate tumors within non-enlarged lymph nodes. CT may also be used to depict soft-tissue metastases elsewhere in the body.

Potential roles of MRI are in guiding prostate biopsy, local staging of biopsy-proven cancers, treatment planning and post-treatment surveillance. [3] The combination of T2-weighted imaging with diffusion-weighted imaging, dynamic contrast-enhanced imaging and spectroscopy is helpful in detecting and localizing suspicious prostatic lesions that can be biopsied under ultrasound- or MRI-guidance. An important role of morphologic T2-weighted MRI is the assessment of local extracapsular extension and invasion of the seminal vesicle in a patient with no documented distant metastases. The reported sensitivities and specificities for local staging range from 14-100 percent and from 67-100 percent, respectively. [4]

(Continued on page 23)

Imaging of Prostate Cancer *(Continued)*

To increase both the sensitivity and specificity of MRI in the detection of prostate cancer, several functional techniques have been developed and utilized. These take advantage of various tumor characteristics, such as cellular density (diffusion-weighted imaging), angiogenesis (dynamic contrast-enhanced MRI) and tumor metabolism (magnetic resonance spectroscopy). In one meta-analysis [5], the pooled sensitivity and specificity of T2-weighted imaging combined with diffusion was 76 percent and 82 percent respectively, and was superior to T2-weighted imaging alone. Accuracies of 70-90 percent have been reported for dynamic contrast-enhanced MRI in the primary diagnosis of prostate carcinoma in the peripheral zone. [6] In a 2013 systematic review, magnetic resonance spectroscopy had the highest sensitivity (92 percent) of the MRI techniques, as well as a higher specificity than T2-weighted MRI. [7]

Radionuclide bone scanning after the injection of a technetium-99m (99m Tc) tracer is the current standard for assessing potential prostate bone metastases. [8] Bone scans have a high sensitivity but low specificity for metastatic prostate cancer. In equivocal cases, targeted imaging with plain films, CT scanning or MRI may be necessary. With diffuse bone metastases, a "superscan" may be seen; this superscan demonstrates diffusely high uptake throughout the skeleton, with poor or absent renal excretion of the tracer.

Positron emission tomography (PET) scanning with fluorodeoxyglucose (FDG) has limited proven value in the detection of lymph node metastases and bone metastases from prostate cancer. Another radioisotope, 11 C-choline seems to be the best tracer for the detection of lymph node metastases and is also promising for identifying bone metastases. Unfortunately, the half-life of this radionuclide is very short, so it can only be used in centers with an on-site cyclotron. [9]

In summary, imaging is primarily used for prostate cancer staging and post-treatment surveillance.

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The Prognosis of Prostate Cancer and Treatment Options

KAMYAR EBRAHIMI, MD
Urology

Prostate cancer (PC) is the most common solid organ cancer in American men, affecting one in every six over their lifetime. While the treatment options for PC have vastly grown in the last 20 years, the mere diagnosis often causes quite a bit of distress and consternation for the patient and families.

According to the Center for Disease Control (CDC), in 2013 (for which the most recent year numbers are available), 176,450 men in the United States were diagnosed with PC and 27,681 men died of it. Yet, despite these staggering numbers, over two million men in the U.S. live with PC. Today many patients with the disease are found to have clinically organ-confined disease at the time of diagnosis, thanks in great part to the widely used screening for PC, PSA and annual digital rectal exam. Despite the controversies around PC screening, many urologists still believe in the practice for men who have longer than 10 years to live.

Traditionally, PC was regarded as "a disease of older men," and many believed that "most patients will die with and not of prostate cancer." This school of thought has led to a concept which was originally called "watchful waiting." These patients, especially those much older and with multiple co-morbidities and with a life-expectancy of less than 10 years, chose to not seek any further treatment and had regular follow up checkups with their physician. This was thought to help avoid some of the side effects of the treatments for men which would not have any long term sequelae from watching their cancer, presumably because they would succumb to other diseases in their advanced age.

Yet, in the younger population of men diagnosed with this devastating disease who are expected to live more than 10 years, the choices of treatment were limited and included radical prostatectomy, radiation or hormonal therapy.

Radiation therapy and its different iterations offer a non-surgical means for the cure of PC. Its advantages include avoidance of surgery and its potential side effects and allowing patients to continue their routine while receiving therapy. Radical prostatectomy was initially described in the early 1900s and underwent several revisions until its form popularized in the late 1970s and early 1980s by Dr. Patrick Walsh. He defined the surgical anatomy of the prostate and devised steps to decrease bleeding during the operation and preserve the important nerves and structures, thus preventing the most dreaded side effects of the surgery, which are post-prostatectomy urinary incontinence and erectile dysfunction. This procedure is, however, difficult to master and upwards of 200 cases are required for acquiring consistent results. Nonetheless, it requires a large incision and patients need significant recuperation post-operatively.

With the advances in laparoscopic surgery, small incisions allow for insertion of a small camera and small tools into the abdominal cavity. The operation was transformed, allowing the patient to have equivalent cancer control yet a decrease in post-operative discomfort and convalescence as the smaller incisions were far less painful. However, due to the position of the prostate in the pelvis, this operation is technically challenging and has a significant learning curve. Furthermore, in most centers traditional laparoscopy provides an image which is two-dimensional and the handling of the instruments are difficult and counterintuitive (i.e. when the surgeon wishes to move the instrument in the body to the right, he/she has to move the instrument to the left outside the body) as the instruments are anchored at the skin level. Thus, laparoscopic prostatectomy did not enjoy widespread popularity in the U.S.

In the early 2000s, however, new robotically-assisted technologies were being developed, which eventually became the paradigm shift that was needed for the next step of prostate cancer. These advances culminated in the development of the da Vinci Surgical System, which is available at GAMC and uses several novel technologies to improve the approach to prostatectomy. Some of these improvements were the capability of having a three dimensional view of the anatomy and the ability to move the instruments in an intuitive fashion (i.e. when the surgeon wishes to move an instrument to the right, he or she does so by moving his or her hand to the right) much like in open surgery. Furthermore, the tiny instruments of the robotic system have all the degrees of freedom that the human hand has and is unrivaled by traditional laparoscopic surgery.

Initially, the use of the robot was reserved to the laparoscopically-trained surgeons as there was no formal training during most residencies and as the anatomy and steps of the procedure were akin to that of laparoscopic prostatectomy. However, as the machines became more ubiquitous, training became more standardized and quickly reached the discipline enjoyed by its predecessor, the open radical prostatectomy. The robotic approach affords many advantages, which include decreased bleeding, shorter hospital stay, decreased pain and smaller incisional scars. In the hands of a master surgeon, many believe that the robotic platform also has potential for improved rates of urinary continence and erectile function. However, the procedure still requires a significant learning curve, akin to the open surgical approach. It is important to also mention that the robotic approach is not without complications, especially as the surgeon is negotiating the learning curve.

Over the last decade in Europe and since late 2015 after its approval from the FDA in the U.S., high intensity focused ultrasound (HIFU) has gained slow popularity as another treatment option for treatment of PC. It is a procedure that applies high intensity focused ultrasound energy to locally heat and destroy tissue through ablation. HIFU is touted to be able to preserve optimal function and afford excellent cancer control. However, rigorous head to head studies need to be conducted for its long-term efficacy.

Finally, the advent of many ancillary tests before and after the biopsy has allowed patients and physicians to take out some of the uncertainty from the equation when it comes to the treatment of PC. Traditionally, the PSA, the rectal exam and the Gleason score were the only tools physicians had to be able to predict the behavior of the cancer. However, today there are three widely used genetic tests that are able to be used adjunctively along with the biopsy which help men in making the right decision when diagnosed with PC. While diagnosis of PC can be disheartening for some, the wide array of options will continue to empower men to live many healthy years after its discovery.

Prostate Cancer on a Cellular Level

CHANDRIKA SENEVIRATNE, MD
Pathology

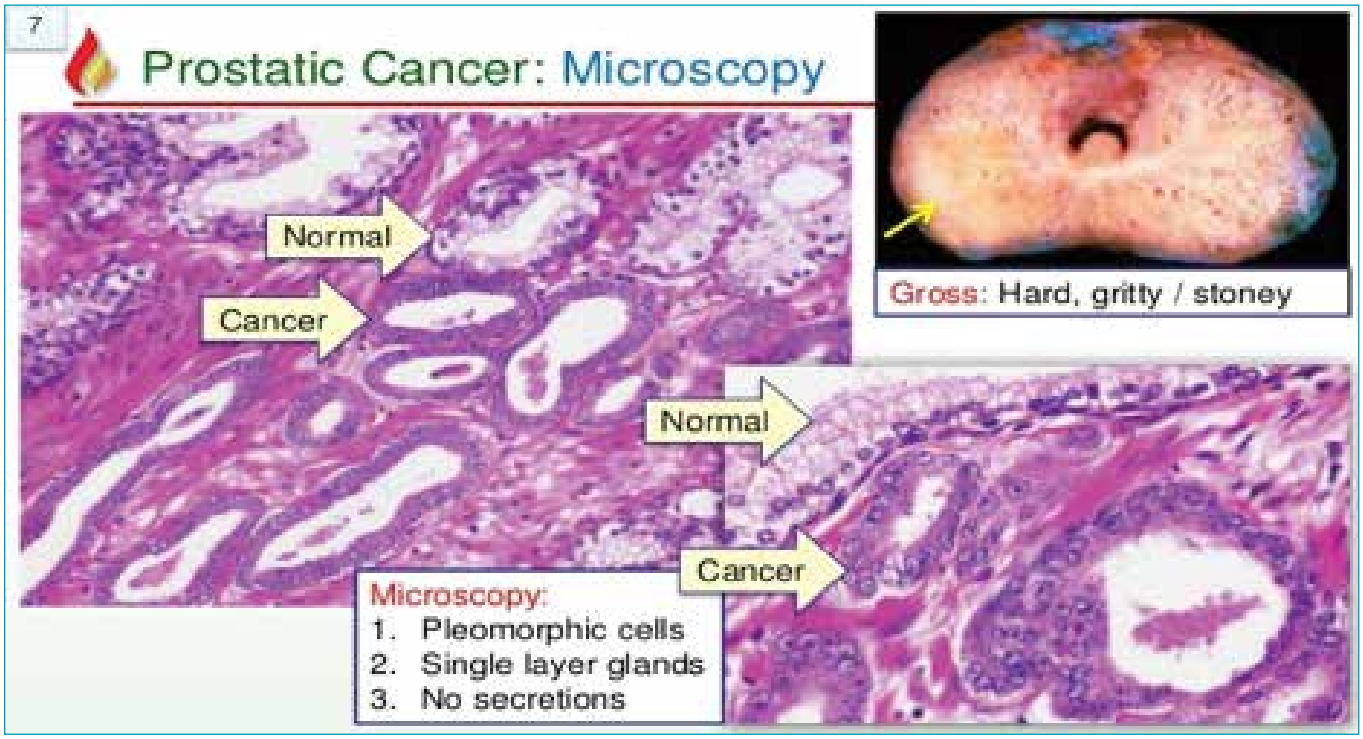
Most prostate carcinomas are adenocarcinomas and arise from acinar cells. The prostate gland usually undergoes atrophy between the fifth and seventh decade. Based on autopsy and epidemiologic data, the lifetime risk of developing prostate cancer for a 50-year-old man is 42 percent, but only 9.5 percent will develop a clinically manifested disease and only 2.9 percent will die from this disease. The majority of prostate carcinoma never progresses to clinically significant disease; a minor portion remains confined to the prostate for many years and other carcinomas progress rapidly to a life-threatening disease. The dilemma for clinicians and pathologists dealing with this tumor is how to distinguish these biologically different types. Pathologists play an important role in preoperative diagnosis and in the postoperative prognosis-oriented evaluation of the prostatectomy material.

Volunteer PSA screening trials have led to an enormous increase in core-needle biopsies of the prostate. With the introduction of widespread screening with PSA, the incidence of stage IV prostate carcinoma presentation has dramatically lessened, although the number of prostate carcinoma detected has increased. PSA is a glycoprotein secreted into the seminal fluid by the epithelial cells of the prostate. It is organ specific but not disease specific. Therefore it is elevated in prostatic injury, infarct, BPH and prostate cancer. Two types of PSA are present. Free PSA is associated with BPH and complex PSA is associated with prostate carcinoma.

Normal PSA - 0-4ng/ml
PSA>10 - Suggestive of cancer
PSA>35 - Almost diagnostic of cancer
Biopsy is indicated if the free PSA<10%
PSA density >0.18

Identification of prostate carcinoma on gross inspection is often difficult, although the color of most grossly visible tumors are tan, white or golden yellow. In prostatectomies prostate carcinoma tend to be multifocal, mainly found in the peripheral zone, followed by the transition zone and central zone. These tumor foci should be at least 5 mm in diameter for a reliable gross identification.

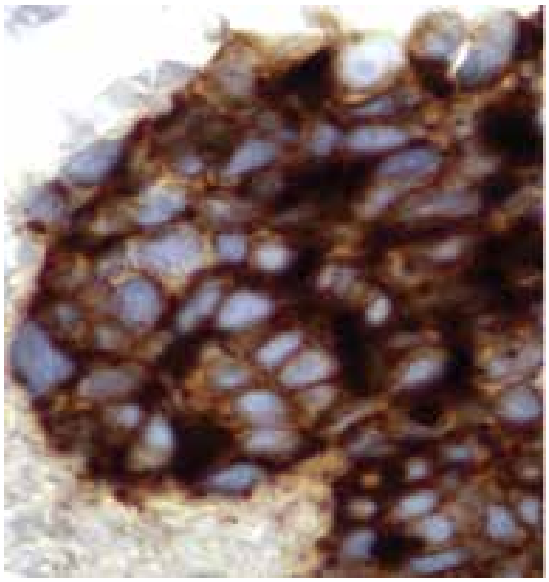
The histological grading is a very important factor for the assessment of prognosis. Carcinoma grading in biopsies is also of limited value in predicting tumor stage. Currently, several different grading systems are in use. Gleason's grading is the most favored, although its reproducibility is very low. The stage of the prostate carcinoma is still the best prognostic factor. In order to accurately assess the pTNM stage, TUR or prostatectomy, tissue must be subject to extensive and standardized processing.



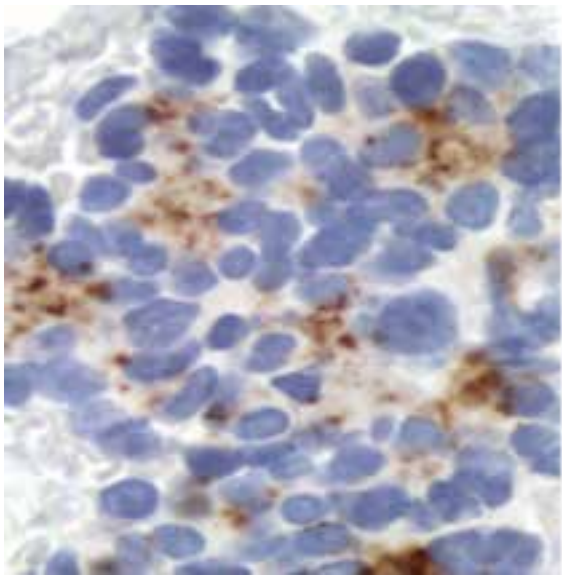
Immunophenotyping of acinar adenocarcinoma:

PSA, PSAP, high molecular weight cytokeratin, p63 and AMACR (P504S) are some of the immunostains utilized since 2004 to aid in the diagnosis of adenocarcinoma. In 2016, two additional immunostains were added, which are NKX3.1 and protein (P501S). NKX3.1 is used if the tumor is negative for PSA and PSAP. It is also useful in the differential diagnosis of urothelial carcinoma and metastatic adenocarcinoma from primary prostate carcinoma.

Prostate adenocarcinoma showing positive staining.



PSMA



PSAP

(Continued on next page)

Prostate Cancer on a Cellular Level

(Continued)

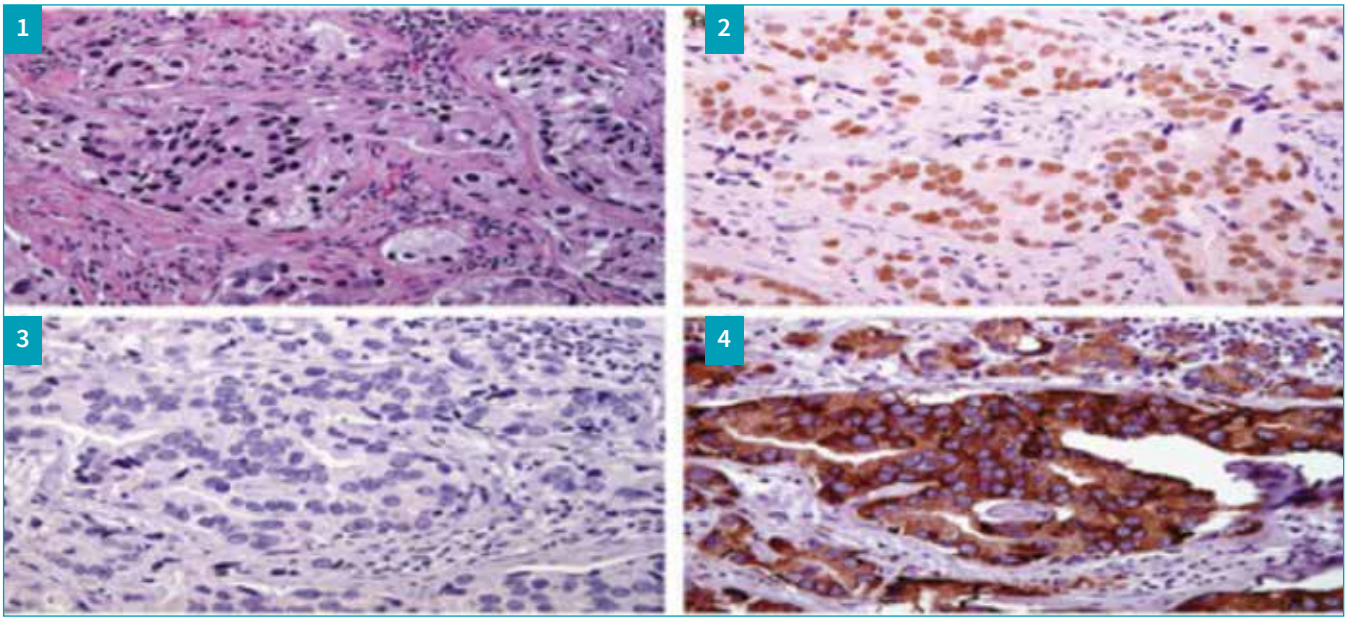


Figure 1: H&E, Prostate CA; Figure 2: NKX3.1; Figure 3: PSA; Figure 4: PSMA

Updated Gleason grading

Gleason grading 2014 International Society of Urological Pathology Gleason grade modification, incorporated into WHO 2016 Classification of prostate cancers.

Grade groups:

Grade 1: Score equal to or less than 6

Grade 2: Gleason score: 3+4 = 7

Grade 3: Gleason score: 4+3 = 7

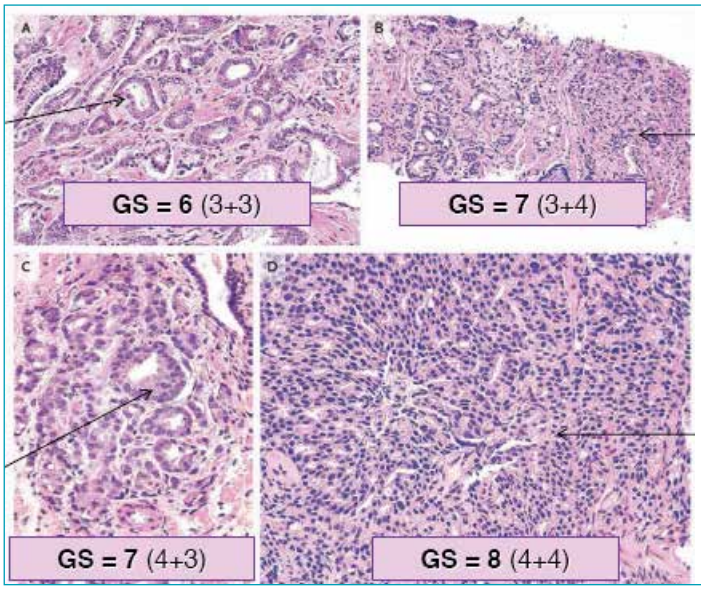
Grade group 4: Gleason score: 4+4 = 8, 3+5 = 8, 5+3+8

Grade group 5: Gleason score: 9-10

Grading changes:

Report % of G4 increase in Gleason 7 cancer

Changes to G4: Cribriform glands and Glomeruloid glands along with fused and poorly formed glands are included in Gleason 4.



Mucinous carcinoma grading is based on the underlying growth (may be Gleason 3 or Gleason 4).

Several studies suggest that minimally active tumor is seen when Gleason grade 4 is less than 5-10%. However it is markedly different when Gleason 4 reaches 20%.

Therefore G4 percent is a significant predictor of adverse pathology and time to biochemical recurrence. Gleason pattern 3+4 has a better outcome in recurrence-free survival than a Gleason pattern of 4+3 after radical prostatectomy.

2016 WHO classification of different histologic tumors of the prostate:

Acinar adenocarcinoma
Prostatic intraepithelial neoplasia (PIN)
Intraductal carcinoma
Ductal adenocarcinoma
Urothelial carcinoma
Squamous carcinoma
Basal cell carcinoma
Neuroendocrine tumors
Mesenchymal tumors
Hematolymphoid tumors
Metastatic tumors

New 2016 WHO classification of tumors of the prostate included new entities in histological grading

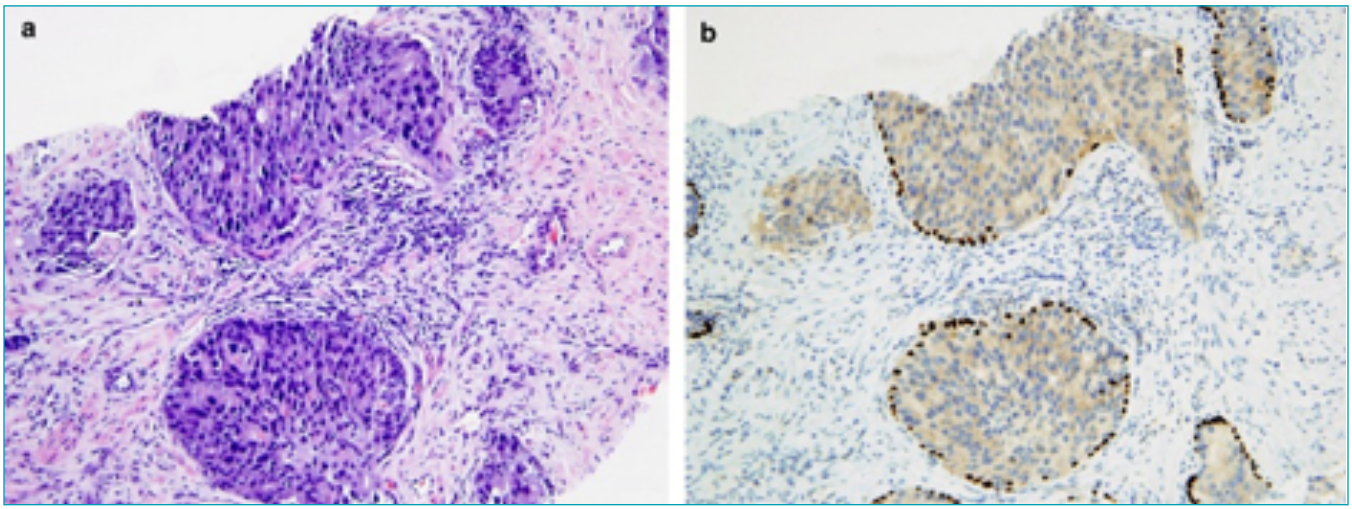
This includes new variants of acinar adenocarcinoma of the prostate, neuroendocrine tumors of the prostate and intraductal carcinoma of the prostate.

The new variants of acinar adenocarcinoma of the prostate include microcystic variant and pleomorphic giant cell variant. The new variant of neuroendocrine tumors of the prostate include large cell neuroendocrine carcinoma.

Intraductal carcinoma of the prostate is an intra-acinar and/ or intraductal neoplastic proliferation that has some features of high-grade prostatic intraepithelial neoplasm (PIN) but exhibits much greater architectural and/or cytologic atypia. This entity is present in 17 percent of radical prostatectomy cases and 2.8 percent of needle biopsy cases. Genetically intraductal carcinomas is different from high-grade PIN with loss of heterozygosity of Tp53 and RB 1 and a greater frequency of ERG gene rearrangement.

Cytoplasmic PTEN loss is common in intraductal carcinoma

Typically associated with high-grade, high-stage, prostatic carcinoma, isolated intraductal carcinoma in a needle biopsy may indicate an association with high-grade prostate carcinoma and a repeat biopsy may be warranted.



Intraductal carcinoma of prostate

P63 staining of basement membrane

Since 2004, there has been a remarkable expansion of knowledge on the genetic studies of prostate cancer. Next generation sequencing technologies have revolutionized the understanding of the molecular base of prostate cancer and significant genetic heterogeneity.

Our future is integration of molecular profiling of these prostate cancer tumors into predicting the outcome and response to treatment.

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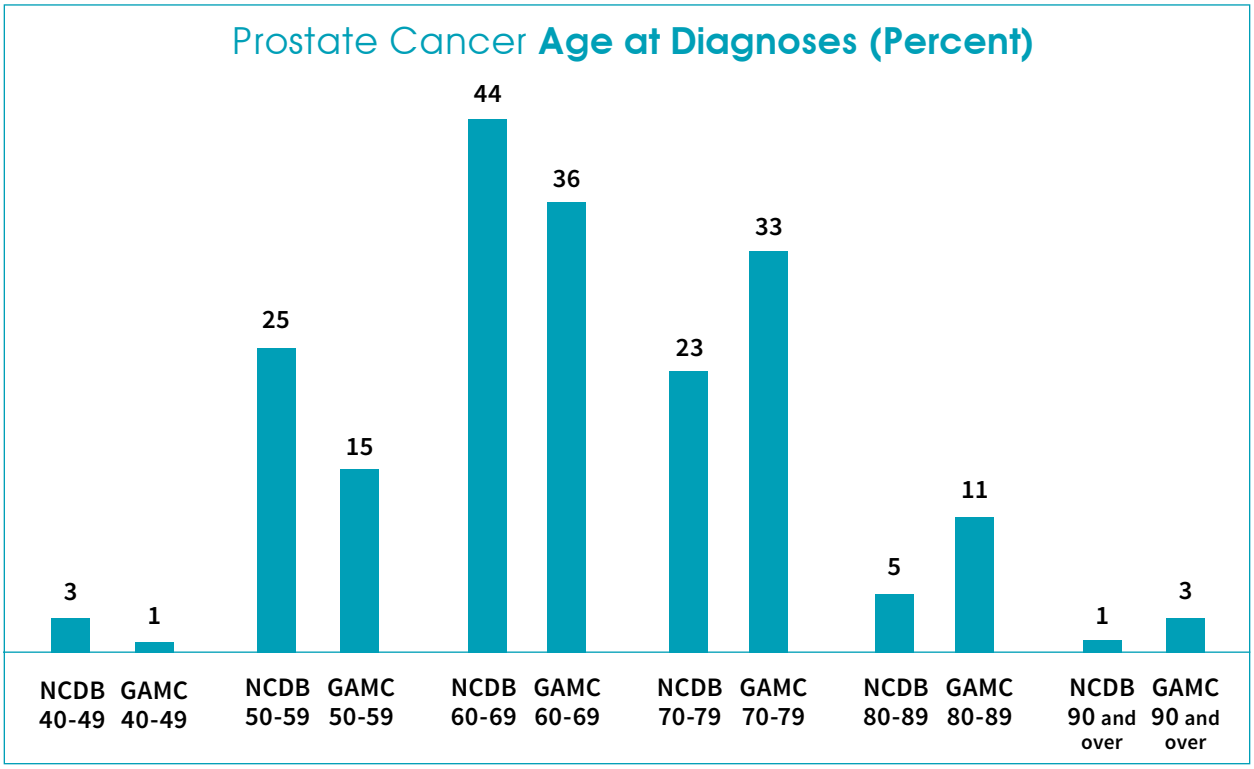
BORIS BAGDASARIAN, DO
Hematology and Oncology,
Chairman, Cancer Committee

Focus on Prostate Cancer

Prostate cancer represents approximately 30 percent of all newly diagnosed cancers in males and 10 percent of cancer-related deaths.

It is the most common non-cutaneous cancer among men in the United States and the second leading cause of death in men after lung cancer. One in six men get prostate cancer during his lifetime and one in 36 die of this disease. Autopsy series show that nearly 70 percent of men older than age 80 have occult prostate cancer. The disease is often indolent and average age at presentation is usually late in life.



NCDB (National Cancer Database): 2009-2013 N=577,632
GAMC (Glendale Adventist Medical Center): 2009-2013 N=181

Epidemiology

Prostate cancer is a disease that predominantly effects men over the age of 65. Current estimates suggest that 5-10 percent of all cases of prostate cancer are hereditary. African-American descent matched for age have a greater number of precursor prostatic intraepithelial neoplasia, lesions and larger tumors as compared to caucasian men.

High-fat and diets rich in red meat correlate with prostate cancer development. Several protective dietary factors have been proposed, including tomatoes, carotenoids, omega-3 fatty acids and cruciferous vegetables.

Early detection and screening

Screening for prostate cancer in asymptomatic patients remains controversial. The rationale for prostate cancer screening is that early detection and treatment of early stage are asymptomatic cancers compared with diagnosis and treatment. At the time of clinical diagnosis, this will result in improvement in survival. Although case controlled studies suggest an association between PSA screening and a decrease in mortality, prospective randomized trials have not convincingly proven that PSA screening decreases mortality. Furthermore, it's unclear whether the harms of testing outweigh the benefits for the general asymptomatic population. Consequently, there is significant controversy regarding PSA screening for prostate cancer.

The American Cancer Society does not currently recommend routine PSA testing and recommends individualized discussion between the patient and his physician. The US Preventative Services Task Force recommended against screening for men older than 75 years and conclude there is insufficient data to recommend for or against routine screening for younger. However, the American Urologic Association continues to recommend PSA testing starting at age 40.

Clinical presentation

A good percentage of patients with prostate cancer are asymptomatic. Some patients may present with symptoms of dysuria, back pain or hematuria. These are often signs of obstruction. In some cases, disease may become evident only after investigation of metastatic symptoms such as bone pain or cord compression.

The PSA is most often utilized due to its high sensitivity of 70-80 percent, along with digital rectal examination. In the general population, sensitivity of a PSA greater than four has been estimated at 70 percent to 80 percent, while the specificity is estimated to be about 60 percent to 70 percent. Free PSA evaluations have helped in determining the percent risk for malignancy.

Transrectal ultrasound assists to guide prostatic biopsies. Bone scan is useful in identifying bone metastases and is recommended for men with PSA values of greater than 20. CT imaging is seldom used to rule out visceral metastases.

Biopsies are essential for diagnosis. The sensitivity can be increased by increasing the number of needle cores that are obtained. It is recommended to obtain anywhere from 8-12 cores per biopsy session. Histologic grade is an important determinant of disease course and patient survival. The Gleason scoring system is predominantly utilized. The system takes the two most predominant histologic patterns in the area of the tumor and assigns each a number from 1-5. Higher scores correlate with poorly differentiated tumors and worse prognosis.

Treatment

Life expectancy and risk of cancer progression are the two key determinants in considering optimal treatment for prostate cancer. The risk of cancer progression is based on pathologic stage, preoperative PSA and Gleason score. Patients with prostate cancer are divided into three groups to guide treatment: Localized prostate cancer, locally advanced prostate cancer or metastatic prostate cancer.

Localized prostate cancer

Tumors confined to the prostate are generally managed by radical surgery, radiation therapy or in some cases, active surveillance.

Observation: PSA should be checked every six months and digital rectal exam every year. Therapy will be initiated at onset of disease progression.

Radical Retropubic Prostatectomy: The goal of the surgery is to completely excise a cancer while maintaining urinary control and preserving potency. The procedure continues to evolve, as urologists utilize biopsy algorithms and extensive imaging to determine both the extent and location of tumor within the prostate. This approach has resulted in refined selection of cases and surgical planning, which in turn has led to more rapid recovery, higher rates of continence and improved potency. Minimally invasive surgery, including both conventional and robotic laparoscopic radical prostatectomy, has emerged as an alternative to open surgery for patients with clinically localized prostate cancer.

Radiation: Radiation can be administered using external beam techniques, implant/radioactive seeds, or a combination of both. Androgen deprivation therapy may or may not be administered. Compared with surgery, radiation therapy is associated with a higher frequency of bowel

(Continued on next page)

Focus on Prostate Cancer *(Continued)*

complications, mainly diarrhea or loose stools. The use of interstitial radiation or implantation of radioactive seeds is based on the principle that deposition of radiation energy and tissues decreases exponentially as score function of the distance from the radiation source. The result is better cancer control and reduced toxicity. An acute toxicity associated with implantation is irritative urinary symptoms, including urinary frequency. Incontinence is rare and potency is generally similar to that observed with radical surgery.

Localized prostate cancer patients are subdivided into three risk categories:

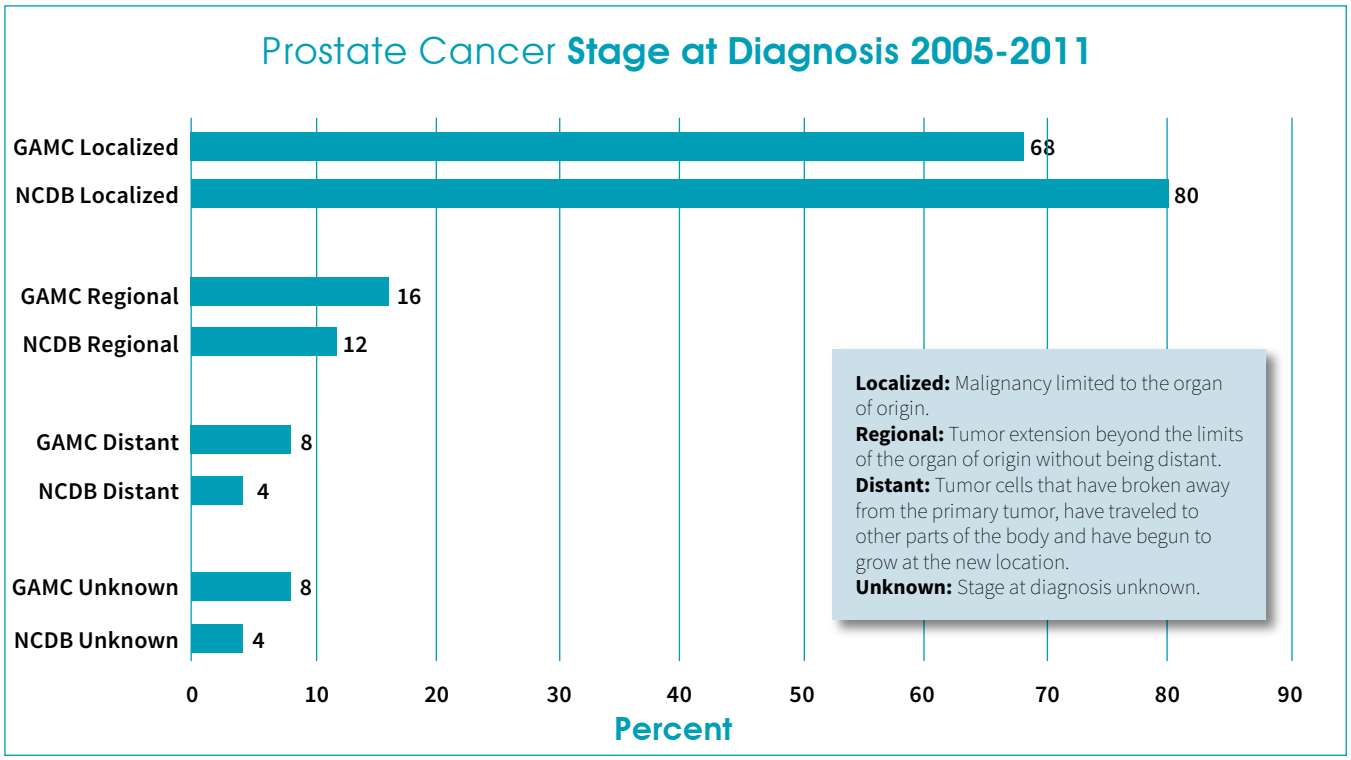
Low risk (T1-T2a, Gleason score less than 6, PSA less than 10): If observation is chosen, PSA should be checked every six months and physical exam at least once a year. Treatment should be initiated at onset of disease progression. Choice of therapy is otherwise based on patient preferences.

Intermediate risk (T2b–T2c or Gleason 7 or PSA 10-20): Unless survival is less than ten years, observation is not acceptable in this category. Surgery, external brain radiation therapy (EBRT) or brachytherapy are equivalent management options.

High risk (T3a or Gleason score 8-10 or PSA greater than 20): These patients are treated with either surgery with pelvic lymph node dissection or EBRT combined with at least 2-3 years of androgen deprivation therapy.

Locally advanced prostate cancer (T3b–T4): These patients are treated with either surgery with pelvic lymph node dissection or EBRT combined with 2-3 years of androgen deprivation therapy.

Neoadjuvant therapy: Although neoadjuvant androgen deprivation therapy before surgery leads to a reduction in the rate of positive surgical margins, it has not had an effect on overall outcome and is not recommended. Studies suggest that perioperative chemotherapy with or without androgen deprivation therapy may improve outcomes.



NCDB 2005-2011, Cancer Facts and Figures (American Cancer Society) 2016-2017, GAMC 2005-2011 N=256 N=880, 884

Metastatic prostate cancer

PSA only recurrence: These patients had biochemical recurrence that occurs after either radiation therapy or surgical resection, and no source of recurrence. Other than elevated PSA, recurrence can be found clinically or through imaging. Treatment options include observation, radiation therapy, (if they had previously had surgery) or in selected patients, salvage surgery (if feasible and if they were originally treated with radiation therapy).

Watchful waiting: This refers to deferment of treatment instead of proceeding with palliative therapy. Prostate cancer can often be indolent in nature, which allows for watchful waiting as a reasonable approach in selected patients. In general, this option is reserved for patients whose life expectancy is less than 10 years and/or who have other co-morbidities limiting treatment options.

Androgen deprivation therapy (ADT): Noncastrate-resistant metastatic prostate cancer as defined by metastases on an imaging study in patients who have non-castrate levels of testosterone. Most men opt for hormonal therapy instead of orchiectomy for psychologic reasons. GnRH agonists are first-line therapy for ADT and are as efficacious as bilateral orchiectomy. Response to ADT can be measured by a decline in PSA values, decrease in the size of nodal or visceral metastases or improvement in cancer-related symptoms. Serial bone scans will show improvement in only 30-40 percent of patients, and a scintigraphic flare on serial bone scans can occur following ADT between three and six months after initiating therapy. This should not be confused with progression of skeletal metastases. The initial rise in testosterone after treatment with a GnRH agonist can result in a clinical flare of the disease. These agents are relatively contraindicated as monotherapy for patients with severe pain, urinary symptoms or spinal cord compromise. Antiandrogens are approved to block the flare response and should be initiated at least seven days prior to start of a GnRH agonist.

Nonsteroidal antiandrogens such as flutamide, bicalutamide and nilutamide block the binding of antiandrogens of the antigen receptor. They have been evaluated for several purposes:

- To block the flare secondary to the initial rise in testosterone that results following administration of GnRH agonists.
- To simultaneously inhibit testicular and adrenal androgens as part of a combined androgen blockade approach.
- As monotherapy in order to preserve potency.

Gynecomastia remains a substantial problem, but can be alleviated, in part, with prophylactic breast irradiation or the addition of tamoxifen. For patients with established metastatic disease, antiandrogen monotherapy was inferior to testosterone lowering therapy.

Chemotherapy

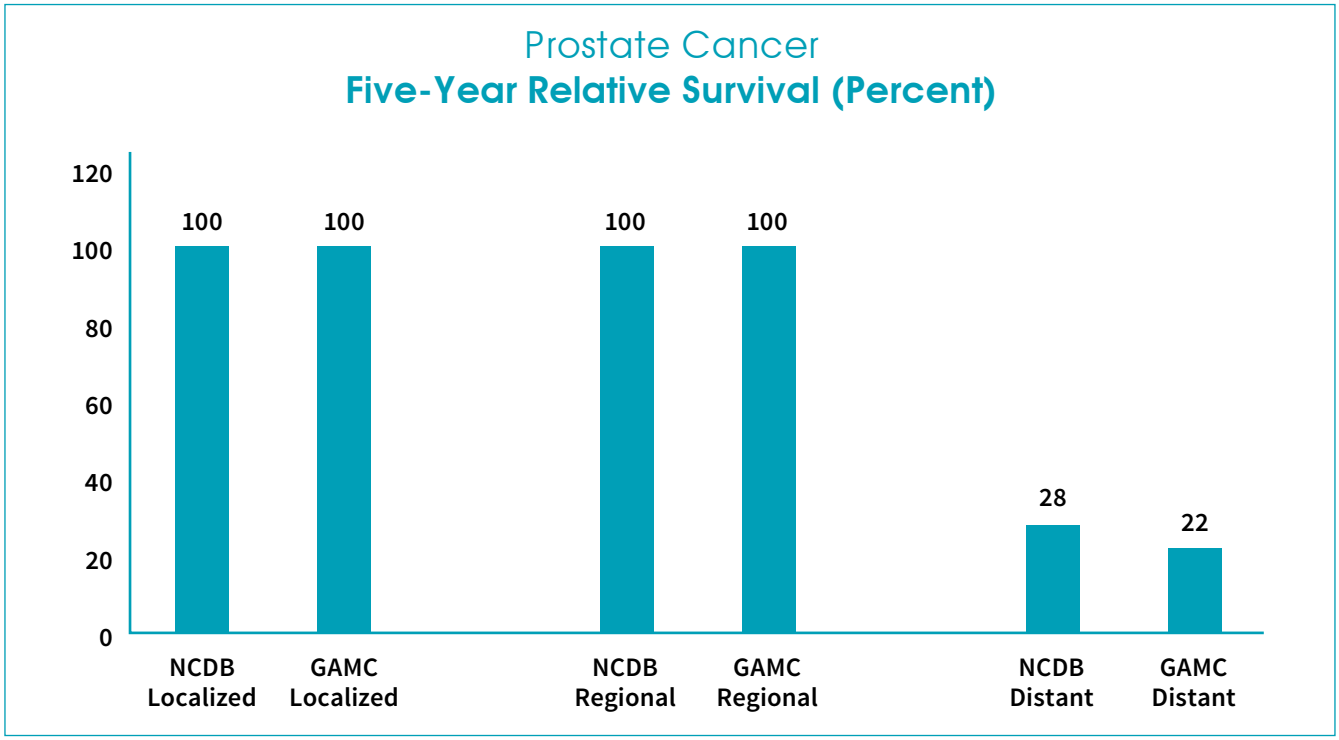
Patients with metastatic castrate-resistant prostate cancer (CRPC) who experience rapid disease progression with development of symptoms on ADT should be considered for systemic chemotherapy. A docetaxel-based regimen with prednisone is the current standard of care therapy for patients with androgen independent prostate cancer, based on a demonstrated survival benefit of 2-3 months over mitoxantrone and corticosteroid-based regimens in two phase III trials (Southwest Oncology Group- {SWOG} 9916 and TAX 327).

Cabazitaxel is a microtubule stabilizing taxanes used as a second line chemotherapy after docetaxel, based on results of a phase III trial of men with CRPC who previously received docetaxel and who were randomly assigned to either cabazitaxel or to mitoxantrone every three weeks in combination with prednisone. Median survival was 15.1 months and 12.7 months of patients treated with cabazitaxel and mitoxantrone, respectively.

(Continued on next page)

Focus on Prostate Cancer *(Continued)*

A recent NIH-funded study shows increased survival of men with metastatic prostate cancer who received chemotherapy once starting hormone therapy. Men with hormone sensitive metastatic prostate cancer who received the chemotherapy drug docetaxel given at the start of standard hormone therapy lived more than a year longer than patients who received hormone therapy alone. This is according to results from a National Institutes of Health-supported, randomized control trial presented at ASCO in 2014.



NCDB 2005-2011, data obtained from Cancer Treatment Survivorship Facts and Figures 2016-2017
GAMC 2004-2013

Localized: Malignancy limited to the organ or origin.
Regional: Tumor extension beyond the limits of the organ of origin without being distant.
Distant: Tumor cells that have broken away from the primary tumor, have traveled to other parts of the body, and have begun to grow at the new location. Unknown: Stage at diagnosis unknown.

New options

There are a number of other agents which have been FDA approved for metastatic prostate cancer that is no longer responding to hormonal treatments or chemotherapy:

Radium RA 223(XOFIGO): This is a drug that contains a small amount of radiation that is injected into the bloodstream. It is intended for men whose cancer has metastasized only to their bones. Xofigo lines with minerals and the bolus to deliver radiation directly to the metastatic sites within the bone, thus palliating pain.

Abiraterone(Zytiga): Medications used in combination with prednisone for treatment of men with metastatic castrate resistant prostate cancer. This can be used in the front-line setting versus second line metastatic setting in men who have

already received prior chemotherapy containing docetaxel, abiraterone blocks and enzyme called CYP 17, helping to stop the production of androgen by the cells. The combination of Zytiga and prednisone significantly lengthened overall survival versus an active control of placebo plus prednisone. There was a 19 percent reduction in mortality risk in patients with a median follow-up of 49 months.

Enzalutamide(Xtandi): This medication blocks the class of drugs known as antiandrogen. In a clinical trial, patients who received Xtandi plus GnRH therapy demonstrated an 83 percent reduction in risk of radiographic progression, or death versus placebo plus GnRH therapy. Median survival was 35.3 months for patients receiving Xtandi plus GnRH therapy versus 31.3 months for those receiving placebo plus GnRH therapy.

Sipuleucel-T(Provenge): This approach utilizes the body's own specialized white blood cells to destroy prostate cancer cells. The immunotherapy consists of autologous peripheral blood mononuclear cells obtained by leukapheresis as a recombinant human protein consisting of prostatic acid phosphatase linked to granulocyte macrophage colony-stimulating factor. A randomized, double-blind, placebo-controlled, multicenter trial was conducted where patients were assigned to receive either sipuleucel-T or control (peripheral blood, mononuclear cells that were not activated). Patients who received sipuleucel-T had a median overall survival of 25.8 months compared to 21.7 months for patients who receive the control treatment. A second trial demonstrated a median overall survival of 25.9 months with sipuleucel-T compared to 21.45 months for patients treated with the control.

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SARA KIM, MD
Radiation Oncologist,
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Prostate Cancer and Radiation Therapy

Prostate cancer is among the most common solid malignancies. Advances in screening with PSA have allowed diagnosis at an earlier stage than previously possible and have permitted a number of treatment alternatives, including observation, prostatectomy, brachytherapy and external beam radiation therapy (EBRT).

Radiation therapy can be delivered in two ways, externally and internally. During external beam radiation therapy, the radiation oncology team uses a linear accelerator machine to direct high-energy X-rays at the prostate. Brachytherapy, or internal radiation, involves placing radioactive sources (such as radioactive seeds) inside the prostate.

At Glendale Adventist Medical Center, all modalities of radiation therapy are available.

Intensity modulated radiation therapy

External beam radiation therapy has dramatically changed over the past several years. Recently, intensity modulated radiation therapy (IMRT) has been introduced and implemented in prostate cancer. IMRT is a specialized form of 3D conformal radiation therapy that allows radiation to be more exactly shaped to fit the target. IMRT for prostate cancer represents a major technologic and clinical advance for radiation therapy. With IMRT, the radiation beam can be broken up into many "beamlets," and the intensity of each beamlet can be adjusted individually. Using IMRT, it is possible to further limit the exact amount of radiation that is received by normal tissues that are near the tumor, such as the bladder and rectum in the case of prostate cancer. This technique allows a higher dose of radiation to be delivered to the tumor, which may increase the chance for cure.

Brachytherapy

Brachytherapy involves placing radioactive material into the prostate. Because the radiation sources are placed in the tumor, a large dose of radiation is given directly to the cancer cells with minimal exposure to normal tissues. Brachytherapy offers cancer control rates at five years, as measured by PSA, that seem to be as effective as surgery and external beam radiation therapy. Brachytherapy consists of several techniques and can be administered alone or in combination with external beam radiation. Early results on cancer control are sufficient to indicate that seed implant is a reasonable option for men.

Permanent, low dose rate brachytherapy using radioactive seeds is the most common technique in the U.S. and is an option for men with small volume cancer or low to intermediate (Gleason <7), PSA< 10 ng/ml, stage T1c- T2a) risk. Ideally, the cancer should be within a prostate of less than 60 cm. The procedure is performed in two stages, a volume study for radiation planning, followed on a later day by the implant.

Radiation therapy results for low-risk disease

Treatment outcome for patients with pretreatment PSA <10 mg/ml, Gleason score less than 7, and T1- T2a disease (1992 staging) is very favorable. Outcome after radical prostatectomy, brachytherapy alone, external beam therapy alone and the combination of external beam plus brachytherapy has been comparable. At MD Anderson Cancer Center, 199 favorable-risk patients who were treated with external beam radiation to a dose of more than 67 Gy had a freedom from failure rate at five years of 92 percent, with no treatment failures observed after five years. These results

are similar to those of other series evaluating external beam therapy(1-5), radical prostatectomy (6-10), or brachytherapy (11-16) in prostate cancer patients.

Zelefsky (17) compared favorable risk patients who received external beam radiation only and permanent radioactive seed implant. There was no difference in freedom from biochemical failure rates (88% vs 82%, p=0.09). D'Amico (18) of Harvard Medical School compared outcomes from patients from selected institutions who were given external beam radiation, permanent radioactive seed implant, or radical prostatectomy. At a median follow up of 38 months, no statistically significant difference in freedom from failure was noted for favorable risk patients. Ramos (19) did a retrospective comparison of radical prostatectomy and radioactive permanent seed implant and found that surgery and brachytherapy were equally effective. The seven year freedom from biochemical failure rates were 84 percent with surgery and 79 percent with brachytherapy (p not statistically significant). Two other investigators (Keyser [20] and Kupelian [21] of Cleveland Clinic) found no difference in outcome between external beam radiation and radical prostatectomy for favorable risk patients.

The effectiveness of permanent radioactive seed implant as monotherapy has been established in several studies. The best studies available on permanent radioactive seed implant for prostate cancer are from the Seattle group (22,23), which have long median follow up. One cohort study involves patients treated in the late 1980s and meticulously followed over the subsequent decade. The patients showed freedom from increasing PSA at 10 years of 60 percent. When the authors exclude the patients treated on the "learning curve" in their first year (1987), this freedom from increasing PSA increased to 80 percent. No other brachytherapy data exists up to 10 years to verify this report, but the many studies reporting shorter follow up appear to be on the same track.

Radiation therapy for intermediate-risk to high-risk disease

Patients with intermediate-risk to high-risk are treated either with external beam radiation with or without brachytherapy. For some patients, anti-androgen therapy is also beneficial.

Several prospective randomized trials (24-27) have shown a survival benefit with the addition of androgen ablation with external beam radiation for patients with Gleason score 8-10. In the RTOG 85-31 clinical trial (24,25), there was a five year overall survival improvement from 55 percent to 66 percent (P<0.05) in patients with Gleason 8-10 who received hormone therapy with radiation therapy.

Radiation therapy after radical prostatectomy

Post-operative radiation is given to the prostatic fossa for high-risk pathologic features, such as positive margin, T3 disease and extracapsular extension. It is also given when there is a rising PSA after prostatectomy.

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Prostate Cancer and Radiation Therapy *(Continued)*

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GAMC'S Cancer Services Center staff with Dennis Quagliani, Director (first row, center).

Cancer Committee

A special thank you to the Cancer Committee members for their dedicated leadership and tireless efforts.

Front row seated (left to right): Chrissy Kim; Marion Watson; Gayle Craig; Lyn Samuel-Jeffers; Sharon Correa; Chandrika Seneviratne, MD; Irene Bourdon; and Carolann Jared.

Second Row (left to right): Denise Cleveland, RHIT, CTR; Sara Kim, MD; Susanna Tamazyan, RN; Val Emery; Simon Keushkerian, MD; Linh Chen, MD; Sze-Ching Lee, MD; Karine Arakelyan; Al Garcilazo; and Allen Molina, RN.

Back Row (left to right): Christina Constantino; Wende De Pietro, RN; Fernando Vazquez; Tracey Sanders; Cynthia Klinger, MFT; Mihran Shirinian, MD; Sam Carvajal, MD; Boris Bagdasarian, DO; and Dennis Quagliani.

Class Of Case Collaboration

Class of Case

Analytic: Cases that are first diagnosed and/or receive all or part of their first course of treatment at Glendale Adventist Medical Center.

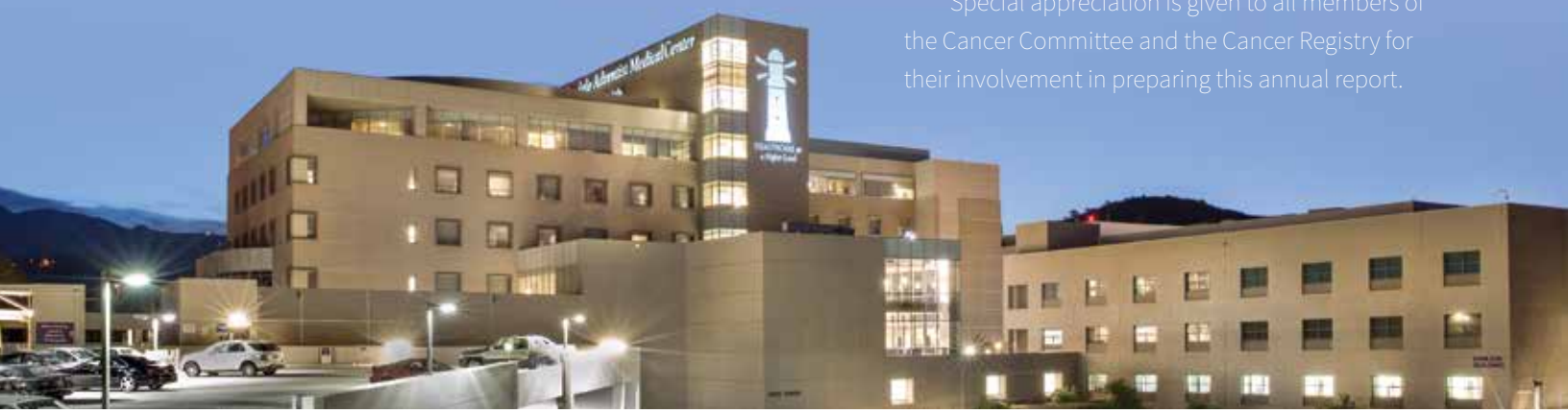
Non-Analytic: Cases that have been diagnosed and have received their entire first course of treatment elsewhere and are first seen at Glendale Adventist Medical Center for subsequent care.

Collaboration

In order to accomplish the wide-ranging and ambitious goals involved in designing and supporting a comprehensive community cancer program, many people have contributed and continue to give their energy and expertise.

The contributions and support of the medical staff, nursing staff and many other professionals who have offered their expertise for the implementation of our cancer program throughout the year are greatly appreciated.

Special appreciation is given to all members of the Cancer Committee and the Cancer Registry for their involvement in preparing this annual report.



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Cancer Services and Radiation Therapy	8198
Clinical Trials	8009
Chaplains Office	8008
Focus on Healing	3530
Healthcare Foundation	8055
Infusion Center	8077
Ingeborg's Place Apart/Positive Image Center	8218

Our Mission

To share God's love with our community by promoting healing and wellness for the whole person.

Glendale Adventist Medical Center

Adventist Health