DEDICATION

SAMUEL FELDMAN, MD, FACS

It is our pleasure to dedicate the 2004 Cancer Care Annual Report to Samuel Feldman, MD, FACS, the chief of surgery at St. Peter’s Hospital.

Dr. Feldman diligently served as a member of the Cancer Committee-Program Development Group, as well as being the Commission on Cancer Physician Liaison from 1998–2004. During his tenure, Dr. Feldman’s steadfast support was instrumental in helping the program maintain focus and grow substantially.

Dr. Feldman, a member of Capital District Colon and Rectal Surgery Associates, joined St. Peter’s in 1980 and has served as chief of surgery since 1998.
HIGHLIGHTS OF 2004 ACTIVITIES INCLUDE:

- Diagnosed and/or treated 2,255 new cancer cases
- Recruited new director for Cancer Care Program
- Achieved program reaccreditation by the American College of Surgeons Commission on Cancer
- Prepared for major expansion and upgrade to Radiation Therapy practice
- Initiated construction on affiliated Radiation Treatment facility at Saratoga Hospital
- Maintained and expanded full program of Community Education and Outreach activities
- Held 48 site-specific interdisciplinary tumor conferences where 199 cancer cases were prospectively reviewed
- Prepared data for this report to:
  - Highlight prostate cancer, including 262 new cases in 2004.
  - Provide detailed discussion on current methods for detecting prostate cancer.
  - Explain what treatments are available.
  - Describe ongoing efforts to improve understanding and maximize early detection of prostate cancer within communities of health providers and the general public.
  - Provide a detailed analysis of St. Peter’s experience in identifying and treating prostate cancer in the context of comparable regional and national data.
  - Detail the Cancer Program’s Quality Improvement Study on Differential Diagnosis and Treatment of Prostate Cancer in the Context of Race.
The mission of St. Peter’s Cancer Care Program is to provide quality cancer care. Guided by the spirit of the Sisters of Mercy, the values that provide direction to the program include:

• Ministry to the physical, psychological and spiritual needs of cancer patients with compassion and caring
• Respect for human life and the dignity of the individual

Dedicated to offering a continuum of services to support the optimal well being of patients and their families, St. Peter’s Cancer Care Program is committed to the promotion of

• The art of caring, balanced with technology
• Continuous improvement and innovation
• Prudent use of resources
• Excellence through collaboration with existing community organizations
• Facilitation of access to care
• Community and professional education
In 2004, St Peter’s Cancer Care Program served in the diagnosis and/or treatment for 2,255 new cancer cases. The region’s largest and most comprehensive Cancer Care Program offers state-of-the-art technology and therapies in the area of surgery, pathology, radiology, medical oncology, and radiation oncology. Services provided across the continuum include inpatient, outpatient, home care, emergency room and hospice. In addition to the diagnosis and treatment of cancer, our program offers support services in many areas, including pain management, nutrition, rehabilitation, complementary therapies, and palliative care.

The program continued to focus on ensuring a wide range of therapeutic choices to patients. To that end, the center continued to plan for facility expansion and equipment upgrades in Radiation Oncology through the year. Meanwhile, Intensity Modulated Radiation Therapy (IMRT) capacity was increased to full capacity and the number of treatable tumor sites was expanded. The Center continued its full schedule of special procedures, such as high dose brachytherapy and stereotactic radiosurgery. This fall, ground was broken for an affiliated radiation therapy treatment facility at Saratoga Hospital. The Center’s provision of comprehensive cancer services through dedicated interdisciplinary clinics, which began with its Brain Tumor Clinic in 2003, is continuing to expand with plans to begin a Prostate Cancer Clinic early next year.

St. Peter’s Cancer Care Program also continues to focus on prevention, treatment, education and research. The Quality Improvement Program relies on cancer data collected by the Tumor Registry to identify local diagnostic and treatment patterns, and to measure these against widely recognized care guidelines. We provide and participate in community outreach events throughout the region, letting residents know about the quality of care and services available within the Cancer Care Program.

In 2004, the program was proud to achieve reaccreditation as a Community-Based Comprehensive Cancer Care Program by the American College of Surgeons Commission on Cancer after undergoing a thorough on-site review. The commission commended St. Peter’s for exceeding the standards for clinical trial accrual, prevention and early detection programs and for quality improvement initiatives. The program also took actions recommended by the commission to further improve its outcome analysis and cancer registry follow-up. Achieving this prestigious accreditation demonstrates St. Peter’s ongoing dedication to providing the best quality and most comprehensive care to members of its community. (For more information about accreditation, see the American College of Surgeons web site at www.facs.org.)

Program Goals for 2005 include groundbreaking for an expansion of the Radiation Oncology department, initiation of a prostate cancer clinic and commencement of MammoSite® brachytherapy program for breast cancer. The program also plans an increase in Cancer Data Management capacity and expansion of the current complement of cancer conferences. Finally, the program anticipates opening of Saratoga Hospital’s RT facility.

The doctors, nurses, therapists, physicists, dosimetrists, administrators and support staff of St. Peter’s Cancer Care Center work together every day to anticipate and meet the needs of our patients and their families. I would like to take this opportunity to thank everyone associated with the program for his or her dedication in providing such a consistently high level of care and services.
As someone who oversees a $400 million loan portfolio, Bob Lazar has built a career out of risk management. But he had to apply the concept to his own health when he was diagnosed with prostate cancer in 2003.

“My emotions were rampant. At first, I was shocked because I had no symptoms and thought I was in good health and then I was really scared,” he admits. After 35 years with the New York Business Development Corp. (NYBDC), Lazar was planning on an active retirement that involved part-time teaching, volunteering and enjoying his family.

However, a PSA blood test and prostate cancer diagnosis in April 2003 forced him to do some quick thinking to decide among the cancer options of surgery, radioactive seeds or to do nothing at all. After his own research, Lazar consulted with Dr. David Zornow and they jointly decided to remove his prostate by the traditional (open) surgery in June of 2003. After successful surgery, a quick recovery at St. Peter’s meant that he could go home in two days, about half the normal stay following such an operation.

“The nurses and doctors at St. Peter’s Hospital were terrific; the treatment was fabulous,” he said. Lazar praised not only Dr. Zornow, but also Dr. Robert Rappaport, Chief of Radiology. When a follow-up PSA showed some residual traces of cancer, he received seven weeks of radiation treatment with Dr. Todd Doyle. Since then, he has resumed a very active life at work, plus frequenting the gym and playing golf. Lazar maintains follow-up visits with Drs. Zornow and Doyle on a rotating basis every six months.

Although he considered having surgery at cancer centers in other cities, he and his wife decided to stay with the familiar surroundings of St. Peter’s.

“In hindsight, that was a great decision,” he said. “I came through with flying colors and with very minimal after-effect. I’m very thankful to everyone who contributed to my care.”

He praised the physicians, nurses and other staff members for being “passionate” about patients’ welfare. Lazar is very grateful for the treatment received from Drs. Zornow, Doyle and Rappaport.

For men who are newly diagnosed with prostate cancer, Lazar advises, “Get as much outside counseling as you can. Get a second opinion; do thorough research. And call on friends who’ve been through it before. Then, make an informed, intelligent decision about your treatment.”

For the past 18 years, Lazar has served as president of NYBDC (now 50 years old) that makes loans to small businesses through a network of 151 partner banks. In 2005, NYBDC approved 262 loans worth $88 million. One-third of the loans went to minority or women-owned businesses.

Now that he is a cancer survivor, Lazar is looking forward to an active retirement in 2006 that includes enjoying his three daughters and four grandchildren, as well as spending some time with his wife, Shirley, at a new condo in Florida. He is a board member at Sterling National Bank (New York City) and NYBDC, and serves as a volunteer board member at the Academy of Holy Names, UAlbany, St. Peter’s Hospital Foundation and Wolferts Roost Country Club. He also volunteers at LaSalle School in Albany.
After a career as an electrician in New York City, Al Beckman was enjoying retirement in the scenic, resort area of Windham when a PSA blood test indicated he may have prostate cancer.

His family physician, Dr. Robert Schneider of Tannersville, referred him to St. Peter’s, where a biopsy performed by Dr. Michael Perrotti confirmed the case. After doing his own homework and consulting with Dr. Perrotti and a radiologist, Beckman opted for a radical prostatectomy (complete removal of the prostate gland) in June 2004.

“Once I had the operation even the incision didn’t hurt after a few days,” he said. “The worst part was having the catheter (a thin tube used to urinate) for two weeks. After the catheter was removed, things seemed much better and within two months, all of my functions were back to normal.”

When Beckman retired from the Port Authority of New York and New Jersey in 1997, he and his wife moved to Windham, where they had family and land. Their children soon moved nearby, and the grandkids could walk through the woods to grandma’s. Beckman channeled his energy and mechanical skills into producing handmade hunting and pocket knives.

When Beckman was diagnosed, he recalled that his father died of cancer at age 55, seven years younger than he is now. However, the younger Beckman has the advantage that cancer now is openly discussed and much information is available. Through online research, he learned more about the disease and evaluated the many options that had developed since his father’s era.

Advising other men who may get the worrisome diagnosis, Beckman said, “Don’t be afraid to ask questions. A doctor like Dr. Perrotti will answer the best he can. Talk to friends or people who have had the problem. Times have changed.”
ACTIVITIES REPORT

St. Peter’s Cancer Care Program maintains a comprehensive and dynamic program of support services for people with cancer and prevention and early detection of cancer for the community at large. A dedicated, full-time community outreach nurse coordinates these activities. During 2004, this program provided lectures, ran free cancer screenings and facilitated support groups. In addition, the community outreach nurse represented the center at health fairs, fund-raising events and through advocacy activities. These 2004 activities are summarized below:

<table>
<thead>
<tr>
<th>Activity Year</th>
<th>Lectures</th>
<th>Cancer Screenings</th>
<th>Health Fairs</th>
<th>Advocacy</th>
<th>Fund Raising</th>
<th>Support Groups</th>
<th>Total Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>14</td>
<td>7</td>
<td>17</td>
<td>3</td>
<td>11</td>
<td>10</td>
<td>62</td>
</tr>
</tbody>
</table>

OUTREACH ACTIVITIES FOR PROSTATE CANCER

The Cancer Care Center pursues a variety of opportunities to help minimize the impact of this disease on the community. These activities are intended to educate men about their risk levels, to promote healthy lifestyles, which may prevent disease occurrence, and to provide free prostate cancer screening and referral throughout the year. Free prostate screenings through the Cancer Center have long been an annual event. In 2004, the center provided 135 men with free screening. From 1992-2004, we have screened 1,487 men.

St. Peter’s Prostate Cancer Screenings  
Individuals Screened 1992 – 2004

Men found to have abnormal screening results are referred for additional follow-up. On average, between seven percent and eight percent of all men screened are found to have abnormal PSA values. This has remained a steady trend since 1992. The number of men found to have abnormal digital rectal exams has trended upward in recent years. Now, between four percent and six percent of men screened are found to have abnormal exams.
WHO IS MOST AT RISK?

Understanding risk factors helps men develop a personal plan for prostate cancer prevention and detection. Generally acknowledged risk factors for prostate cancer include age, race, family history, and diet.

- **Age**: More than 75 percent of prostate cancer is found in men 65 and over.

- **Race**: African-American men have a higher incidence of prostate cancer (twice that of the Caucasian male) and the highest mortality rate related to prostate cancer. (Because of this increased risk, St. Peter’s has specifically targeted outreach activities to the African American community. In the last five years, African Americans have made up nearly 10 percent of all men screened for prostate cancer at the center.)

- **Family History**: Having a family history of prostate cancer increases your risk of getting the disease.

- **Diet**: Men who eat a high-fat diet have a greater chance of getting prostate cancer as opposed to those who eat a lot of fruits and vegetables.

WHEN SHOULD MEN BE TESTED FOR PROSTATE CANCER?

- All men should begin yearly testing at age 50.

- High risk individuals, including African-American men and men with a family history of the disease should begin yearly testing at age 40.

WHAT SYMPTOMS SHOULD BE WATCHED FOR?

While early stage prostate cancer often does not produce any symptoms, the following symptoms may be associated with diseases of the prostate including cancer:

- Frequent urination (especially at night)
- Weak urinary stream
- Inability to urinate
- Interruption of urinary stream (stopping and starting)
- Aching pain in the penis, scrotum, testicles, anus, lower abdomen, or lower back.

- Pain or burning on urination
- Blood in urine
- Problems with sexual function

A man experiencing any or all of these symptoms should contact his primary health care provider immediately. While these symptoms may have causes other than cancer, they indicate a problem that needs to be addressed by a professional.

REFERENCES:
http://www.cdc.gov/cancer/prostate/decisionguide/
http://www.cancer.org
Prostate Cancer Bookmark Early Detection of Prostate Cancer
In 2004, the Cancer Care Center’s Program Development Group (PDG) continued to direct Cancer Program activities at St. Peter’s. This year the PDG welcomed several new members to its committee, representing areas from Surgery, Pastoral Care, the Palliative Care Team and Family Health.

St. Peter’s Cancer Care Program continued to grow and diversify this year. More than 2,250 patients were initially diagnosed and/or treated for cancer in the center — a 7.6 percent increase from 2003 when the program treated 2,095 new cases. This program growth continues a steady upward trend. The program has experienced growth in case volume of 56 percent since 2001.

The most frequent primary cancer sites remain breast (17%), prostate (14%), lung (12%), colon (7%) and bladder (6%). This year’s annual report focuses on prostate cancer. Some 324 cases of prostate cancer were diagnosed in 2004.

The program’s accomplishments in 2004 included:

- Reaccreditation by the American College of Surgeons Commission on Cancer. The program continues to allocate resources to maintain a multifaceted quality improvement program. The QI program regularly measures and reports on clinical outcomes, process improvements and patient satisfaction. Quality parameters include the National Patient Safety Goals endorsed by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).
- Ongoing support and cancer prevention services for affected populations in the community. Education and outreach activities include cancer screenings, community educational programs, health fairs, support groups and the Cancer Information Line.
- Work to maintain state-of-the-art technological capacity through construction of an additional radiation treatment vault and CT simulation suite within the Radiation Oncology treatment center. The center completed all budgetary planning and commenced detail programming on a major capital improvement with planned groundbreaking in 2005. Meanwhile, construction commenced on the affiliated Radiation Treatment facility at Saratoga Hospital.
- Continuity and consistency of cancer care through development and implementation of generic patient care standards and standardizing chemotherapy order sheets.
- Support and expansion of collaborative practice and professional education through interdisciplinary cancer conferences and grand rounds.
- Pursuit of strategic priorities aimed at maintaining St. Peter’s position as health care system of choice for physicians. The center maintained budgeted staffing levels within key clinical professions such as nursing, medical imaging and other allied health fields during a time of national shortage. The center successfully recruited into the key position of director for cancer care.
- Compliance with the requirements of the federal Health Insurance Portability and Accountability Act (HIPAA), the New York State Department of Health and the National Cancer Database (NCDB).
Cancer Care Program Goals for 2005

- Groundbreaking on Radiation Therapy renovation and equipment upgrade project and opening of Saratoga Hospital’s Radiation Therapy facility.
- Initiation of a Prostate Cancer clinic and commencement of MammoSite® brachytherapy for breast cancer.
- Expansion of Cancer Center Web site materials.
- Employing technology to improve cancer data management activities such as case-finding, follow-up, collaborative cancer staging and physician quality oversight of data abstraction.

Cancer Registry Activity Report

During 2004, the Cancer Registry collected data on 2,255 new cases. This represents an increase of 7.6 percent from 2003, when the program treated 2,095 new cases. This ongoing program growth continues a three-year upward trend. New cases in 2001, 2002 and 2003 cumulatively represent a 59 percent increase over 2000.

This significant increase reflects changes in both actual new cases and improved case finding mechanisms employed by the Registry. With 9,196 cases added from 2000-2004, the Cancer Care Center remains the largest cancer center in the Capital District. The graph at the right indicates the five-year growth in reported cases.

Registry data are submitted monthly to the New York State Central Cancer Registry and annually to the National Cancer Database.

St. Peter’s Cancer Committee – Program Development Group (PDG) provides direction and oversight of registry activities. The quality improvement specialist, an MBA-prepared registered nurse with extensive experience in cancer care, manages day-to-day operations. Three tumor registrars staff the registry. Certification by the National Cancer Registrars Association is a requirement to work in St. Peter’s Tumor Registry. Plans for 2005 include expanding the number of full-time registrar positions from three to five in order to accommodate recent program growth.

Cancer Registry Activities

The Cancer Committee-PDG employs registry data to determine areas of need and establish program goals and objectives. In addition, the Cancer Care Quality Improvement program regularly uses registry data to assess program-specific disease incidence and to document the efficacy of treatment outcomes. Community outreach efforts are also data-driven. The need for educational programs, screenings and participation in regional events, as well as requirements for new technology, are given weight from registry incidence data.

In addition to maintaining currency of the Cancer Database, the registry also facilitates weekly Tumor Conferences (interdisciplinary forums for prospective case presentation and treatment determination). Current conferences focus on tumors of the lung and thoracic region, the breast, the gastrointestinal tract, the genitor-urinary tract

5-Year Cancer Registry Activity

![Graph showing 5-year cancer registry activity with data points for 2000 to 2004. The graph indicates a trend of increasing cases over the years.]
and gynecological sites. Surgeons, radiation and medical oncologists, diagnostic radiologists and pathologists, as well as other practitioners attend tumor conferences. In 2004, 199 patient cases were discussed at 48 tumor conferences. Prospective cases represented 99.5 percent of all cases presented.

The quality of cancer data abstraction is monitored and reported regularly to the Cancer Committee-PDG. Registry QA activities include:

- Inter-reviewer and physician review of a minimum of 10 percent of annual analytic abstracts. Results of these audits are reported to the PDG and used to identify additional training and resource needs.
- Abstracting timeliness is monitored regularly and reported to both the Cancer Committee and the New York State Cancer Registry.
- Annual follow-up of at least 90 percent of all active cases to ensure that up-to-date health status and survival information is in the database. Process improvements added to this activity in 2004, including an encounter-based disease index and direct outreach to patients, resulted in an 11 percent improvement to follow-up rates in 2004.
- Regular coding edits check for format accuracy. Inter-field edits ensure internal data consistency within records.

### Registry Data and the Cancer Care Program Quality Improvement Program

Registry data support Cancer Program’s quality improvement (QI) initiatives. The registry collects, analyzes and reports site-specific data to administration and QI conference.

Among the areas regularly reported on from registry data include:

- Percent of cases staged by the managing physician
- Five-year relative survival rates by stage
- Percent of colorectal cases receiving multimodal therapies
- Referrals of colorectal cases to medical and radiation oncology by stage
- Surgical treatment modalities for invasive breast cancer vs. ductal carcinoma in situ
- Invasive post-lumpectomy breast cancer cases receiving radiation therapy
- Differential treatment of pre-menopausal occurrences of breast cancer with surgery, chemotherapy and hormonal therapy
- Preoperative chemotherapy rates for newly diagnosed N2 lung cancer
- Referrals of Stage IV lung cancer cases to medical oncology
- Development of metastatic disease in lung cancer within six months of resection with curative intent
- Differential treatment modalities for prostate cancer by stage

Beginning in 2005, at the recommendation of the Cancer Committee-PDG, the Cancer Program plans to initiate an annual program of discrete targeted QI studies.
<table>
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<tr>
<th>Code</th>
<th>Location</th>
<th>2003 Cases</th>
<th>2003 percent of all cases</th>
<th>2004 Cases</th>
<th>2004 percent of all cases</th>
<th>Change in rate '03 to '04</th>
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<td>11</td>
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<td>-52</td>
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<tr>
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<td>Gall Bladder</td>
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<td>2</td>
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<td>-61</td>
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<td>Bronchus &amp; Lung</td>
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<td>Heart, Mediastinum &amp; Pleura</td>
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<tr>
<td>C40</td>
<td>Bones, Joints &amp; Articular Cartilage of Limbs</td>
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<td>3</td>
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<td>Bones, Joints &amp; Articular Cartilage of Other &amp; Unspecified Sites</td>
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<td>3</td>
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<td>-40</td>
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<td>C42</td>
<td>Hematopoietic/ Reticuloendothelial Systems</td>
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<td>156</td>
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<td>C44</td>
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<td>101</td>
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<td>C47</td>
<td>Peripheral Nerves &amp; Autonomic Nervous System</td>
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<tr>
<td>C48</td>
<td>Retroperitoneum &amp; Peritoneum</td>
<td>2</td>
<td>0.1</td>
<td>4</td>
<td>0.2</td>
<td>+91</td>
</tr>
<tr>
<td>C49</td>
<td>Connective, Subcutaneous &amp; Other Soft Tissues</td>
<td>6</td>
<td>0.3</td>
<td>11</td>
<td>0.5</td>
<td>+64</td>
</tr>
<tr>
<td>C50</td>
<td>Breast</td>
<td>344</td>
<td>16.4</td>
<td>381</td>
<td>16.9</td>
<td>+3</td>
</tr>
<tr>
<td>C51</td>
<td>Vulva</td>
<td>18</td>
<td>0.9</td>
<td>6</td>
<td>0.3</td>
<td>-67</td>
</tr>
<tr>
<td>C52</td>
<td>Vagina</td>
<td>6</td>
<td>0.3</td>
<td>5</td>
<td>0.2</td>
<td>-19</td>
</tr>
<tr>
<td>C53</td>
<td>Cervix Uteri</td>
<td>36</td>
<td>1.7</td>
<td>34</td>
<td>1.5</td>
<td>-12</td>
</tr>
<tr>
<td>C54</td>
<td>Corpus Uteri</td>
<td>95</td>
<td>4.5</td>
<td>65</td>
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<td>-36</td>
</tr>
<tr>
<td>C55</td>
<td>Uterus NOS</td>
<td>3</td>
<td>0.1</td>
<td>7</td>
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<td>+121</td>
</tr>
<tr>
<td>C56</td>
<td>Ovary</td>
<td>78</td>
<td>3.7</td>
<td>51</td>
<td>2.3</td>
<td>-39</td>
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<tr>
<td>C57</td>
<td>Other Female Genital Organs</td>
<td>6</td>
<td>0.3</td>
<td>13</td>
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<td>+103</td>
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<tr>
<td>C60</td>
<td>Penis</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>0.1</td>
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<tr>
<td>C61</td>
<td>Prostate Gland</td>
<td>243</td>
<td>11.6</td>
<td>324</td>
<td>14.4</td>
<td>+24</td>
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<tr>
<td>C62</td>
<td>Testis</td>
<td>5</td>
<td>0.2</td>
<td>3</td>
<td>0.1</td>
<td>-42</td>
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<tr>
<td>C63</td>
<td>Other Male Genital Organs</td>
<td>1</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>-100</td>
</tr>
<tr>
<td>C64</td>
<td>Kidney</td>
<td>46</td>
<td>2.2</td>
<td>42</td>
<td>1.8</td>
<td>-16</td>
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<tr>
<td>C65</td>
<td>Renal Pelvis</td>
<td>5</td>
<td>0.2</td>
<td>3</td>
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<td>-42</td>
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<tr>
<td>C66</td>
<td>Ureter</td>
<td>10</td>
<td>0.5</td>
<td>2</td>
<td>0.1</td>
<td>-80</td>
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<tr>
<td>C67</td>
<td>Bladder</td>
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<td>5.9</td>
<td>134</td>
<td>6.0</td>
<td>+1</td>
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<tr>
<td>C69</td>
<td>Eye &amp; Adnexa</td>
<td>3</td>
<td>0.1</td>
<td>1</td>
<td>0.0</td>
<td>-65</td>
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<tr>
<td>C70</td>
<td>Meninges</td>
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<td>0.5</td>
<td>8</td>
<td>0.4</td>
<td>-30</td>
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<tr>
<td>C71</td>
<td>Brain</td>
<td>31</td>
<td>1.5</td>
<td>33</td>
<td>1.4</td>
<td>-2</td>
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<tr>
<td>C72</td>
<td>Other Central Nervous System</td>
<td>9</td>
<td>0.4</td>
<td>9</td>
<td>0.4</td>
<td>-2</td>
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<td>C73</td>
<td>Thyroid Gland</td>
<td>39</td>
<td>1.9</td>
<td>53</td>
<td>2.3</td>
<td>+26</td>
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<tr>
<td>C74</td>
<td>Adrenal Gland</td>
<td>1</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>-100</td>
</tr>
<tr>
<td>C75</td>
<td>Other Endocrine Glands and Structures</td>
<td>5</td>
<td>0.2</td>
<td>0</td>
<td>0.0</td>
<td>-100</td>
</tr>
<tr>
<td>C76</td>
<td>Other &amp; Ill-Defined Sites</td>
<td>4</td>
<td>0.2</td>
<td>0</td>
<td>0.0</td>
<td>-100</td>
</tr>
<tr>
<td>C77</td>
<td>Lymph Nodes</td>
<td>44</td>
<td>2.1</td>
<td>62</td>
<td>2.8</td>
<td>+32</td>
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<tr>
<td>C80</td>
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<td>1.7</td>
<td>55</td>
<td>2.4</td>
<td>+46</td>
</tr>
<tr>
<td><strong>TOTAL CASES</strong></td>
<td><strong>2095</strong></td>
<td></td>
<td><strong>2255</strong></td>
<td></td>
<td><strong>+7.6</strong></td>
<td></td>
</tr>
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</table>
Most Frequent Cancer Sites in 2004 at SPH

With 344 new cases representing almost 17 percent of all cancer cases in 2004, cancer of the breast continues to be the most commonly occurring cancer at SPH, followed (in descending order) by prostate (14 percent), lung (12 percent), colon (7 percent), hematopoietic (blood and blood forming tissues-seven percent) and bladder (six percent).

Most Common Cancer Sites 2004

A comparison with state and national cancer site incidence data shows that in 2004, St. Peter’s identified a proportionally higher percent of breast, hematopoetic, and bladder cancers than were identified in either New York state or the U.S. Conversely, a smaller percentage of prostate, lung, colon and bladder cancers were identified at St. Peter’s than in the state and nation at a whole.

Relative % of New Cancer Incidence by Tumor Site SPH vs. NY State vs. US

*New York State Department of Health, NY State Cancer Registry provisional incidence data. 2004
**American Cancer Society, Cancer Facts & Figures 2004
PROSTATE CANCER RISK FACTORS

Regional and Environmental Factors

Prostate cancer incidence varies widely throughout the world. High-risk countries include the U.S., Canada, Sweden, Australia, and France. Intermediate risk countries include the remaining Western European nations, and low-risk countries include most of Asia. Regional differences may be due in part to genetic factors as well as environmental ones.

Evidence suggests that dietary factors play an important role in prostate cancer risk. Increased intake of animal fat in Western society has been identified as a risk factor for increased prostate cancer incidence. By contrast, an Asian diet rich in soy, seaweed, rice, shiitake mushrooms, fish and green tea may reduce the incidence risk of prostate cancer.

Studies indicate that Asian-Americans develop higher incidence rates of prostate cancer than their non-Westernized Asian counterparts. Additional studies have found that prostate cancer incidence tends to increase in countries previously deemed as low-risk once Westernization increases dietary fat and obesity and decreases physical activity. Evolving data indicate that obesity appears to be linked to poorer prostate cancer outcomes.

Ethnic and Genetic Factors

Among the different ethnic groups in the United States, African-Americans have the highest prostate cancer incidence rates, followed by Caucasians, Hispanics and Asians. It is difficult to differentiate what genetic (as opposed to environmental) factors may be contributing to this difference in incidence. There are data to suggest that androgen (male hormone) secretion and metabolism may play an important role. Genetic work has identified two specific genes that correlate with prostate cancer incidence. The SRD5A2 gene codes for the enzyme responsible for conversion of testosterone to its more potent form in the prostate gland, and the GYP3A4 gene is involved in testosterone oxidation. The SRD5A2 gene hold promise in the area of prevention, while the GYP3A4 gene has been linked to adverse prostate cancer factors at
diagnosis. These genetic advances may help to explain the increased incidence rates in relatives of men with prostate cancer. Family patterns of prostate cancer have been identified by case-control analysis. A man with one first-degree relative with prostate cancer is estimated to have a 2.1-fold to 2.8-fold greater risk of being diagnosed with prostate cancer. Having a first-degree and second-degree relative with prostate cancer may increase the prostate cancer risk for that individual by a factor of six above that of the general population.

**Age**

Increasing age is a risk factor for prostate cancer incidence. More than 40 percent of prostate cancers are diagnosed in men between the ages of 65 and 74 years. Men diagnosed between the ages of 50 and 64 years account for just over 20 percent, and approximately one percent of prostate cancers are diagnosed in men under 50 years. Men over 74 years of age account for roughly 35 percent of prostate cancers diagnosed each year in the United States.

**Digital Rectal Exam**

A digital (finger) rectal exam (DRE) may be done as part of a regularly scheduled examination or to investigate symptoms (such as difficulty urinating or a decrease in force of the urine stream) that may indicate a problem with the prostate gland. During the examination, a health professional inserts a lubricated, gloved finger of one hand into the rectum and may use the other hand to press on the lower abdomen or pelvic area. A tumor in the prostate can often be felt as a hard lump. However, the digital rectal exam is not a foolproof method of detecting prostate cancer because not all abnormalities in the prostate can be felt through the rectum.

**Prostate Specific Antigen (PSA) as a Prostate Cancer Marker**

**Prostate Specific Antigen (PSA)**

A tumor marker is defined as any measurable entity that provides information regarding the clinical course of a particular cancer. During the past 15 years, prostate specific antigen (PSA) has become indispensable in the management of prostate cancer. This tumor marker is specific to prostate tissue only and does not correlate with the presence of other cancers (e.g., colon cancer). In men diagnosed with prostate cancer, the serum PSA level is helpful in estimating the extent of disease and acts as a surrogate of tumor volume and cancer burden, with higher levels indicating increasing likelihood of prostate cancer spread outside of the prostate gland. Pre-treatment serum PSA level, therefore, predicts for likelihood of success of definitive treatment and may help guide treatment decisions. The serum PSA is also very helpful in monitoring patients after they have received treatment for prostate cancer. Significant increases in the serum PSA level following treatment may indicate recurrence of cancer and the need for additional treatment. The efficacy of PSA has been scrutinized most closely in its usefulness in screening for prostate cancer: in evaluating its ability to indicate the presence of prostate cancer when the test is abnormal (i.e., positive predictive value), and in its ability to indicate that prostate cancer is not present when the test is normal (i.e., negative predictive value). It is well recognized that neither the positive nor negative predictive values of this serum test are 100 percent.

**Prostate Specific Antigen Isoforms**

The positive predictive value (PPV), or likelihood of cancer being diagnosed, for a PSA value between 4.0-10.0ng/ml in a patient with a normal DRE is about 30 percent. The PPV for a PSA value between 4.0-10.0ng/ml in a patient with a DRE suspicious for cancer increases to about 50 percent. The PPV for a normal PSA value below 4.0ng/ml and a suspicious DRE is about 10 percent, and a yearly DRE is an important component of prostate cancer screening. To improve the predictive value of PSA in diagnosing prostate cancer, clinicians will utilize the PSA velocity (PSAV), or rate of change of PSA over time. An increase of 0.75ng/ml per year or greater than 20 percent per year in the serum PSA level may indicate an increased risk of a prostate cancer being present.

![Digital Rectal Exam Detecting Prostatic Tumor](image)
PSAV is most helpful when a PSA is obtained at three- to six-month intervals for two years duration. PSA isoforms may be helpful in increasing the usefulness of PSA, particularly in the patient who has already undergone a prostate biopsy showing no cancer. In that setting, a 25 percent free PSA cutoff is 95 percent sensitive and results in 20 percent fewer biopsies with a decreased detection rate of only five percent.

**Biopsy for Detection of Prostate Cancer**

The serum PSA and digital rectal examination indicate prostate cancer risk only. Confirmation of the presence of prostate cancer requires biopsy. In the vast majority of cases, prostate biopsy is performed by passing a needle into the prostate gland under real-time direct localization using ultrasound. At the time of biopsy, the prostate gland is sampled by region. Traditionally, the sextant biopsy has included a biopsy needle sample from the prostate base, mid-gland and apex on both the left and right lobes, producing six samples. Recent reports have suggested that an increased number of samples obtained at the time of prostate biopsy (i.e., greater than one sample from each sextant) and additional more laterally directed biopsy samples improve the diagnostic value of prostate biopsy. This has led to improved cancer detection rates in men with cancer, and greater confidence that cancer has not been missed when the biopsy shows no cancer being present.

**Biopsy Guidelines**

Presently, prostate biopsy is recommended for patients with serum PSA levels above 4.0ng/ml or significant increases of 0.75ng/ml per year or 20 percent per year even if the PSA is still less than 4.0ng/ml, a suspicious digital rectal examination, and a life expectancy of at least 10 years. In general, prostate cancer screening is initiated at age 50 years, but many men are being screened at earlier ages. It is recommended that men with a family history of prostate cancer and African-Americans be screened starting at age 40. An upper age cut-off to stop screening for prostate cancer does not exist. It may not be unreasonable to check a yearly PSA in men of advanced age in the event that the PSA is markedly elevated and may indicate advanced disease. In such cases, consideration of treatment may be warranted to avoid adverse events such as pathologic hip fracture. However, great caution must be exercised in interpreting serum PSA levels in the elderly. It is probably inappropriate to become alarmed over mild elevations in serum PSA and thus to initiate prostate biopsy and potential harmful therapies in the vast majority of these men.

**Prostate Cancer Staging**

**Radiographic Imaging**

Traditional radiographic imaging modalities are most useful in patients with measurable prostate cancer outside of the prostate gland. The radionuclide bone scan is most helpful in patients with serum PSA levels greater than 20ng/ml, and felt not to be helpful in newly diagnosed men with serum PSA levels below this level in the absence of musculoskeletal complaints. Computerized tomography (CT) scanning will identify nodal metastases in advanced prostate cancer but has a limited role in early disease. Magnetic resonance imaging (MRI) with use of a transrectal receiver coil (eMRI) offers high-resolution images of the prostate gland and may be useful in identifying extracapsular disease spread beyond the prostate gland in select high risk cases. In newly diagnosed cases, however, such spread may be just a few millimeters, and beyond the imaging capability of even this advanced imaging modality. In patients with obvious extracapsular spread on eMRI, this can often be predicted based upon the digital rectal examination, serum PSA and biopsy Gleason grade.

**Prediction Methodology**

Prediction methodology represents a vast amount of work being performed in the area of nomogram development. Nomograms are designed to characterize: prostate cancer stage at diagnosis;
anticipated clinical behavior of newly diagnosed cancers; expected response to treatment; and likelihood of clinical progression in the event of PSA recurrence following treatment. Nomogram methodology is established most firmly in staging newly diagnosed cancers, which is the prediction of actual extent of prostate cancer. In the case of staging, tables have been developed which require the following readily available patient factors: (1) serum PSA; (2) digital rectal examination; (3) grade of cancer on biopsy specimen. Additional tables provide information regarding anticipated natural history with the input of the above readily available patient factors and patient age. Prediction methodology will continue to play an important role in guiding treatment decisions and is anticipated to be strengthened by evolving novel biochemical and molecular markers.

TREATMENT OF NEWLY DIAGNOSED PROSTATE CANCER

Most clinicians agree that no one therapy is appropriate for all patients. Factors such as patient age, co-morbidities, stage at diagnosis and anticipated natural history of the newly diagnosed cancer will guide treatment decisions. Early detection due to PSA screening and associated stage migration has led to improved outcomes utilizing most forms of definitive local therapy compared to a decade ago. Treatment options available for definitive local therapy include radical prostatectomy, intensity modulated external beam radiotherapy (IMRT), and prostate brachytherapy permanent seed implantation.

Surgery

The majority of men now undergoing radical prostatectomy will receive bilateral prospective nerve sparing. Preservation of the neurovascular bundles on each side of the prostate gland increases the likelihood of post-operative erectile function that is satisfactory for intercourse. The approach to the prostate gland is either through a small vertical skin incision (open radical prostatectomy) below the umbilicus (belly button), or through a series of small port sites (laparoscopic, robotic). The goal of surgery is to remove the entire prostate gland with a small rim of surrounding tissue. Pelvic lymph node removal is performed in patients with risk factors for spread to these regions. Pelvic lymph node spread may indicate that the cancer is no longer confined to the prostate gland.

Following the operation, the prostate gland is evaluated microscopically for cancer grade and extent, and a pathologic stage is assigned. Rarely will the pathologic findings upon inspection of the prostate gland indicate the need for immediate radiation therapy.

The post-operative serum PSA level should be undetectable as a result of complete prostate gland removal. In patients with a detectable serum PSA level following prostatectomy, pathologic grade and pathologic stage, and rate of serum PSA doubling time will predict cancer behavior and need for additional therapy.

Follow-up Care

Appointments are scheduled every three months following surgery. A serum PSA is obtained at this same interval.

LOOKING FORWARD

The Urology Service at St. Peter’s Cancer Care Center, in collaboration with our Radiation Oncology and Medical Oncology colleagues, is participating in a research protocol for men with newly diagnosed prostate cancer of high Gleason score. These aggressive cancers have been challenging to manage with traditional treatment modalities, and our innovative approach shows promising results and has been well tolerated by participating patients.

All patients treated on our campus receive the latest technological advances in diagnosis and treatment, and the benefits of our Multidisciplinary Prostate Cancer Clinic, Multidisciplinary Tumor Board, and Prostate Pathology Conference Review of all operated cases.
Prostate cancer is the most common non-skin cancer in American men. A total of 232,090 new cases of prostate cancer and 30,350 deaths from the disease are anticipated in the United States in 2005. A man’s lifetime risk of prostate cancer is one in six. Prostate cancer is the second leading cause of cancer death in men, next to lung cancer.

It is estimated that there are more than two million American men currently living with prostate cancer. In fact, there is an even more frequent anatomic form of prostate cancer in which a microscopic focus of prostate cancer is discovered as an incidental finding, either at postmortem examination or in a surgical specimen removed for other reasons. Approximately 90 percent of these latent prostate cancers do not cause trouble in the lifetime of the host. A better understanding is needed of the genetic and biologic mechanisms that determine why some prostate cancer remain clinically silent, while others cause serious, even life-threatening illness.

Etiology/Pathogenesis

Little is known about the causes or pathogenesis of prostate cancer. Several risk factors are suspected of playing roles including age, race, family history, hormone levels and environmental influences. Age, race and family history of prostate cancer are the three most important risk factors for prostate cancer in the United States.

Prostate cancer is rarely seen in men younger than 40 years; the incidence rises rapidly with each decade thereafter. For example, the probability of being diagnosed with prostate cancer is one in 19,299 for men younger than 40 years, one in 45 for men 40 to 59 years, and one in seven for men aged 60 to 79. Prostate cancer exhibits tremendous differences in incidence among populations worldwide; the ratio of countries with high and low rates of prostate cancer ranges from 60-fold to 100-fold. Asian men typically have a very low incidence rate from two to 10 per 100,000 men. Higher incidence rates are generally observed in Northern European countries. African-American men, however, have the highest incidence of prostate cancer in the world. Within the United States, African-American men have a 60 percent higher incidence rate compared with white men.

Family clustering of prostate cancer has been reported frequently. Approximately 5-10 percent of prostate cancer cases is believed to be due primarily to high-risk inherited genetic factors or prostate cancer susceptibility genes. A family history of a brother or father with prostate cancer increases the risk of prostate cancer by twofold to threelfold. The risk of prostate cancer rises with the number of close relatives who have the disease.

There are other factors likely influencing prostate carcinogenesis but none of them has been proven to be causative. They include endogenous hormones (androgens and estrogens) and environmental factors. Many environmental factors have been
studied for their possible candidates of prostate carcinogenesis. For example, increased consumption of fats has been implicated because dietary fat intake influences levels of hormones such as testosterone, which, in turn, affect the growth of prostatic epithelium.

**Pathologic Diagnosis**

The diagnosis of prostate cancer can be confirmed only by tissue exam performed by a pathologist. The tissue can be a prostate biopsy specimen for diagnostic purpose or a specimen of radical prostatectomy for the purposes of therapy and pathologic analysis. Prostate cancer, similar to most other forms of cancer, is described pathologically by both grade and stage. Many pathological parameters are required for grading and staging prostate cancer. They include histologic type and patterns, tumor location, resection margin status, extraprostatic extension, vascular invasion, seminal vesicle invasion and tumor quantification.

Grade describes how closely the tumor resembles normal prostate tissue, i.e. degree of differentiation. Several grading systems of prostate cancer have been developed, of which the Gleason system is the best known and currently widely used by pathologists. Under the Gleason system, prostate cancer is graded 1 through 5 based on histologic patterns, representing from well-differentiated tumor to poorly differentiated tumor. Because most tumors contain more than one pattern, it is usual to assign a primary grade to the dominant pattern and a secondary grade to the subdominant pattern. The two numerical grades are then added to obtain a combined Gleason score. Thus, under this schema, the most well differentiated prostate cancers have a Gleason score of 2 (1+1) and the least-differentiated tumors merit a score of 10 (5+5). Grading is of particular importance in prostatic cancer because there is in general fairly good correlation between the prognosis and the degree of tumor differentiation. High-grade tumors generally grow more quickly and are more likely to spread than low-grade tumors. Therefore, the Gleason score assigned to the tumor at radical prostatectomy is the most powerful predictor of progression following surgery. Prostate cancer usually presents with an intermediate Gleason score 5-7.

**Stage** refers to the extent of the cancer and usually takes both clinical and pathological parameters into account. Early prostate cancer, stages I and II, is localized and has not spread outside the gland. Stage III prostate cancer, often called locally advanced disease, extends beyond the gland to the seminal vesicles. Stage IV cancer means that the tumor cells have spread to lymph nodes and/or to other tissues or organs, i.e. metastasis. Thus, staging of prostate cancer is also important in establishing a prognosis and in selection of the appropriate form of therapy.

**Pathological Prognostic Factors**

Tumor stage and Gleason score are the most important pathological prognostic indicators following surgery. The pathological stage of the tumor is a strong predictor of outcome. In patients...
who have undergone radical prostatectomy, examination of excised tissue can determine whether there is involvement of the lymph nodes and/or seminal vesicles, a finding that is associated with a poor prognosis and a high rate of relapse (53–85 percent relapse within five years). In patients with disease that is still confined to the prostate, there is a very low recurrence rate (less than 10 percent).

Gleason score is also an important predictor of outcome in patients who do not have lymph node or seminal vesicle involvement. Localized cancer with a Gleason score of 2-4 carries with it an excellent, post-surgery prognosis (five-year freedom from relapse of more than 90 percent), while a Gleason score of 8-10 is uniformly poor (10-year disease-free survival rate of 35 percent). For patients with intermediate Gleason scores (5-7), the surgical margin status, whether or not cancerous cells are found at the edges of excised tissue, is a useful prognostic marker. Gleason score can be also employed in combination with clinical prognostic marker pre-therapy PSA level for the prediction of outcome in prostate cancer.

**Molecular and Cellular Prognostic Markers (Biomarkers)**

For establishing more accurate prognosis in prostate cancer, new prognostic markers are being introduced and evaluated continuously. Perhaps the most promising results will be found through investigation of the genetic mutations responsible for cancer. By using special techniques on the prostatic tissue, it is now possible to detect the gene products (proteins) associated with cancer progression and metastasis, and so predict with greater accuracy the likely outcome for these patients.

Most of these potential markers are still under investigation to determine their robustness and overall prognostic value; a brief overview of some of the most promising is presented here:

- **p53.** The p53 gene is a tumor suppressor gene. Mutations in this gene lead to a higher risk of genetic instability and the possibility of transformation to malignancy. Several studies investigating the mutated p53 gene in prostate cancer have shown that its presence in prostate tissue is an indicator of a poor prognosis, even in patients with low or intermediate Gleason scores. The potential of this gene as a prognostic marker is being investigated.

- **bcl-2.** The bcl-2 is a proto-oncogene and is involved in regulating programmed cell death, or apoptosis. Like p53, bcl-2 is expressed in 27-68 percent of prostate cancer tissue samples. Increasing expression of bcl-2 is associated with increasing Gleason score and tumor stage and appears to be an independent predictor of a poor prognosis.

- **Ki-67.** Ki-67 is present in dividing cells but not in stationary cells, and therefore has the potential for use as a marker for cellular proliferation. Ki-67 expression has been correlated with recurrence of prostate cancer following prostatectomy, with increased expression of the antigen associated with a lower disease-free survival rate.

- **apoptotic index.** There is some evidence that the apoptotic index may be a better predictor of five-year, disease-free survival than tumor volume, mitotic index or status of organ confinement.

- **angiogenesis.** The ability of tumors to grow is dependent upon their ability to form new blood supplies (angiogenesis). The proliferation of blood vessels within a tumor can be measured and quantified by tissue staining. Microvessel density (MVD) has been shown to increase with the worsening pathological stage of the tumor and can predict the likelihood of extraprostatic extension.
BACKGROUND

Over the past 20 years, radiation therapy has become a valuable tool in the curative treatment of prostate cancer. However, several issues may impact determining the optimal treatment for any patient with the disease. These include:

- The wide variation in the biologic behavior of prostate cancer.
- The possibility that competing medical illnesses may result in a patient’s death prior to being able to measure the long-term effectiveness of his prostate cancer treatment.
- The dearth of good randomized clinical trials comparing different treatment methods.
- The continually evolving nature and ongoing implementation of new treatment technologies which make it difficult to evaluate the long-term efficacy of one form of treatment over another.

Despite these issues, which have prevented defining a single “best treatment” for prostate cancer, radiation remains an excellent therapeutic choice.

The Effect of Radiation on Cells

Radiation therapy exploits this difference in repair capabilities between cancer cells and normal cells. Radiation of cancer cells damages the cells’ DNA. Because cancer cells have poor mechanisms to repair radiation-induced damage to their DNA, this damage renders the cancer cells unable to reproduce and the cells die. Normal cells have better DNA repair mechanisms and are better able to recover after receiving radiation therapy. However, normal cells also have a threshold for radiation tolerance and recovery that, when exceeded, can result in cell death. Successful delivery of radiation therapy requires walking the “fine line” between killing cancer cells and not causing irreparable harm to normal structures.

METHODS OF RADIATION THERAPY

Radiation therapy can be delivered by two different methods: via external beam techniques or via brachytherapy techniques (the placement of radioactive sources either in or near tumors).

External Beam Radiation

In external beam therapy, X-ray beams about 1,000 times more powerful than chest X-rays are aimed at the area of the cancer. The beam is delivered to the prostate from a sequential series of different directions so that the summation of the beams at the point of convergence (the isocenter) imparts a high dose of radiation to the prostate itself while
delivering a minimal radiation dose to the adjacent healthy tissues. Recent success in treating prostate cancer patients with external beam therapy can be attributed to

- The ability to increase the dose of radiation therapy administered to the prostate, and
- The recognition that the prostate gland itself is a mobile organ that can occupy different positions within the pelvic region on a daily basis.

**Dose Increase**

In 1990, the radiation dose that could be safely delivered to the prostate was in the range of 6500 cGY, whereas today, routine doses of 7800 cGY are being delivered. This represents a dose escalation of 20 percent. (The term “cGY” is a unit of radiation). The ability to increase the dose of radiation therapy is due to techniques such as IMRT (intensity modulated radiation therapy) which allow for the aperture as well as the angle of the radiation beam to change with time. Sophisticated treatment planning computers now allow the development of treatment plans that shield sensitive adjacent structures such as the rectum and bladder while delivering radiation to the target tissue. Computer models can now define the actual amounts of rectum and bladder tissue treated allowing the treatment team to predict and plan for the risk of late complications.

**Prostate Localization**

In the past, marks were placed on the skin to line up a patient for treatment. It is now recognized that, due to prostate mobility, this is an inaccurate way of defining the target tissues. This is especially crucial in IMRT because there is such a steep gradient in dose between the target tissue and uninvolved tissues. Today, methods such as daily ultrasound visualization of the prostate gland, placement of markers within the prostate gland, or daily CT scans to view the prostate greatly enhance localization of the prostate prior to each IMRT treatment.

**Brachytherapy**

Prostate brachytherapy (e.g. prostate implant) is another highly effective method of treating prostate cancer. In this method, small seeds containing radioactive iodine or palladium are placed throughout the prostate gland. Each of these seeds emits a “halo” of radiation around it. The net effect of these “halos” results in a very high dose of radiation therapy concentrated in the prostate gland itself, while minimizing radiation therapy to the surrounding rectum and bladder. Up to 100 small seeds are placed into the prostate gland under ultrasound visualization. The seeds contain a radioactive isotope and a shell around the isotope. The shells remain in the patient for the remainder of his lifetime. Radioactive isotopes
decay (give off radiation) over time until the isotope stabilizes and becomes essentially inert. As the isotope inside the shell decays, the surrounding tissues receive a concentrated and predictable dose of radiation.

**Using Half-Life to Determine Brachytherapy Dose**

Scientists are able to quantify the unique decay characteristics of each isotope. For example with iodine 125, the half-life is 59 days. At one half-life, there will only be 50 percent of the original radioactivity present in the patient; by two half-lives, there will be 25 percent of the original half-life. The biologic consequences of the radiation continue for many months after the prostate implant is performed.

**Decay Characteristics of I-125**

<table>
<thead>
<tr>
<th>Days after Implant</th>
<th>Percent of Original Radioactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>120</td>
<td>25</td>
</tr>
<tr>
<td>180</td>
<td>12.5</td>
</tr>
<tr>
<td>360 (one year)</td>
<td>1.6</td>
</tr>
</tbody>
</table>

**Common Side Effects of Radiation Therapy**

Side effects of radiation therapy for prostate cancer include injury to the wall of the rectum and erectile dysfunction. Because the rectum lies in close proximity to the prostate, it is inevitable that some radiation will be delivered to the rectal wall. This can result in rectal bleeding, which can be bothersome. In rare cases, this bleeding is severe enough to require surgical correction. Erectile dysfunction also remains a problem for patients treated with radiation therapy for prostate cancer. Recognition that the penile bulb plays an important role in the physiology of erections now allows us to try to shield this structure in the radiation treatment process.

As radiation oncologists, we are pleased with some of the very important technological advances made in the field of prostate cancer treatment, and we look forward to implementing new findings to endeavor to provide the safest and most effective treatments for our patients.
Prostate Cancer at St. Peter’s Hospital: Statistical Analysis

Prostate Cancer at St. Peter’s Hospital

This report presents an overview of St. Peter’s experience in diagnosing and treating prostate cancer and how this experience compares to its larger state and national sample cohorts. Data was obtained from two main sources. The first source was prostate cancer case data collected through St. Peter’s Cancer Registry. St. Peter’s Cancer Data Management department collects and compiles data on all identified cases of cancer that are diagnosed and/or treated at the institution. These data are compiled according to standards established by its accrediting body, the American College of Surgeons Commission on Cancer (ACoS-CoC). Adherence to these standards allows data to be aggregated and confidently compared to data collected elsewhere using the same standards. These standards establish criteria for considering reported cases to be analytic vs. non-analytic. Analytic cases have had a greater proportion of their diagnosis and/or treatment at the institution. For purposes of comparison, only analytic cases were counted in compiling case volumes. Depending on the context of comparison, these data may encompass the complete history of the registry (1985 to the reporting year 2004) or aggregated data from more recent periods. Date ranges throughout this report are clearly identified for the purposes of meaningful comparison.

The second main source was comparative data available through the National Cancer Database (NCDB), Commission on Cancer, ACoS. Benchmark Reports, v3.0. These data are aggregated from submissions to the Commission on Cancer by accredited programs across the country using identical reporting criteria. Currently, available NCDB site-specific data is limited to those from reporting years 2000 and 2001. The comparative data used for this report are an aggregate of both years. The NCDB data allows comparison of St. Peter’s data with those within New York state and throughout the United States, thus providing greater understanding of the St. Peter’s experience within those larger contexts. For the two-year period in question, 2,680 hospitals reported a total of 230,428 prostate cancer cases throughout the United States. Of those a total of 15,285 prostate cancer cases were reported by 140 hospitals within New York state. During the same period, St. Peter’s reported 340 cases of prostate cancer. (This number is slightly lower than the registry figure for these two years combined due to restrictions placed on data submissions to the NCDB, which eliminate cases deemed duplicative with other area institutions.) Percentage rather than numerical data have been used in much of this report to allow comparison between these disparately sized data cohorts. Also, because of the relatively higher long-term survival rates experienced by men treated for prostate cancer, those rates are reported in terms of 10-year, rather than five-year survival throughout this analysis.

Prostate Cancer Incidence at St. Peter’s

Between 1985, when its Cancer Registry began tracking incidence, and 2004, St. Peter’s Cancer Care Center diagnosed and/or treated 2,970 separate analytic cases of prostate cancer. On average, in the last 10 years, prostate cancer cases have increased at a rate of 10.4 additional new cases per year. Two hundred sixty-two new cases were identified in 2004. This steady increase in the number of prostate cancer cases is not unique to this tumor site, but rather follows the larger trend within St. Peter’s Cancer Care Center of increases in case volume as its program has grown. The 19-year historical incidence rate and two-year projected linear trend for prostate cancer follows:
Three hundred eighty-four total (analytic and non-analytic) cases of prostate cancer were identified at St. Peter’s Hospital (SPH) during 2004 representing 14.4% of all newly diagnosed cancer cases seen at the institution. Cancer of the prostate represents the 2nd most frequently occurring cancer in St. Peter’s population. This case incidence is relatively lower than both state and national averages for the same period.

Morphology

While prostate cancers may occasionally arise and express themselves with varied morphology (cell type), the vast majority of identified prostate cancers are adenocarcinomas, as is illustrated by the 19-year SPH incidence data specific to prostate cancer morphology group below:

Variation of morphology plays a relatively insignificant role in evaluation of prostate cancer survival. However, it is of note that comparison of the predominant adenocarcinoma cell-type with the next most frequently occurring epithelial cell-type tumors shows the latter to have a distinct survival disadvantage. A nearly 20% survival disadvantage at five years expands to a 56% disadvantage at ten years. Relative survival by morphology is illustrated:
NCDB: Incidence by Morphology

The following NCDB comparative morphology data demonstrates relative frequency of prostate cancer cell types for reporting years 2000-2001:

<table>
<thead>
<tr>
<th>ICD-O Morphology Code</th>
<th>All States %</th>
<th>NY State %</th>
<th>St Peter’s %</th>
</tr>
</thead>
<tbody>
<tr>
<td>80103 Carcinoma, NOS</td>
<td>0.5</td>
<td>0.4</td>
<td>0.0</td>
</tr>
<tr>
<td>81403 Adenocarcinoma, NOS</td>
<td>95.7</td>
<td>94.1</td>
<td>100.0</td>
</tr>
<tr>
<td>85503 Acinar Cell Carcinoma</td>
<td>1.5</td>
<td>2.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Other Specified Types</td>
<td>2.4</td>
<td>3.3</td>
<td>0.0</td>
</tr>
</tbody>
</table>

A review of the NCDB morphology data reveals the following:

- All cases reported by St. Peter’s during the two reporting years fell into the predominant Adenocarcinoma morphology group. While a review of the full registry history shows that the rarer forms of prostate tumor types are not totally absent, it may be concluded that their incidence at St. Peter’s is highly infrequent.

Family History

Studies have demonstrated there to be a greater likelihood for men with family histories of prostate cancer to both develop the disease at a younger age and to die from it than men who don’t have a family history. Also, level (closeness) of relation is significant in judging the correlation of family history to prostate cancer incidence and survival. A strong family history of breast cancer may also increase one’s risk of prostate cancer, particularly if the relative was diagnosed under the age of 40. Additionally, some studies have found an increased risk of prostate cancer among men who’ve had bowel cancer.

The CoC’s FORDS data collection standards currently used to abstract registry data have not required data abstractors to specify either the level of family relation or the site of the cancer affecting a related family member when family history is recorded to the cancer abstract. Therefore, data correlating family history of cancer with incidence and survival is too general to draw conclusions related to any specific familial predisposition to prostate cancer.

Given these limitations, St. Peter’s Registry data relating prostate cancer to family history is ambiguous. Year to year, there is no consistent pattern in the preponderance of positive vs. negative responses to this issue. Further confounding the issue is the large average number of cases where family history is not known. For the remaining sample, the five-year average incidence of family history is evenly split, with 38.5% of cases indicating a family history, 39.1% demonstrating no family history and 22.4% with data unknown. Family cancer history data is displayed following:
Age at Diagnosis

Age is the most significant risk for development of prostate cancer. While no longer rare in men under 50, nearly 63% of all new cases occur in men aged 70 or more. An analysis of St. Peter's Registry Data related to age at diagnosis indicates an increasing percent of cases being identified at younger ages.

Data related to age at diagnosis is shown at the right.

Predominantly, prostate cancer is being diagnosed in men in the 60- to 80-year range, who comprise an average of 67% of all cases. On average, one fifth of all new cases are identified in men under 60. While these data show that prostate cancer is predominantly a disease of the older population, a 10-year analysis of all new diagnoses under age 60 shows this segment to be growing relative to the population as a whole.

An examination of the 10-year survival rate shows that the likelihood of survival diminishes with the advance in age at time of diagnosis. For example, approximately 86% of patients diagnosed under the age of 69 were alive after 10 years, while the survival advantage diminished to 75% for those between 70 and 79 and diminished yet further to 51% for those diagnosed between ages 80 and 90. Mortality data collected by the registry do not necessarily indicate the cause of death, or more specifically, whether that cause of death was related to the initial diagnosis of cancer. Because prostate cancer still remains predominantly a disease of older age, there is an increased likelihood that death may occur from conditions unrelated to the cancer.
NCDB: Incidence by Age

The data below indicates the age at initial diagnosis for all diagnosed prostate cancer cases during the two-year period 2000-2001:

<table>
<thead>
<tr>
<th>Age at Initial Diagnosis</th>
<th>All States (%)</th>
<th>NY State (%)</th>
<th>St. Peter’s (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>16-29</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>30-39</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>40-49</td>
<td>2.2</td>
<td>2.5</td>
<td>0.9</td>
</tr>
<tr>
<td>50-59</td>
<td>18.2</td>
<td>19.8</td>
<td>21.2</td>
</tr>
<tr>
<td>60-69</td>
<td>36.5</td>
<td>36.7</td>
<td>36.8</td>
</tr>
<tr>
<td>70-79</td>
<td>34.1</td>
<td>32.1</td>
<td>33.8</td>
</tr>
<tr>
<td>80+</td>
<td>8.8</td>
<td>7.8</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Comparison of NCDB data reflect a relatively fewer number of very old (80 and above) cases versus both the state and the country as a whole. Data for the two cohorts encompassing the ages 60 to 79 are relatively comparable across all three age cohorts. St. Peter’s sees a proportionately higher percent of 50- to 59-year-olds and relatively fewer patients in the 40 to 49 year range, despite the data presented above indicating a general rising trend for diagnosis within these age groups.

**Race**
AS A FACTOR IN PROSTATE CANCER

Research has shown the African-American population to be at increased risk both for diagnosis with and for fatality from prostate cancer than are men of other races. A comprehensive analysis of diagnosis and treatment outcomes by race is included in the study “Outcomes of Prostate Cancer in the African-American Population – An Analysis of Program Data,” contained elsewhere in this report.

NCDB: Incidence by Race

The data below indicates the race of all diagnosed prostate cancer cases during the two-year period 2000-2001:

<table>
<thead>
<tr>
<th>RACE</th>
<th>All States</th>
<th>NY State</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>79.7</td>
<td>70.6</td>
<td>93.8</td>
</tr>
<tr>
<td>Black</td>
<td>12.7</td>
<td>18.6</td>
<td>4.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3.6</td>
<td>4.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Native American</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Asian</td>
<td>1.5</td>
<td>2.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>2.4</td>
<td>4.3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Logarithmic scale used to facilitate comparison of disparate percentages.

A review of NCDB data by race reveals the following:

- St. Peter’s prostate cancer patient population as a whole shows markedly less racial diversity than either New York State or the nation. The racial demographic of St. Peter’s prostate cancer cases is predominantly white. The SPH rates constitute just 22% of the comparable NY state African-American cohort, 7% of the state’s Hispanic cohort and 14% of the state’s Asian cohort.
- The same trend is evident, but less extreme in comparison with the national percentages.

HOUSEHOLD INCOME

NCDB: Incidence by Household Income

The data below demonstrates relative frequency of prostate cancer by household income for reporting years 2000-2001.

<table>
<thead>
<tr>
<th>HOUSEHOLD INCOME</th>
<th>All States</th>
<th>NY State</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;$28,000</td>
<td>9.6</td>
<td>10.2</td>
<td>4.1</td>
</tr>
<tr>
<td>$28,000 - $32,999</td>
<td>12.4</td>
<td>8.5</td>
<td>3.8</td>
</tr>
<tr>
<td>$33,000 - $38,999</td>
<td>17.8</td>
<td>12.3</td>
<td>7.7</td>
</tr>
<tr>
<td>$39,000 - $48,999</td>
<td>22.7</td>
<td>17.6</td>
<td>43.8</td>
</tr>
<tr>
<td>$49,000 +</td>
<td>35.0</td>
<td>48.2</td>
<td>39.1</td>
</tr>
<tr>
<td>Not Available</td>
<td>2.6</td>
<td>3.2</td>
<td>1.5</td>
</tr>
</tbody>
</table>
A review of the NCDB prostate cancer incidence by Household Income reveals the following:

- Within all three cohorts, the largest percentage of all cases occurs in the highest income bracket. The largest disparity in these percentages occurs in NY state data where 48.2% of cases occur in households making more than $50K per year. St. Peter’s 39.1% also exceeds the national incidence (35.0%), but to a less significant degree.

- When data from low-income groups (defined for this report as income below $39K per year) are aggregated, St. Peter’s relative percent of cases from those groups is 15.6%. This represents a relatively smaller number when compared to national incidence rates, where the relative percent of poorer men is 155% greater (39.8%). The comparable figure for New York State is somewhat lower (31.0%) but still represents twice the percent of lower income cases than St. Peter’s. In short, patients diagnosed with prostate cancer at SPH are on average significantly more affluent than either the national or state means.

**Behavior**

**NCDB: Incidence by Behavior**

The data below demonstrates relative frequency of prostate cancer by cell behavior for reporting years 2000-2001.

<table>
<thead>
<tr>
<th>BEHAVIOR</th>
<th>All States</th>
<th>NY State</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Situ</td>
<td>0.1</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Malignant</td>
<td>99.9</td>
<td>99.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Incidence of newly reported prostate cancer cases by behavior reveals that all St. Peter’s cases and the vast majority of state and national cases are malignant rather than in situ.

**Stage at Diagnosis**

Upon initial diagnosis, prostate cancer is categorized by stage. Stage at diagnosis remains a significant prognostic predictor in prostate cancer. Survival after a diagnosis of prostate cancer is directly proportional to the stage at which the cancer is diagnosed. Staging takes into account the size of the tumor, whether the lymph nodes are affected and whether the tumor has spread anywhere else. Prostate cancer has four basic stages. In Stage 1, the cancer is very small and completely inside the prostate gland. In Stage 2, the cancer is still inside the prostate gland, but is larger and a lump or hard area can be felt when a rectal examination is done. In Stage 3, the cancer has broken through the covering of the prostate and may have grown into the neck of the bladder or the seminal vesicle. In Stage 4, the cancer has spread to another part of the body. Cancers identified microscopically, which have not grown sufficiently to spread from their point of origin, are designated “in situ” and receive a stage designation of zero (0).
For the purpose of this analysis, SPH Registry data from the last 10 completed collection years was considered. In cases where clinical information related to stage is absent or unavailable, a stage designation of 99, or “unknown” is assigned. An examination of the percent of stages that were known vs. those that were unknown varies quite significantly year to year (from 1% in 1999 to 34% in 2003) as demonstrated below:

This may be attributable to the special circumstance of recovering from an abstraction backlog when 2002 and 2003 cases were being completed. This may have compromised the availability of clinical data on cases necessary to determine tumor stage. To correct for this variation, unknowns were dropped from the sample for the examination of stage at diagnosis. The following graph displays the relative percent for all known cases per year by their stage at time of initial diagnosis.

By far, the greatest percentage of cases is designated Stage 2 at diagnosis. Also, when viewing the two, five-year blocks comprising the sample, the relative percent of Stage 2 cases has increased by 20% (from an initial [1995-1999] 5-year average of 69% to a subsequent [2000-2004] five-year average of 83%). This increase has had the effect of decreasing the relative percents of Stage 1, 3 and 4 tumors by 73%, 25% and 38% respectively. Only the relatively negligible rates of Stage 0 cases remains unchanged. The following chart compares the percent of cases by initial stage for the two most recent five-year periods.

Survival statistics again bear out national data showing a significant survival advantage associated with earlier stage diagnosis. The SPH five- and 10-year survival rates stratified by initial stage at diagnosis are as follows:
It is interesting to note that the best survival rate (98% at both five and ten years) is demonstrated by those with Stage 3 disease. This is followed by Stage 2 with 96%/94% and Stage 1 with 93%/91% survival at five- and ten-years respectively. This divergence from the national survival averages may be attributable to the limited sample sizes for the Stage 1 and 3 cohorts. Survival with Stage 4 disease is comparable to national averages with rates of 62% at five years and 27% at 10 years.

**NCDB: Incidence by Stage**

The data below demonstrates relative frequency of prostate cancer by stage at time of diagnosis for reporting years 2000-2001.

<table>
<thead>
<tr>
<th>STAGE</th>
<th>All States %</th>
<th>NY State %</th>
<th>St. Peter's %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.6</td>
<td>1.8</td>
<td>2.1</td>
</tr>
<tr>
<td>2</td>
<td>78.3</td>
<td>82.2</td>
<td>85.3</td>
</tr>
<tr>
<td>3</td>
<td>8.4</td>
<td>7.0</td>
<td>8.8</td>
</tr>
<tr>
<td>4</td>
<td>5.3</td>
<td>5.3</td>
<td>3.2</td>
</tr>
<tr>
<td>NA</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Unknown</td>
<td>5.5</td>
<td>3.7</td>
<td>0.6</td>
</tr>
</tbody>
</table>

A review of the NCDB diagnostic stage data reveals the following:

- The largest percent of cases across all three cohorts were diagnosed at Stage 2. SPH relative percent is 4% higher than state and 9% higher than national averages.
• For the two years in question, St. Peter’s also has relatively fewer cases whose stage is unknown (0.6% vs. 3.7%/5.5% [NY/US]). Considering the increase in unknown stages for 2002 and 2003, this may be reversed when SPH data for more recent years is aggregated by the NCDB for future report.

• Relative percent of Stage 3 cases at SPH is higher than the state and comparable to the nation while SPH sees relatively fewer stage 4 cases than either the state or national cohorts.

First Course of Therapy

The five most recent years of data (2000-2004) were examined to determine the distribution of initial therapies for newly diagnosed prostate cancer cases. Surgery alone, at 29%, is the most common initial form of therapy. This is followed in descending order by the combination of Radiation and Hormone Therapy (22%), Radiation Therapy alone (21%) or no treatment (21%) and Hormone Therapy alone (2%). The remaining 5% received other types or combinations of therapy.

A comparison of the change in rates for initial therapies over a 10-year period illustrates how treatment modalities have changed. While the largest proportion of patients was treated with surgery alone for both study periods, the proportion from the earlier to the later date ranges diminished from 33% to 28% (a 15% reduction). Both radiation alone and hormone therapy alone experienced reductions from 24% to 21% (a 13% reduction for RT) and 5% to 2% (a 60% reduction for hormone). Conversely, the proportion of patients receiving both radiation and hormone therapy increased from 15% to 22% (a 47% increase). The proportion of patients that fell into other categories reduced from 12% to 5% (a 58% decrease) while those receiving no treatment nearly doubled from 11% to 21%.

Relative survival data for these four most frequent treatment regimes shows relatively similar survival advantages for the three most common treatment modalities (Surgery alone, Radiation Therapy alone and Radiation/ Hormone combination with ten-year survival of 98%, 92% and 88% respectively). Also, just over half of those who received no therapy (52%), were alive 10 years after diagnosis. A 60% survival rate for those on hormone therapy alone in year nine is mitigated by a sudden drop to zero at year 10. This may be a factor of the small initial sample but bears further exploration.
NCDB: Incidence by First Course of Treatment

The data below demonstrates relative frequency of initial treatment modalities in newly diagnosed prostate cancer for reporting years 2000-2001.

<table>
<thead>
<tr>
<th>FIRST COURSE OF TREATMENT</th>
<th>All States</th>
<th>NY State St.</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery Only</td>
<td>37.2</td>
<td>30.2</td>
<td>32.4</td>
</tr>
<tr>
<td>Radiation Only</td>
<td>20.5</td>
<td>23.2</td>
<td>28.2</td>
</tr>
<tr>
<td>Radiation &amp; Hormone Therapy</td>
<td>19.8</td>
<td>23.2</td>
<td>27.1</td>
</tr>
<tr>
<td>No 1st Course Rx</td>
<td>9.0</td>
<td>11.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Hormone Therapy Only</td>
<td>5.9</td>
<td>6.0</td>
<td>4.7</td>
</tr>
<tr>
<td>Other Specified Treatment Combinations</td>
<td>7.6</td>
<td>5.9</td>
<td>5.6</td>
</tr>
</tbody>
</table>

A review of the NCDB initial treatment modality data reveals the following:

- For all three cohorts, the largest percentage of prostate cancer cases is treated with surgery alone. St. Peter’s rate of 32.4% is slightly below the national rate of 37.2% and slightly higher than the NY state rate of 30.2%.
• The SPH rates for RT alone and for RT with hormone therapy are each significantly higher than either the national or state rates for those modalities.

• At 2.1%, St. Peter’s reports a significantly lower number of patients with no first course of treatment than either the national (9.0%) or state (11.5%) cohorts.

**NCDB: Incidence by First Surgery**

The data below demonstrates relative frequency of various surgical procedures in initial treatment of newly diagnosed prostate cancer:

<table>
<thead>
<tr>
<th>FIRST SURGERY</th>
<th>All States</th>
<th>NY State</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Surgery</td>
<td>56.1</td>
<td>64.9</td>
<td>62.4</td>
</tr>
<tr>
<td>Radical prostatectomy</td>
<td>34.5</td>
<td>27.9</td>
<td>26.8</td>
</tr>
<tr>
<td>Local tumor destruction</td>
<td>7.9</td>
<td>5.6</td>
<td>10.6</td>
</tr>
<tr>
<td>Subtotal or simple prostatectomy</td>
<td>0.1</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>Less than total prostatectomy</td>
<td>0.1</td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Prostatectomy with en bloc resection</td>
<td>0.5</td>
<td>0.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Prostatectomy, NOS</td>
<td>0.3</td>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Surgery, NOS</td>
<td>0.4</td>
<td>0.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>

A review of NCDB First Surgery data reveals the following:

• Three options encompass the large majority of patients’ surgical option. Of these, the predominant choice is actually the non-surgical option. The SPH proportion of prostate cancer patients receiving no surgery (62.4%) is higher than the national average (56.1%) and lower than the state average (64.9%).

• Of the two remaining surgical options, the next most frequent option is radical prostatectomy. St. Peter’s proportion receiving this option (26.8%) is lower than both the state (27.9%) and national (34.5%) incidence. The option of local tumor destruction is proportionally higher for St. Peter’s (10.6%) than for either the state or national cohorts (5.6% and 7.9% respectively).

• The balance of surgical options within all three groups is negligible.
NCDB: Incidence of Treatment with Radiation Therapy

The data below demonstrates relative frequency of prostate cancer treatment with radiation therapy for reporting years 2000-2001.

<table>
<thead>
<tr>
<th>Radiation Therapy</th>
<th>All States</th>
<th>NY State</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Radiation</td>
<td>56.2</td>
<td>51.0</td>
<td>41.5</td>
</tr>
<tr>
<td>Beam Radiation</td>
<td>23.7</td>
<td>21.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Brachytherapy</td>
<td>12.1</td>
<td>15.1</td>
<td>10.0</td>
</tr>
<tr>
<td>Radiation Therapy, NOS</td>
<td>8.0</td>
<td>12.5</td>
<td>38.2</td>
</tr>
</tbody>
</table>

A review of the NCDB data reveals the following:

- While national and state data indicate a larger proportion of external beam radiation rather than brachytherapy for prostate cancer, the volume appears to be almost equally divided at SPH. The significantly larger percentage of non-specific RT in the SPH figures makes it difficult to draw any conclusions concerning that proportional difference.

NCDB: Incidence of Treatment with Systemic Therapy

The data below demonstrates relative frequency of ovarian cancer treatment with systemic therapy for reporting years 2000-2001.

<table>
<thead>
<tr>
<th>Systemic Therapy</th>
<th>All States</th>
<th>NY State</th>
<th>St. Peter’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Systemic Therapy</td>
<td>69.0</td>
<td>66.9</td>
<td>64.4</td>
</tr>
<tr>
<td>Chemotherapy Alone</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Hormone Therapy Alone</td>
<td>30.3</td>
<td>32.6</td>
<td>35.3</td>
</tr>
<tr>
<td>Systemic Therapy, NOS</td>
<td>0.8</td>
<td>0.5</td>
<td>0.3</td>
</tr>
</tbody>
</table>

A review of NCDB Systemic Therapy treatment data reveals the following:

- Systemic therapy, when employed, is limited to hormonal therapy for tumor suppression. Chemotherapy plays no role in initial treatment of prostate cancer.
- Approximately one-third of prostate cancer patients across all three cohorts receive hormonal therapy as part of their initial treatment regime. Of the three cohorts, SPH has the highest relative hormone use (35.3%).
**Conclusions**

- Within all three catchments, local, regional and national, adenocarcinoma is the predominant morphologic cell type of prostate cancer. In almost all cases, prostate cancer is diagnosed as malignant rather than in situ.
- While evidence links increased occurrence of prostate cancer in a context of other familial cancers, data historically collected for the cancer registry are insufficient to draw similar conclusions for the SPH population.
- While still predominantly an illness of older men, the mean age of new prostate cancer cases is trending younger.
- Incidence of prostate cancer is increased in the African-American population at large. However, SPH sees proportionally fewer African-American men with prostate cancer than other institutions both regionally and nationally.
- The proportion of low-income men with prostate cancer seen at St. Peter’s is lower than that for other regional and national institutions.
- In recent years, prostate cancer has predominantly been diagnosed at stage 2. The relative proportion of stage 2 prostate cancers to other stage disease has also increased over the last 10 years. The proportion of cases whose stage is unknown has varied widely at St. Peter’s over the last 10 years. Except for those diagnosed at Stage 4, men can expect 10-year survival of greater than 90%.
- While surgery alone remains the most common first treatment option, multi-modal therapies have increased in proportion in recent years both at St. Peter’s specifically and in general across all cohorts. When surgery is performed, it consists predominantly of removal of the entire prostate rather than partial resection. Robust survival rates (nothing under 88% in 10 years) have been documented for men undergoing all initial treatment modalities except for hormone administration alone and no treatment.
- Both external beam and brachytherapy radiation are common forms of prostate cancer therapy. Systemic therapy is limited to administration of hormones for cancer suppression.

**Recommendation for Future Activities Concerning Prostate Cancer**

- In order to better use data related to family cancer histories, continue to collect and document in the abstract more detailed data concerning family history that is currently required by the CoC.
- In response to results indicating an increasingly younger population and the special risk factors for prostate cancer associated with African-Americans, continue to gear community education and outreach activities to include younger and racially diverse populations.
- Continue activities to encourage and track early and accurate cancer staging by managing physicians.
- Continue collaborative activities tracking incidence and outcomes for differential treatments of prostate cancer through cancer conference.
Prostate cancer continues to present a serious public health risk in the country. Prostate cancer is the most frequently diagnosed non-cutaneous cancer and is a leading cause of cancer death in American men. Both disease incidence and mortality rates are increasing.

The probability for African-American men to be diagnosed with prostate cancer is greater that that for other races. The mortality rate for this disease is higher in the African-American population than it is for comparable men of other races. (See Figure 1). Studies have suggested that this increased risk may be attributable to a lack of early screening and treatment in the African-American population rather than to a specifically more aggressive disease progression in African-Americans.

In its plan for monitoring quality of care during 2005, the QI Subcommittee of the Cancer Care Program Development Group (PDG) recommended conducting a study examining this issue in its population. The study design was presented and approved by the PDG. For purposes of eventual comparison, the design purposely mirrored a number of criteria and measures within the ACoS-Commission on Cancer study entitled, “Assessments and Comparisons of Quality of Care Criteria for Localized Prostate Cancer between Black and White Men.” St. Peter’s Cancer Registry served as the source for much of the data. Additional data was collected from St. Peter’s on-line laboratory and imaging reports.

**U.S. Prostate Cancer Death Rate in Men Age 45 and >**

<table>
<thead>
<tr>
<th>Race</th>
<th>Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>159.7</td>
</tr>
<tr>
<td>African American</td>
<td>70.7</td>
</tr>
<tr>
<td>White</td>
<td>64.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>47.6</td>
</tr>
<tr>
<td>Native American/Hispanic</td>
<td>37.2</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>26.4</td>
</tr>
</tbody>
</table>

* Per 100,000 in the US Standard population (Source: CDC, 1998) Figure 1
STUDY OBJECTIVES

The study objectives were to

- ascertain differences in outcomes in invasive prostate cancer in the African-American population vs. the non-African-American population,
- compare observed/expected number of African-American cases of prostate cancer for our population,
- compare age at initial diagnosis for African-American vs. other comparable cases of prostate cancer,
- compare stage, Gleason score and Prostate Specific Antigen levels at initial diagnosis,
- evaluate types of treatment,
- evaluate outcomes of treatment, and
- identify implications of findings for community outreach initiatives.

Study Sample

The study identified cases of invasive (Stage T1 or greater) prostate cancer that were diagnosed and accrued into the St. Peter’s Cancer Registry in the years 2000 and 2001. Once data was collected, the study group was split by race and differences between the two groups were compared and contrasted.

A total of 344 patients met the study criteria. Of those, 325 (94.5%) were white, 16 (4.7%) were African-American and one (0.3%) was Asian. For purposes of the study, data from all non-African American cases (designated as “OR” for “Other Races”) comprised cohort one (n = 326/94.8%) and the African-American group (designated as “AA” for “African-American”) comprised study cohort two (n = 16/4.7%). For the purposes of this report, the two cohorts will be identified as “cohort 1-OR” and “cohort 2-AA”.

Sample Size, Margin of Error and Confidence Levels

Reliability and reproducibility of a data analysis depends intrinsically on how consistently the respective cohort subgroups are representative of the whole population. The disparate sizes of the two cohorts and, specifically, the relatively small size of the African-American cohort compromise the confidence with which the data can be reported as representing the larger population. Because of this disparity, data derived from Cohort 1-OR can be reported at a 95% confidence level with a +/- 2% margin of error. The smaller size of Cohort 2-AA greatly reduces the confidence with which those data may be used to draw conclusions. Cohort 2-AA data of can be reported at a 90% confidence level with a +/-21% margin of error.

Age at Diagnosis

Mean age for Cohort 1-OR was 66.60 years. The median age for that cohort was 67. Mean patient age at time of diagnosis for Cohort 2-AA was 66.56 years. Median age for that cohort was 65.

<table>
<thead>
<tr>
<th>Sample Cohort</th>
<th>Sample Size</th>
<th>Mean Age</th>
<th>Median Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1-OR</td>
<td>(Other Races) 326</td>
<td>66.60</td>
<td>67</td>
</tr>
<tr>
<td>Cohort 2-AA</td>
<td>(African American) 16</td>
<td>66.56</td>
<td>65</td>
</tr>
</tbody>
</table>
Distribution of cases by age is shown in Figure 2. More than 80% of all cases first occurred between the ages of 55 and 75. However a larger proportion of African-American cases (44% vs. 28%) were between 55 and 65 years. A larger proportion of Cohort 1-OR was older at diagnosis that was Cohort 2-AA. More than 45% of that cohort were diagnosed between the ages of 65 and 75 while 31% of African-Americans diagnoses occurred within that age range. These demographic data indicate a younger average diagnostic age for African-Americans than for other races.

**Gleason Scores at Diagnosis**

In assessing prostate tumor morphology, the Gleason system assigns histologic grade based on the predominant (primary) and lesser (secondary) pattern of tumor. The grade numbers of the two patterns are added to obtain the Gleason score, which may range from 2 to 10. Higher Gleason scores are associated with less well differentiated (hence, more aggressive) tumors. Patients with Gleason scores from 8-10 with pathological stage C3 have been shown to be in the worst prognostic category (7.2 times the risk of recurrence) compared to stage C1 or C2 and Gleason score 2-7 patients.

Gleason scores were grouped into low (2-6), mid (7-8), high (9-10) and unknown groupings. The percent of low Gleason scores was similar for both cohorts (63.5% vs. 62.5%). The proportion of Gleason 7-8 was significantly higher in Cohort 1-OR than in Cohort 2-AA (30.4% vs. 12.5%). For both Gleason 9-10 and for unknown levels, that proportion was reversed with occurrences in those group markedly lower in Cohort 1-OR than in Cohort 2-AA (4.3% vs. 12.5% and 1.3% vs. 12.5%, respectively). Relative percents of Gleason scores are displayed in Figure 4.
PROSTATE SPECIFIC ANTIGEN LEVELS

Prostate Specific Antigen (PSA) is not diagnostic of cancer. The gold standard for identifying prostate cancer is still the prostate biopsy. However, tracking PSA levels over time in men who have been diagnosed with prostate cancer is extremely predictive of the presence of residual or recurrent cancer in the body.

Laboratory results of PSA levels were collected for all cases in the study. Readings were aggregated into the following groupings: 0-4, 4-10, 10-25, over 25, and unknown.

Pre-Treatment PSA readings were grouped and the percent of cases that fell into the respective groups were graphed. The results appear in Figure 5.

While some variation in the proportion from each cohort is evident, they are relatively slight in all but the “over 25” grouping. In that group, around 40% more Cohort 2-AA men had pre-treatment PSA’s greater than 25 than did men in Cohort 1-OR (6.3% vs. 3.7%). The percent of cases for which the pre-treatment PSA was unknown is comparable between African-Americans and men of other races.

Because rise in PSA value after treatment is strongly predictive of possible recurrence, post-treatment PSA values for both cohorts was collected and graphed. In order to obtain a meaningful sample, it was necessary to define inclusion in these data as follows: any value obtained within six months prior or subsequent to the 18-month and four-year anniversary dates after treatment was included in the sample. The scale used to graph these data was changed so as to be congruent with expected post-treatment PSA’s. These groupings are 0-1, 1-4, 4-10, >10, and unknown.

These data are displayed in Figures 6 (including the proportion of unknowns) and 7 (deleting the unknowns).

The most notable aspect of the 18-month data is the much larger proportion of unknown values for Cohort-2-AA (56.3%) as opposed to Cohort 1-OR (34.7%). This disparity compromises meaningful interpretation of the actual data that was collected, which is particularly notable for an lower proportion of low PSA values among the African-American cohort (31.3% vs. 50.0% for Cohort 1-OR). When
the percentage of unknowns is removed from the sample, this disparity is less notable. There were no 18-month occurrences in the mid- and high-PSA range for Cohort 2-AA as opposed to relatively small occurrences in those ranges for Cohort 1-OR (mid: 3.1% / high: 1.2%).

The disproportion in lost data seen between the two cohorts in the 18-month data does not exist in the four-year data. Cohort 1-OR, with 54.3% unknowns would appear to have "caught up" and is now comparable to the 56.3% of unknowns in Cohort 2-AA. The percentage of cases in Cohort 1-OR with four-year PSA levels 0-1 is 52% higher than the comparable group in Cohort 2-AA. There were no PSA's in the 4-10 range among African-Americans in the sample and few among other races (1.2%). However, the percentage in Cohort 2-AA with PSA's over 10 (12.5%) was significantly higher than was the percentage for Cohort 1-OR (1.5%).

The disparity in unknowns at 18 months suggests that men in the African-American cohort were more prone to be lost to follow-up after initial treatment. That this disparity did not continue in the four-year data suggests that once a follow-up pattern has been established, it will be maintained over time. Stating it differently, attrition rates in African-American men occur earlier in the post-treatment period than do those for men of other races.

The significantly higher proportion of men with PSA's greater than 10 in Cohort 2-AA in comparison with men in Cohort 1-OR suggests that the African-American men experienced, on average, more frequent recurrences than did men of other races.

**TREATMENT OF PROSTATE CANCER**

Which of the variety of treatment options that exist for prostate cancer are offered depends, in part, on whether and to what extent the tumor has spread. For tumors that are still inside the prostate, using radiation therapy to kill the cancer cells and radical prostatectomy are common treatment options. "Watchful waiting," that is, giving no treatment unless the tumor gets bigger, is also a treatment option.

Androgens, such as testosterone, are known to stimulate growth in prostate cancer cells. Hormone therapy lowers levels of the male hormones in the body, which can make prostate cancers shrink or grow more slowly. Hormone therapy may be used as first-line therapy for men who are not able to have surgery or radiation or whose cancer has already spread beyond the prostate gland. Hormones may also be administered after surgery or radiation therapy.

In their standards for collection of cancer data, the American College of Surgeons Commission on Cancer groups biopsies with other forms of treatment. Therefore, frequency data related to biopsies are included in this section of the analysis. While actually a diagnostic procedure rather than a form of treatment, the core needle biopsy of the prostate allows for pathologic cancer staging, knowledge of which plays a crucial role in determining what forms of treatment are most appropriate.

Data on the frequency of these procedures or treatment modalities was collected for both cohorts. Many individuals receive more than one treatment modality either together or at different points in their treatment regime. For the purposes of this analysis, each number represents the percentage of each cohort’s total sample that received that procedure or treatment. For example, 83.1% of Cohort 1-OR’s sample were biopsied while only 75.0% of Cohort 2-AA’s sample were biopsied. As a result, each...
percentage displayed in Figure 8 should be evaluated only as it relates to the comparable percentage for the alternate cohort.

Members of Cohort 1-OR were 11% more likely to be biopsied than those in Cohort 2-AA. The largest racial disparity in treatment is found for Radiation Therapy. The African-American sample group was 57% more likely to receive a form of radiation therapy than were those of other races. A similar but less extreme disparity was noted for other therapies, with 17% and 35% more African-Americans receiving hormone therapy and surgery, respectively, than those of other races. Fewer than 1% of Cohort 1-OR received chemotherapy or other (unspecified) treatments, while none of the members of Cohort 2-AA received either of those modalities.

Each individual within the two study cohorts was evaluated for the number of different treatment modalities received (including biopsy). The relative proportion of each of these groups is shown in the graph. The largest proportion of each group received two modalities. The second largest proportion of patients received one modality. None in Cohort 2-AA was found to have received more than two modalities. Six point five percent (6.5%) of Cohort 1-OR received three treatment modalities and 1.8% received four treatment modalities. The relative distribution of treatment modalities received for each cohort is displayed in Figure 9.

**Radiation Therapy Treatment Modalities**

Different methods are effective in radiating the prostate. At the time that the study cohorts were initially treated, two therapeutic modalities were available:

- External Beam Radiation (EBRT) focused on the prostate gland from a source outside the body.
• Permanent low-dose rate brachytherapy (Radioactive Seed Implant)

These modalities could also be administered in tandem.

A subset of each cohort had received some form of radiation therapy as part of his initial course of treatment. These cases were examined and identified as having received either or both of these RT therapy options. These relative percentages are documented in Figure 10.

These data show a disparity in the differential distribution of RT modalities, when selected by race. None within the African-American cohort were treated with seeds alone, while almost a fifth (19.3%) of Cohort 1-OR received Seeds as their only RT treatment modality. At 87.5%, the largest proportion of African-Americans received dual therapy of EBRT and seeds. The remainder of that cohort (12.5%) received EBRT alone. While the majority of the Cohort 1-OR sample (62.6%) received dual therapy. The balance between each of the therapies alone is more evenly distributed, with 18.2% receiving EBRT alone and, as noted above, 19.3% receiving seeds alone.

**Outcomes**

The Cancer Registry tracks each active patient in its database for follow-up data at least annually. Among the data collected for that activity include evidence of tumor recurrence as well as vital status. These measures, in tandem with PSA failures noted above, document treatment outcome. The relative percent of each cohort that had either evidence of recurrence, evidence of disease-free status or no data appear on the left of Figure 11. Differential vital status appears on the right of that figure, as well.

A higher proportion of Cohort 2-AA had evidence of disease recurrence in comparison to Cohort 1-OR (12.5% vs. 8.5%). Also, a larger proportion of the African-American cohort lacked recurrence data (25.0% vs. 18.7%) when compared to the Other Race cohort. The proportion of Cohort 1-OR with documented disease-free status was therefore higher (72.8% vs. 62.5%).

Data on vital status favors Cohort 1-OR slightly, with 85.3% of that sample were known to be alive within the last year as opposed to Cohort 2-AA, from which 81.3% were known to be alive within the same period.
Observations

Based on the findings of this study, the following observations can be made concerning prostate cancer diagnosis and treatment:

- Based on mean and median ages, African-American men are diagnosed with prostate cancer at the same age as men of other races. However, when evaluated as to where newly diagnosed men fall within specific age ranges, a larger proportion of African-American men are likely to be diagnosed between the ages of 55 and 65 than are men of other races. Conversely, men of other races are more likely to be diagnosed between the ages of 65 and 75 than are African-American men.

- The study results are inconclusive as to whether pre-treatment Gleason and PSA values are comparable between African-American men and men of other races at time of diagnosis.

- African-American men are more likely to be lost to follow-up in the 18 months after treatment than are men of other races. However, that differential in lost-to follow-up rates equilibrates between 18 months and four years post-treatment. Therefore, at year four, the proportion of cases lost to follow-up is comparable between African-American men and men of other races.

- African-American men are more likely to experience PSA failure four years post-treatment than men of other races.

- African-American men are more likely to be treated with radiation therapy as part of their treatment regime than are men of other races. Those African-American men being treated with radiation therapy are more likely to be treated with both EBRT and seeds and less likely to be treated with seeds alone than are men of other races.

- African-American men are less likely to be treated with more than two treatment modalities than are men of other races within the limitations of data collection for this study.

- African-American men are more likely to experience a tumor recurrence than are men of other races.

Conclusions

The null hypotheses were as follows:

- African-American men treated at St. Peter’s are equally likely to be diagnosed with later stage disease as non-African-American men, and

- The observations made as a result of this study appear to disprove both null hypotheses.
Cancer Care Program Development Group: 2004 Membership

Michael Kolodziej, MD – CO-CHAIR
Aileen Smith-Caruso, RN – CO-CHAIR

Vijayan R. Aroumougame, Ph.D. – CHIEF MEDICAL PHYSICIST, CANCER CARE CENTER
Peggy Cassidy, Clinical Nurse Specialist – ONCOLOGY
Theodore Chang, MD – UROLOGY
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Kelly Culler, RT, CTR
Denise DeLollo, RN, Community Outreach Nurse – CANCER CARE CENTER

Lisle Eaton, MD – PATHOLOGY
Samuel Feldman, MD – CLINICAL CHIEF, SURGERY
Lawrence Garbo, MD – MEDICAL ONCOLOGY
Wayne Holmen, RN – QI SPECIALIST
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Sarah Linville, AMERICAN CANCER SOCIETY
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317 South Manning Boulevard • Albany, New York 12208 • 518-525-1662
www.stpetershealthcare.org