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Cancer Annual Report-1996

Aurora Health Care
1996 Cancer Annual Report

1995 Cancer Data Review

St. Luke's Medical Center

AuroraHealthCare®

Special Focus:
Bone and Soft Tissue Tumors
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A gain this year we are making our annual report an educational endeavor as well as a review and summary of statistics from our Cancer Registry. Our focus this year is sarcoma; an infrequent tumor, but one in which appropriate management from the point of suspicion can result in a better tumor prognosis for the individual. Both tumor control and life quality can be affected. Current limb preservation approaches, which were considered risky and radical when I was a resident, are now considered the norm.

Sarcoma is a diagnosis which in the past implied frequent loss of limb and life for most patients. Today, an approach with coordinated management, newer reconstructive procedures and prosthetics often preserve function of an extremity with local tumor control. However, due to the rarity of sarcomas, these outcomes can only be attained when the primary care provider refers these patients when a sarcoma is first suspected. In many instances even the technique of the initial biopsy may affect treatment results. Unfortunately even with our improvements in local treatment, we still have challenges as caregivers to decrease the rate of distant spread. Fortunately there is hope on the horizon as you will read in this annual report.

As Chair of the Cancer Committee, I want to report on our activities for the year. Again we were goal driven for the year.

Cancer Committee Goals for 1995-1996

- Enhance patient and community education about cancer in general and the cancer services at St. Luke's Medical Center.

- Develop mechanisms to enhance communication between healthcare providers involved in the St. Luke's Cancer Center Program.

- Increase Cancer Center physician participation in clinical trials.

- Increase the impact of disease site programs in the current environment of healthcare through clinical guidelines/standards development and in anticipation of new payment systems.

In 1995, Marija Bjegovich formally accepted the position of Oncology Services Program Director. She had been serving as acting Director for the past year. We also welcomed Lawrence Lum, MD, Ph.D. as the new Scientific Director and Head of the Cellular Studies Laboratory at St. Luke's.

Program highlights included: 1) the creation of a multi-specialty task force to increase both awareness and accrual to lung cancer clinical trials in order to improve the prognosis and quality of life for patients, 2) American College of Surgeon survey with three year approval, 3) the Five Year Anniversary of the Autologous Bone Marrow Transplant Program, 4) the opening of the first VLCC satellite site in Slinger, Wisconsin, and 5) the joining of St. Luke's Medical Center and St. Luke's South Shore Cancer Programs.

Internal quality management efforts included a review of toxicity for continuous 5-FU infusion with pelvic irradiation for colorectal cancer and a survival study for patients treated with intraoperative radiation. We participated in the American College of Surgeon studies on Esophageal Cancer and Breast Cancer Treatment. We also participated in the Quality Assurance Mini-Study and the TRIAD study on patient awareness of support and resource services.

Community outreach activities included a “Cancer Survivor Day Celebration”, co-sponsorship of the “Making Strides Against Breast Cancer” event and The Vince Lombardi Golf Classic and Ball. Out of the generous activity of the Lombardi volunteers, significant financial support was provided for the Vince Lombardi Cancer Clinic and other cancer program activities at St. Luke's. Community Education included presentations on: prostate, breast, ovarian, cervical, uterine, and endometrial cancer as well as the use of Autologous Bone Marrow Transplantation for Breast Cancer.

Another busy, productive, and challenging year.

Marcia J.S. Richards, MD
Cancer Committee Chair
Work-Up and Biopsy Techniques for Bone and Soft Tissue Tumors

Musculoskeletal oncology is a subspecialty of orthopedic surgery that focuses on the diagnosis and treatment of patients of all ages with bone and soft tissue tumors. These tumors include benign and malignant primary bone tumors, benign and malignant soft tissue tumors, and tumors which are metastatic to the musculoskeletal system.

Primary malignant bone and soft tissue tumors are relatively uncommon. Approximately 3,000 new malignant bone tumors occur each year in the United States. In addition, approximately 5,000 new cases of soft tissue sarcomas are reported yearly in the United States. Nearly 3,000 people die of soft tissue sarcomas each year.

The evaluation of patients presenting with musculoskeletal tumors begins with a thorough history and physical examination. Patients with primary bone tumors usually present with pain as their most common symptom. The location, duration, character, and timing of pain should be noted. Aggressive benign and malignant bone tumors usually cause pain at rest and may present with nocturnal discomfort. They may also present with a soft tissue mass which is enlarging. This occurs when tumor breaks through bone cortex and extends into surrounding tissues. Later, systemic symptoms may occur, such as weight loss, loss of appetite and chronic fatigue. Pain with minor activity may indicate severe bone destruction and impending pathologic fracture.

In contrast, patients with soft tissue tumors will usually present with an enlarging painless mass in the extremity or trunk. Large masses may cause local discomfort by impinging on neurovascular structures which may lead to extremity dysfunction such as a limp. In general, larger tumors present in the less visible areas of an extremity, such as the posterior arm and shoulder and in the gluteal region and posterior thigh. Patients should be asked regarding any history of previous carcinomas, hereditary benign bone disease such as exostoses or hereditary soft tissue tumors such as neurofibromatosis. This may assist the examiner in narrowing the differential diagnosis which may include transformation of a benign process to a more aggressive malignant variant such as chondrosarcoma or neurofibrosarcoma.

Physical examination should focus on not only the presenting complaint or mass, but also on the remainder of the extremity and other organ systems. Characteristics of any soft tissue mass such as size, depth, warmth, and mobility are noted. In general, malignant lesions are larger, deeper, more vascular, and less mobile than benign lesions. Muscle atrophy and loss of function of surrounding joints should also be noted. Skin characteristics, such as pigmented lesions (café au lait spots), vascular pattern, and dermal inflammation should also be noted.

At the completion of the history and physical, the tumor may be placed into one of three categories: (1) Primary bone tumor; (2) Primary soft tissue tumor; (3) Metastatic tumor.

Staging a primary bone or soft tissue tumor includes determining the location of the tumor, the local extent of disease, and presence of distant metastatic disease.

Dr. Hinke's article will address the role of radiology for bone and soft tissue tumor evaluation. Bone scans with Technetium 99 MDP are also ordered. The relative vascularity of the tumor is noted on the early scan phases. In the later phase local extent of bone involvement, bone reaction to overlying soft tissue tumors, and presence of skeletal metastatic disease can be detected. In addition, multifocal tumors can be identified. Biopsy to obtain histologic diagnosis and tumor grade is performed after imaging studies are completed. The type of biopsy completed will depend upon the differential diagnosis and possible surgical treatment.

Routine laboratory studies are usually obtained at the time of initial evaluation. A baseline CBC with differential, electrolytes, BUN, Creatinine, sed rate, calcium, phosphorus, and alkaline phosphatase should be obtained. Further studies will depend on the age of the patient and suspected diagnosis. For example, a male patient older than 35 years presenting with a destructive bone tumor should have a serum and urine electrophoresis to detect multiple myeloma and a PSA to rule out metastatic prostate cancer. Urinalysis will help screen for a potential renal cell carcinoma.

Biopsy of musculoskeletal neoplasms is potentially hazardous. The procedure must be carefully planned so that diagnostic tissue is obtained and future resection and limb salvage procedures are not compromised. Biopsy should be performed only after staging studies are obtained since soft tissue edema, scar, and hemorrhage can adversely effect the interpretation of these studies. The incision should not be transverse; biopsy incisions should be longitudinal and placed in a site that is readily resectable during any future limb salvage surgery. Neurovascular structures should be avoided and the most direct route possible should be taken to the tumor. Any lateral soft tissue dissection of flaps must be resected in the future, therefore vigorous retraction must be avoided. Meticulous hemostasis is critical since hematoma and dissecting hemorrhage will contaminate tissues with tumor cells.

Donald A. Hackbarth, MD
Orthopedics
If a bone tumor is associated with a soft tissue mass, the soft tissue mass should be biopsied first to arrive at a diagnosis. If a bone biopsy is necessary, holes should be round and back-filled with polymethyl methacrylate cement. This will minimize pathologic fractures through the stress risers and will minimize hemorrhage. Drains should be of the small closed suction type and placed in line within 1 cm. of the incision apex as exit sites must be removed at the time of definitive resection.

Preoperative and intra-operative consultation with a pathologist experienced in bone and soft tissue tumors is mandatory for successful biopsies. A frozen section should be used to determine if sufficient diagnostic tissue has been obtained. The pathologist will assist with determining if additional tissue is needed for special stains, EM studies and flow cytometry. Tumor resection should not be performed unless the frozen section is absolutely diagnostic of the suspected tumor. Cultures should be obtained during any biopsy because infection can mimic tumors. The accuracy of the final diagnosis depends on good communication between the orthopedic oncologist, radiologist, and pathologist.

A variety of biopsy techniques are utilized depending upon the differential diagnosis. An excisional biopsy should be performed only if the soft tissue tumor is 3 cm or less in diameter, superficial, and wide margins can be maintained. Otherwise, biopsy should be incisional. Needle biopsies are being performed more frequently. Needle biopsy tracts must be resectable and hemorrhage minimized. Because of the smaller sample size, communication with the pathologist is necessary, and frozen sections should be obtained.

If localization of a tumor is difficult, a CT directed needle biopsy can be used. A direct approach avoiding neurovascular structures is used, and bleeding must be easily controlled to avoid tumor cell spread from hematoma. The orthopedic oncologist and radiologist must communicate regarding the needle approach in relation to the anticipated definitive surgery.

Fine needle aspirates (FNA) are frequently performed in soft tissue tumors and suspected metastatic lesions. Cellular characteristics are analyzed since malignant tumors are more likely to shed cells. A definite diagnosis may not be made, but suspicious cells may direct urgency of treatment. This type of biopsy should be done by the treating surgeon since the needle placement and contamination issues are critical. FNA is best done at the treating institution where the pathologist is experienced in cell analysis. A non-diagnostic needle biopsy is not a negative biopsy, and if necessary, an open biopsy should be performed.

In the Journal of Bone and Joint Surgery, Dr. Henry Mankin of Boston reported in 1982 and again in 1996 on the hazards of biopsy. Errors, complications, changes in course of treatment and inability to perform limb salvage were 2 to 12 times greater when biopsies were performed in a referring institution rather than in the treating center. Therefore, when sarcoma is suspected, patients should be referred to a cancer center experienced in treating sarcomas.

Donald A. Hackbart, MD
Orthopedic Oncology

Summary of Principles for Open Bone or Soft Tissue Tumor Biopsies:

1. Perform only after staging exams are complete
2. Use only longitudinal incisions; do not use transverse incisions which can compromise resection and reconstruction
3. Use most direct approach to tumor to avoid excess contamination
4. Avoid rigorous tissue retraction
5. Maintain meticulous hemostasis to prevent hematoma and hemorrhage
6. Place surgical drains within 1 cm of incision apex
7. Bone biopsies should be back-filled with bone cement to minimize fracture risk and hemorrhage
8. Utilize frozen section to determine if sufficient tissue has been obtained for special stains, cytometry, etc.
Pathological and Prognostic Aspects

Grading Soft Tissue Tumors:

There is no consensus among pathology experts regarding the grading system to be used for soft tissue tumors. There are advantages and disadvantages for the various systems used around the country. Some of the reasons for the lack of consensus include:

- There is no agreement on the gross and microscopic criteria that separates grades I, II, III, and IV. Some pathologists use grades I through III, while others opt for using I through IV.

- Some pathologists do not recommend grading sarcomas with numbers, but prefer to use the terms low and high grade.

- Many soft tissue tumors are automatically assigned a grade according to the histologic subtype (I through III of IV, or whether they are low or high grade). Some sarcomas are almost always low grade (grade I), others are intermediate grade (grade II), and others are high grade (grades III-IV). Consequently, since a significant number of these sarcomas are already automatically graded (see Table 1), only a small number of sarcomas are assigned to one of the three histologic grading possibilities using the gross and microscopic criteria (see Table 2). Therefore, pathologists do very little in grading the great multitude of sarcomas that have been described.

- There has not been a multi-variant analysis of the independence of grading criteria.

- Survival rates have drastically changed over the past 40 years and new descriptions of sarcomas have changed the picture entirely.

Accurate sarcoma treatment outcome analysis can best be achieved when a method for consistent grading of sarcomas is in place. In addition, protocols which accrue patients are often based on tumor histology and grade. Uniform grading standards within a treating institution will certainly enhance accuracy of tumor registry data. Perhaps a solution to solve many of these problems is to develop a multi-institutional and perhaps multi-national analysis of pathologic parameters in sarcomas, entity-by-entity.

A grading system was developed by the Pathology Department at St. Luke’s Medical Center in accordance with the American Joint Committee on Cancer requirements for staging. Taking into consideration all the above mentioned concerns, a grading system was developed that provide a fairly uniform and consistent system that followed the know morphologic and prognostic aspects of these tumors.

Table 1

<table>
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<th>GRADING OF SOFT TISSUE SARCOMAS ACCORDING TO HISTOLOGIC TYPES</th>
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| GRADE I | Dermatofibrosarcoma Protuberans  
Well Differentiated Liposarcoma  
Myxoid Liposarcoma |
| GRADE I or II | Infantile Fibrosarcoma |
| GRADE I, II or III | Malignant Fibrous Histiocytoma (Mostly II or III; Myxoid MFH is Grade II)  
Round Cell Liposarcoma (Mostly Grade II or III)  
 Leiomyosarcoma  
Angiosarcoma (Mostly Grade II or III)  
Hemangiopericytoma  
Synovial Sarcoma (Mostly Grade II or III)  
Malignant Schwannoma (Mostly Grade II or III)  
Myxoid Chondrosarcoma (Mostly Grade II) |
| GRADE II or III | Fibrosarcoma  
Malignant Mesothelioma (Mostly Grade III)  
Extraskelatal Osteosarcoma  
Malignant Granular Cell Tumor (Mostly Grade II)  
Alveolar Soft Part Sarcoma (Mostly Grade II)  
Epithelioid Sarcoma (Mostly Grade II)  
Clear Cell Sarcoma (Mostly Grade II)  
Pleomorphic Liposarcoma |
| GRADE III | Rhabdomyosarcoma  
Neuroblastoma  
Ganglioneuroblastoma  
Extraskeletal Mesenchymal Chondrosarcoma  
Extraskeletal Ewing’s Sarcoma |
| GRADE IV | Corresponds to undifferentiated sarcomas which by clinical history, morphologic criteria or special studies cannot be classified in a specific subtype. |
Prognosis
Prognostic factors common to all sarcomas include: size, depth, site, grade and histologic subtype. Age and gender may also be a factor for selected tumors. In some lesions, a poor prognosis applies regardless of histologic features. In general, the following are important prognostic factors:

1. Size > 5 cm is a poor prognostic feature.
2. Superficial tumors carry a more favorable prognosis regardless of grade.
3. Peripheral soft tissue lesions fare better than central lesions. On the other hand, organ based lesions may have their own prognosis depending upon the organ.
4. Sarcoma tumor staging relies heavily upon tumor grade; high grade, high stage tumors have a poor prognosis as opposed to low grade, low stage tumors.

5. DNA flow cytometry; in some tumors such as lymphomas and neuroblastomas, DNA ploidy values clearly correlate with prognosis. With regard to sarcomas, a fair number of studies have been performed which show a correlation between flow cytometry and patient outcome. It seems generally true that there is a rough correlation of DNA ploidy with grade (with higher grade lesions being more frequently non-diploid or aneuploid), and between the percent S phase and grade as well. However in an individual case, there is a wide variation. To date, there is a suggestion that DNA ploidy is related to prognosis in Malignant Fibrous Histiocytomas, gynecologic leiomyosarcomas, gastrointestinal stromal tumors and in synovial sarcomas. Childhood and adult sarcomas are different. Aneuploidy portends a better prognosis in small round cell tumors, but a worse prognosis for adult spindle tumors.

Jorge G. Pellegrini, MD.
Laboratory Medicine

| Table 2 |
|-------------------------|-------------------------|-------------------------|
| **GRADING OF SOFT TISSUE SARCOMAS ACCORDING TO GROSS AND MICROSCOPIC CRITERIA** | **GRADE I** | **GRADE II** | **GRADE III/IV** |
| **SIZE** | <5 cm | >5 cm | >5 cm |
| **LOCATION** | Superficial | Superficial or Deep | Deep |
| **DEGREE OF TUMOR DIFFERENTIATION** | Close resemblance to tissue; difficult to decide if it is benign or malignant | Tumor type clearly recognizable; no question it is malignant (looks malignant) | Tumor type uncertain |
| **CELLULARITY** | Low | Moderate | Marked |
| **PLEOMORPHISM** | Mild | Moderate | Marked |
| **MITOSES** | 0-9/10 HPF (40x ob) | 3-20/10 HPF (40x ob) | >20/10 HPF (40x ob) |
| **NECROSIS** | Absent or minimal | Present (<50%) | Present (>50%) |
| **OTHER HISTOLOGIC CRITERIA** | Hypovascular Much stroma Well circumscribed (with pushing margins) or infiltrating | Hypervascular Minimal stroma Infiltrating | Hypervascular Minimal stroma Infiltrating |

The grading system used at St. Luke’s Medical Center is summarized above.
HISTOLOGICAL CLASSIFICATION OF MALIGNANT SOFT TISSUE TUMORS

I. Fibrous tumors
   A. Malignant tumors
      1. Fibrosarcoma
         a. Adult fibrosarcoma
         b. Congenital or infantile fibrosarcoma
         c. Inflammatory fibrosarcoma (inflammatory myofibroblastic tumor)

   B. Malignant tumors
      1. Angiosarcoma and lymphangiosarcoma
      2. Kaposi’s sarcoma

II. Fibrohistiocytic tumors
   A. Intermediate tumors (intermediate malignancy)
      1. Atypical fibroxanthoma
      2. Dermatofibrosarcoma protuberans (including pigmented form, Bednar tumor)
      3. Giant cell fibroblastoma
      4. Plexiform fibrohistiocytic tumor
      5. Angiomatoid fibrous histiocytoma

   B. Malignant tumors
      1. Malignant fibrous histiocytoma
         a. Storiform-pleomorphic fibrous histiocytoma
         b. Myxoid fibrous histiocytoma
         c. Giant cell fibrous histiocytoma (malignant giant cell tumor of soft parts)
         d. Xanthomatous (inflammatory type) fibrous histiocytoma

III. Lipomatous tumors
   A. Malignant tumors
      1. Liposarcoma
         a. Well-differentiated liposarcoma
            (i) Lipoma-like liposarcoma
            (ii) Sclerosing liposarcoma
         b. Myxoid liposarcoma
         c. Round cell (poorly differentiated myxoid) liposarcoma
         d. Pleomorphic liposarcoma
         e. Dedifferentiated liposarcoma

   B. Malignant tumors
      1. Malignant fibrous histiocytoma
         a. Storiform-pleomorphic fibrous histiocytoma
         b. Myxoid fibrous histiocytoma
         c. Giant cell fibrous histiocytoma (malignant giant cell tumor of soft parts)
         d. Xanthomatous (inflammatory type) fibrous histiocytoma

IV. Smooth muscle tumors
   A. Malignant tumors
      1. Leiomyosarcoma
      2. Epithelioid leiomyosarcoma

V. Skeletal muscle tumors
   A. Malignant tumors
      1. Rhabdomyosarcoma
         a. Embryonal rhabdomyosarcoma
         b. Botryoid rhabdomyosarcoma
         c. Spindle cell rhabdomyosarcoma
         d. Alveolar rhabdomyosarcoma
         e. Pleomorphic rhabdomyosarcoma
      2. Rhabdomyosarcoma with ganglionic differentiation (ectomesenchymoma)

VI. Tumors of blood and lymph vessels
   A. Intermediate tumors (intermediate malignancy)
      1. Hemangiendothelioma
         a. Epithelioid herangiendothelioma
         b. Endovascular papillary angioendothelioma (Dabska tumor)
         c. Spindle cell hemangiendothelioma

   B. Malignant tumors
      1. Angiosarcoma and lymphangiosarcoma
      2. Kaposi’s sarcoma

    VII. Perivascular tumors
       A. Malignant tumors
          1. Malignant glomus tumor
          2. Malignant hemangiopericytoma

    VIII. Synovial tumors
       A. Malignant tumors
          1. Synovial sarcoma
             a. Biphasic (fibrous and epithelial) synovial sarcoma
             b. Monophasic (fibrous or epithelial) synovial sarcoma
          2. Malignant giant cell tumor of tendon sheath

    IX. Neural tumors
       A. Malignant tumors
          1. Malignant peripheral nerve sheath tumor (MPNST) (malignant schwannoma, neurofibrosarcoma)
             a. Malignant Triton tumor (MPNST with rhabdomyosarcoma)
             b. Glandular MPNST (malignant glandular schwannoma)
             c. Epithelioid MPNST (malignant epithelioid schwannoma)
          2. Malignant granular cell tumor
          3. Clear cell sarcoma (malignant melanoma of soft parts)
          4. Malignant melanocytic schwannoma
          5. Gastrointestinal autonomous nerve tumor (plexosarcoma)
          6. Primitive neuroectodermal tumor
             a. Neuroblastoma
             b. Ganglioneuroblastoma
             c. Neuroepithelioma (peripheral neuroectodermal tumor)
             d. Extraskeletal Ewing’s sarcoma

    X. Paraganglionic tumors
       A. Malignant tumors
          1. Malignant paraganglioma

    XI. Extraskeletal cartilaginous and osseous tumors
       A. Malignant tumors
          1. Extraskeletal chondrosarcoma
             a. Well-differentiated chondrosarcoma
             b. Myxoid chondrosarcoma
             c. Mesenchymal chondrosarcoma
          2. Extraskeletal osteosarcoma

    XII. Pluripotential mesenchymal tumors
       A. Malignant tumors
          1. Malignant mesenchymoma

    XIII. Miscellaneous tumors
       A. Malignant tumors
          1. Alveolar soft part sarcoma
          2. Epithelioid sarcoma
          3. Malignant extrarenal rhabdoid tumor
          4. Desmoplastic small cell tumor

    XIV. Unclassified tumors
### CANCER STAGING FOR SOFT TISSUE TUMORS

#### DEFINITIONS

**Primary Tumor (T)**
- TX: Primary tumor cannot be assessed
- T0: No evidence of primary tumor
- T1: Tumor 5 cm or less in greater dimension
- T2: Tumor more that 5 cm in greatest dimension

**Lymph Node (N)**
- NX: Regional lymph nodes cannot be assessed
- N0: No regional lymph node metastasis
- N1: Regional lymph node metastasis

**Distant Metastasis (M)**
- MX: Presence of distant metastasis cannot be assessed
- M0: No distant metastasis
- M1: Distant metastasis

**Histopathologic Grade (G)**
- GX: Grade cannot be assessed
- G1: Well differentiated
- G2: Moderately differentiated
- G3: Poorly differentiated
- G4: Undifferentiated

**Histopathologic Type**
- Tumors included in the analysis are listed below:
  - Alveolar soft-part sarcoma
  - Angiosarcoma
  - Epithelioid sarcoma
  - Extraskeletal chondrosarcoma
  - Extraskeletal osteosarcoma
  - Fibrosarcoma
  - Leiomyosarcoma
  - Liposarcoma
  - Malignant fibrous histiocytoma
  - Malignant hemangiopericytoma
  - Malignant mesenchymoma
  - Malignant schwannoma
  - Phabdomyosarcoma
  - Synovial sarcoma
  - Sarcoma, NOS (not otherwise specified)

The staging system applies to all soft-tissue sarcomas except Kaposi's sarcoma, dermatofibrosarcoma, and desmoid type of fibrosarcoma grade 1. Excluded from the staging system are those sarcomas arising within the confines of the dura mater, including the brain, and sarcomas arising in parenchymatous organs and from hollow viscera.

*American Joint Committee on Cancer - 1992 Manual For Staging Of Cancer, fourth edition*

### CANCER STAGING FOR BONE TUMORS

#### DEFINITIONS

**Primary Tumor (T)**
- TX: Primary tumor cannot be assessed
- T0: No evidence of primary tumor
- T1: Tumor confined within the cortex
- T2: Tumor invades beyond the cortex

**Lymph Node (N)**
- NX: Regional lymph nodes cannot be assessed
- N0: No regional lymph node metastasis
- N1: Regional lymph node metastasis

**Distant Metastasis (M)**
- MX: Presence of distant metastasis cannot be assessed
- M0: No distant metastasis
- M1: Distant metastasis

**Histopathologic Grade (G)**
- GX: Grade cannot be assessed
- G1: Well differentiated
- G2: Moderately differentiated
- G3: Poorly differentiated
- G4: Undifferentiated

**Histopathologic Type**
- A. Bone-forming
  1. Osteosarcoma (osteogenic sarcoma)
- B. Cartilage-forming
  1. Chondrosarcoma
  2. Mesenchymal chondrosarcoma
- C. Giant cell tumor, malignant
- D. Ewing's sarcoma
- E. Vascular tumors
  1. Hemangiendothelioma
  2. Hemangiopericytoma
  3. Angiosarcoma
- F. Connective tissue tumors
  1. Fibrosarcoma
  2. Liposarcoma
  3. Malignant mesenchymoma
  4. Undifferentiated sarcoma
- G. Other tumors
  1. Chordoma
  2. Adamantinoma of long bones

This classification is used for all primary malignant tumors of bone except for primary malignant lymphoma, multiple myeloma, juxta cortical osteosarcoma, and juxta cortical chondrosarcoma. There should be histologic confirmation of the disease to permit division of cases by histologic type.

*American Joint Committee on Cancer - 1992 Manual For Staging Of Cancer, fourth edition*
The Role of Radiology in Evaluating Tumors

Radiology plays an integral role in the management of patients with musculoskeletal tumors. Patients will often present with a newly discovered mass, pain, pathologic fracture or an incidentally discovered lesion detected during work-up of another medical problem. After its discovery, the radiologist can help guide the subsequent work-up with the goals being to characterize and stage the tumor.

Many imaging modalities are available to aid in this endeavor. They include plain film, nuclear medicine, ultrasound (US), angiography, computed tomography (CT) and magnetic resonance imaging (MRI). Each has its relative merits.

Plain film radiography is the easiest and least expensive exam and is often the initial study. It can be actually the most specific in many instances for primary bone tumors. Features assessed include location, aggressiveness, extent of osseous destruction, matrix and the presence of a soft tissue mass. These findings will guide which other imaging modalities are subsequently needed.

Nuclear Medicine studies are helpful in determining a lesion’s vascularity, underlying osseous involvement associated with a soft tissue sarcoma, and as a survey for other sites of osseous involvement.

Angiography can also assist in the evaluation of soft tissue tumors which are highly vascular or encroaching on vascular structures. The findings are important to determine if vascular graft reconstruction is indicated. Imaging can be performed with conventional methods or with MR angiographic techniques.

The role of ultrasound is mainly for determining if a lesion is solid or cystic. Additionally, ultrasound guided percutaneous needle biopsies can be performed for certain lesions.

CT imaging is critical in the work-up of patients. Its primary role is in staging the chest, abdomen and pelvis for distant metastases. CT can also help determine a primary site of malignancy in someone presenting with a metastatic osseous lesion. When feasible, percutaneous biopsy with CT imaging guidance can offer a less invasive method for obtaining a histologic diagnosis. Consultation with the oncologic orthopedic surgeon prior to the procedure is of utmost importance so as to minimize the chance of extra-compartmental tumor contamination along a needle tract (pertinent when limb salvage is a therapeutic option). CT is also useful for evaluating calcific matrix, integrity of cortical bone and largely for obtaining three-dimensional surface-rendered images which can be useful in pelvic and facial reconstruction pre-surgical planning.

Although all the imaging modalities discussed have certain strengths and weaknesses, what is clear is that MRI has truly revolutionized the diagnosis and evaluation of musculoskeletal soft tissue pathology. Although MRI can help characterize and yield specific diagnoses in some cases, its most important contribution is providing accurate information for staging. Because the goal of staging is to determine the appropriate surgical procedure and current treatments now emphasize limb salvage as an alternative to amputation, the outcome depends greatly on accurate localization of tumor. MRI is perfectly suited to this task because it is highly sensitive to the detection of abnormal tissue. State of the art imaging is provided from advancements in surface coil technology, and both hardware and software upgrades, all yielding high quality studies.

Following initial diagnosis, staging and treatment, radiology still plays a vital role. The follow-up usually include a baseline MRI exam from which subsequent studies are compared to for determining response to treatment and for evaluation of possible recurrence. CT is routinely used for the continued survey of the chest, abdomen and pelvis for distant metastases at intervals appropriate for the tumor histology and grade.

Technologic improvements in all imaging modalities will continue to keep the Department of Radiology at St. Luke’s Medical Center on the cutting edge for optimal management of patients with musculoskeletal tumors.

David H. Hinke, MD
Department of Radiology
A 73 year old female with a large extra-skeletal chondrosarcoma of the medial ankle.

Magnetic Resonance Imaging - T1 weighted axial image.

Magnetic Resonance Imaging - T2 weighted coronal image.
After completion of the staging, biopsy, and confirmation of histologic diagnosis, a treatment plan is coordinated. Patients with bone and soft tissue sarcomas are treated by a multidisciplinary team at St. Luke's Medical Center including orthopedic oncology, radiology, medical oncology, radiation oncology, pathology, surgical specialists, nursing, physical and occupational therapists, psychologists, rehabilitation team members, cancer support services and pastoral care.

The primary surgical goal is to save the patient’s life by resecting the primary tumor with wide margins (surrounding cuff of normal tissue). In addition, potential micrometastatic disease must be treated. Depending on the sarcoma type, location, and grade, potential microscopic disease is treated with postoperative multi-agent chemotherapy or preoperative neoadjuvant chemotherapy with additional postoperative chemotherapy. In patients with Ewing’s sarcoma and osteosarcoma, chemotherapy has made the greatest impact on improved survival rates. Dr. Bruckman will address the role of radiation treatment for sarcomas in his article.

The secondary goal of the orthopedic oncologist is to save a functional extremity if possible. Reconstruction techniques are planned preoperatively based on the anticipated post-resection extremity. The patient’s occupation, activity level, and expected residual limb function are taken into consideration when deciding upon reconstruction techniques. Reconstruction options, potential complications with each type, and potential for future additional surgeries to revise or repair the salvaged limb are discussed at length with patients. When appropriate, patients may be connected with others who have similar reconstructions. Preoperative physical and occupational therapy evaluations assist with patient directed goals and successful postoperative outcomes.

If complete resection of a tumor would result in poor extremity function, a limb which cannot be adequately reconstructed, or if a safe margin cannot be obtained, then amputation to obtain wide margins is recommended. Sarcomas in rare distal sites such as the hand or foot usually necessitate amputation to achieve a safe margin. When amputation is indicated, incisions and tissue flaps are created to provide optimal residual limb length and soft tissue coverage. With the help of modern prosthetic designs and techniques, early postoperative function can be achieved. Counseling with the prosthetist and rehabilitation team members will often improve the patient’s overall acceptance and functional outcome following limb loss. Preoperative teaching regarding phantom limb sensation and pain is also completed. Patients undergoing hemipelvectomy, disarticulation, or for quarter amputation procedures will need extensive preoperative preparation and support following amputation.

The most common soft tissue sarcomas treated at St. Luke’s include malignant fibrous histiocytoma, liposarcoma, and fibrosarcoma. Large, high-grade tumors frequently lie close to or involve neurovascular structures. Preoperative external beam radiation can improve resectability.
Intraoperative radiation therapy or postoperative brachytherapy can be used if margins remain close or contaminated following resection. Deeply situated sarcomas may necessitate the removal of large muscle groups within a facial compartment. The combination of large resection defects and radiation can result in wound healing problems which may require a combination of treatments including muscle flap coverage, skin grafting and in slow healing wounds, hyperbaric oxygen treatment.

Bone sarcomas in the adult population include chondrosarcoma, malignant fibrous histiocytoma, and osteosarcoma. Again, the primary goal is local and systemic eradication of tumor with limb preservation. Reconstruction options include allograft (cadaver) bone, custom prostheses, allograft/prostheses composites, and vascularized bone transfers. The type of reconstruction depends on the tumor location, amount of resection necessary, and the timing necessary to order custom metal components. The Wisconsin Tissue Bank (located on the St. Luke's Medical Center campus) is involved in the procurement of donated bone and soft tissues. Its parent organization, the Musculoskeletal Transplant Foundation, provides St. Luke's with high quality allograft tissue. These carefully tested and processed grafts are used to reconstruct segmental bone defects, joint defects, and include special tissues for ligament, tendon, and spinal reconstruction.

Composite reconstruction with allograft and a total joint prosthesis can be used to reconstruct joints such as the hip and shoulder. The prosthesis provides the construction for the resected joint, and the surrounding capsule, ligaments and bone structure can be provided by allograft. Customized prostheses and modular oncology systems can be used when indicated to reconstruct hip, knee, shoulder, or elbow joints. Both allograft and total joint composite reconstructions will frequently be covered by local or free muscle flaps.

Metastatic neoplasms and multiple myeloma account for the greatest number of malignant tumors of the adult skeletal system. The most common primary sites causing metastatic tumors include breast, prostate, lung, kidney, and thyroid. Carcinomas of the skin, oral cavity, and genital tract are less likely to metastasize. Multiple myeloma (MM), a plasma cell tumor, originates in the bone marrow. It is the most common adult primary bone tumor.

The orthopedic surgeon's role in treating a patient with a lesion suspicious for metastasis includes coordination of the tumor evaluation, search for a primary lesion, biopsy of the lesion, stabilization of the bone to prevent fracture, and treatment of pathologic fractures. Tumor evaluation may include x-rays, bone scans, CT and MRI scans to evaluate bone and soft tissue involved with tumor, and CT scans of the chest, abdomen and pelvis to search for a potential primary site. Routine labs including calcium and phosphorus should be ordered. Serum and urine protein electrophoresis should be ordered if myeloma is suspected.

Pain is a primary symptom of patients with impending pathologic fractures and is the major indication for prophylactic internal fixation of the metastatic bone lesion. In general, accepted indications for internal fixation of impending fractures includes loss of 50% or more of bone cortex, lesions 2.5 cm in diameter or greater, or increased bone pain combined with 50% cortical destruction. Prosthetic and composite joint replacements may be indicated for lesions of the femoral neck or head or humerus head.

The type and extent of internal fixation should be individualized for the patient, taking into consideration the diagnosis, extent of local and systemic disease, and overall prognosis. The goals of orthopedic intervention are to decrease pain and to improve mobility and function. Following the stabilization of the extremity or spine, radiation and medical oncologists may resume treatment of the metastatic process and primary tumor.

Patients with musculoskeletal sarcomas are followed by the orthopedic oncologist for a minimum of 5 years. Patients are closely monitored for local and metastatic tumor recurrence and for stability of limb salvage reconstruction.

Donald A. Hack Barth, MD
Orthopedic Oncology
The Role of Radiation Therapy in the Treatment of Soft Tissue Sarcoma and Bone Cancer

The general objectives of cancer management are: (1) Prevention, to reduce the development of cancer; (2) Screening, to diagnose cancer at the earliest possible stage, and (3) Treatment, to completely eradicate the disease with preservation of as much function as possible. This is certainly true for soft tissue sarcoma and bone cancer. However, since prevention and screening efforts are unfounded at the present time, the emphasis is on treatment. Distant metastasis in these cancers are well recognized and occur all too frequently, but in lieu of effective adjuvant systemic therapy, satisfactory local treatment must be emphasized.

Historically, soft tissue sarcoma patients, especially when the tumor was located in extremities, were treated by amputation. In the 1950's and 1960's, a number of large institutions like MD Anderson Tumor Institute and Massachusetts General Hospital, treated patients with function preserving resection and post-operative radiation therapy. They demonstrated local control and survival similar to amputation, with the obvious advantage of limb preservation in most patients. From 1975 to 1982 a randomized study was conducted at the National Cancer Institute (NCI) comparing amputation to conservation surgery plus post-operative radiation therapy. In 211 patients with high grade extremity soft tissue sarcoma, local control with amputation was 100%, compared to 91% for surgery and radiation therapy. The 5 year disease-free survival was 55% versus 65%, and 5 year overall survival was 62% versus 82%. This solidified the contention that radiation therapy and conservative surgery could eliminate amputation in most patients, without sacrificing cancer control, and at the same time preserving extremity function. This is now the approach throughout the world. In some cases, the patient's tumor characteristics are such that a useful limb is not possible and so amputation with prosthesis is used. In very early cases, with small low grade tumors, radical limb sparing resection alone is effective. In the experience of our radiation oncology group, treating patients in this manner gave results of 82 % local control and 64% NED survival (45 consecutive patients treated from 1986 to 1993, with 3 year minimum follow-up). This is despite 15 patients having a positive resection margin compared to the NCI study where all patients had clear margins, thus the slightly high local recurrence.

The use of radiation therapy in soft tissue sarcoma involves a number of different techniques and modalities with specific treatment aims. External irradiation is used to treat a large area (tumor plus possible infiltrating margins) to a homogeneous dose. Brachytherapy, or the placement of radioactive sources in or near a tumor at the time of resection, is used to treat a limited area of tumor attachment to non-removed structures like nerves, vessels, joints, or intra-abdominal structures in retroperitoneal sarcoma. Intraoperative radiation therapy (IORT), or treatment with external irradiation electrons at the time of surgery, is used for similar situations as brachytherapy, but used in preference to treat larger attached areas or those that have more thickness. Usually brachytherapy and IORT are not used in the same patient and are used with external large field radiation therapy.

Functional outcome is related to numerous factors. If the tumor grows near or interferes with joint, nerve or vessel function and if large resection volume of muscle, nerve or vessels is required, the extremity function will suffer. Also, radiation therapy factors can result in limb dysfunction by producing edema, fibrosis or nerve injury. Radiation treatments may also interfere with wound healing. Experienced Radiation Oncologists and Orthopedic Oncologists using special techniques can reduce this risk. If it is determined that the functional outcome with conservative treatment will be poor, then amputation is preferred. Even with these risks, conservative surgery and radiation therapy result in about 60% of patients having near normal and useful limb function.

The use of Radiation Therapy in bone cancer is more limited. This is due to the availability of effective systemic therapy and the relative radioresistance of these cancers. The standard approach is amputation or limb-sparing resection with chemotherapy. Radiation Therapy is used in the few cases where radical resection is not technically or medically feasible, such as vertebral body or base of skull locations. Ewing's Sarcoma and Lymphoma of bone are two specific tumor types that are more radioresponsive where radiation therapy has a role in the primary treatment. Other situations of radiation therapy use are in palliative endeavors such as brain or bone metastasis.

James E. Bruckman, MD
Radiation Oncology
A Statistical Review of Soft Tissue and Bone Tumors

DISTRIBUTION OF ANALYTIC PATIENTS WITH SOFT TISSUE TUMORS, RADIATION AS FIRST COURSE THERAPY 1990 - 1995

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>External Beam Radiation Only</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Brachytherapy &amp; External Beam</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Intra-operative Radiation &amp; External Beam</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
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<tr>
<td>No Radiation Therapy</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>16</td>
<td>18</td>
<td>49</td>
</tr>
</tbody>
</table>

Analytic cases are patients which are first diagnosed and/or given their first course of treatment at St. Luke's Medical Center and/or St. Luke's South Shore.

The table above excludes 4 patients with lymphomas of the soft tissues and 23 non-analytic patients. When reviewing the analytic cases at St. Luke's, 1990-1995, we note that beginning in 1994, a combination of external beam therapy and brachytherapy or intra-operative radiation was used. Over all, 65% of the patients received some type of radiation therapy as part of their first course of treatment.

ST. LUKE'S MEDICAL CENTER SOFT TISSUE TUMORS 1990 - 1995 BY AJCC STAGE AT DIAGNOSIS

<table>
<thead>
<tr>
<th>AJCC Stage</th>
<th>IA</th>
<th>IB</th>
<th>IIA</th>
<th>IIB</th>
<th>IIIA</th>
<th>IIIB</th>
<th>IVA</th>
<th>IVB</th>
<th>Unstaged</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>6</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>6</td>
<td>16</td>
<td>0</td>
<td>7</td>
<td>16</td>
<td>72</td>
</tr>
</tbody>
</table>

Note: 11 of the 16 unstaged patients were diagnosed and received their first course of therapy elsewhere, they presented to SLMC for subsequent therapy only, therefore staging was not available. The remaining 5 patient's tumors were not graded, therefore staging was not possible.

The table above excludes 4 patients with lymphomas of the soft tissues.

ST. LUKE'S MEDICAL CENTER BONE TUMORS 1990 - 1995 BY AJCC STAGE AT DIAGNOSIS

<table>
<thead>
<tr>
<th>AJCC Stage</th>
<th>IA</th>
<th>IB</th>
<th>IIA</th>
<th>IIB</th>
<th>IVA</th>
<th>IVB</th>
<th>Unstaged</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: The 3 unstaged patients were diagnosed and received their first course of therapy elsewhere, they presented to SLMC for subsequent therapy only, therefore staging was not available.

The table above excludes 7 patients: (6 patients with lymphomas, and 1 patient with plasmacytoma)
Neoadjuvant Chemotherapy for Soft Tissue Sarcomas

Neoadjuvant chemotherapy, the treatment of cancer with drugs prior to a surgical procedure to remove the cancer, has been studied rarely. Even in common tumors such as breast cancer or colon cancer, there is little data on this subject. Soft tissue sarcomas are among the most rare forms of cancer. Data on the effectiveness of post-operative chemotherapy is minimal and inconclusive. It is therefore not surprising that there have been very few published reports on the use of neoadjuvant chemotherapy in sarcomas. Yet, the idea of preoperative chemotherapy in sarcomas is intriguing.

Neoadjuvant chemotherapy has theoretical advantages in all cancers.

1. As noted above, a reduction in the size of the primary tumor may allow more conservative surgery or radiation therapy.

2. Tumor vascularity will not have been compromised by prior surgery or radiation, therefore, allowing good drug delivery to the tumor.

3. Patients may tolerate chemotherapy better before other treatments are undertaken, allowing full doses of chemotherapy to be delivered.

4. Chemotherapy of micrometastatic disease is most likely to be effective when given as early in the course of treatment as possible.

5. The effectiveness of the chemotherapy can be assessed by assessing both clinical and pathologic responses in the primary tumor.

There are a few reports of preoperative chemotherapy alone prior to surgery or radiotherapy. Priebrat reported in an ASCO abstract treating 17 patients with extremity soft tissue sarcomas utilizing intra-arterial cisplatinum followed by an Adriamycin infusion. 94% of the patients avoided amputation. 2-year disease-free survival was 68%. At MD Anderson 46 patients with extremity sarcomas were treated with preoperative CyVADIC chemotherapy followed by definitive surgery and radiation. 40% of the patients responded to chemotherapy. They noted that responders to chemotherapy had survival times twice as long as non-responders. (60 months vs. 32 months)

There is some data available on the use of combined neoadjuvant chemotherapy with radiotherapy. UCLA School of Medicine published a series of preoperative trials in soft tissue sarcoma. These trials began with Adriamycin given intra-arterially, then intravenously, with various doses of radiation. Later, cisplatinum and ifosfamide were added to the regimen. This study demonstrates that this treatment can be given safely to selected patients. The addition of ifosfamide improved the complete response rate from 7% to 34% demonstrating the importance of this drug in adjuvant sarcoma therapy. Overall survival rates improved as the chemotherapy became more aggressive from 56% with intraarterial Adriamycin to 85% in patients treated with radiation, Adriamycin, cisplatinum, ifosfamide and surgery.

The results of these studies suggest that neoadjuvant chemotherapy can reduce the amputation rate and improve the local control rate in extremity soft tissue sarcomas. All of the reports contain few patients and have used a variety of chemotherapy regimens. It is unclear if the same regimen given preoperatively is better than when it is used postoperatively. With reports of complete response rates of 34% when using neoadjuvant chemotherapy we can hope that a randomized trial may be possible in the near future. In the meantime, it appears clear that in selected patients with soft tissue sarcoma, neoadjuvant chemotherapy should be considered as a possible treatment plan.

Jacob C. Frick, MD
Medical Oncology
A Statistical Review of Soft Tissue and Bone Tumors

CONNECTIVE, SUBCUTANEOUS, AND OTHER SOFT TISSUE TUMORS BY SITE
1990 - 1995

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of Cases</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Limb and Hip</td>
<td>40</td>
<td>55.6%</td>
</tr>
<tr>
<td>Pelvis</td>
<td>9</td>
<td>12.5%</td>
</tr>
<tr>
<td>Upper Limb and Shoulder</td>
<td>8</td>
<td>11.1%</td>
</tr>
<tr>
<td>Head Face, and Neck</td>
<td>5</td>
<td>6.9%</td>
</tr>
<tr>
<td>Trunk, NOS</td>
<td>5</td>
<td>6.9%</td>
</tr>
<tr>
<td>Thorax</td>
<td>3</td>
<td>4.2%</td>
</tr>
<tr>
<td>Abdomen</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Soft Tissues, NOS</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>72</td>
<td>100%</td>
</tr>
</tbody>
</table>

Excludes 4 patients with lymphomas of the soft tissues.

PRIMARY BONE TUMORS BY SITE
1990 - 1995

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of Cases</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelvic Bones, Sacrum, Coccyx and Associated Joints</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Vertebral Column</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>Bones of Skull and Face and Associated Joints</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Mandible</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Long Bones of Lower Limb and Associated Joints</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Rib, Sternal, Clavicle and Associated Joints</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>

Excludes 7 patients: (6 patients with lymphomas, and 1 patient with plasmacytoma)

PRIMARY BONE TUMORS 1990 - 1995
DISTRIBUTION BY AGE AT DIAGNOSIS
(Total of 10 Patients)

<table>
<thead>
<tr>
<th>AGE</th>
<th>CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>0</td>
</tr>
<tr>
<td>80 - 89</td>
<td>1</td>
</tr>
<tr>
<td>70 - 79</td>
<td>1</td>
</tr>
<tr>
<td>60 - 69</td>
<td>2</td>
</tr>
<tr>
<td>50 - 59</td>
<td>1</td>
</tr>
<tr>
<td>40 - 49</td>
<td>2</td>
</tr>
<tr>
<td>30 - 39</td>
<td>1</td>
</tr>
<tr>
<td>0 - 29</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
</tr>
</tbody>
</table>

Excludes 7 patients: (6 patients with lymphomas, and 1 patient with plasmacytoma)

SOFT TISSUE TUMORS 1990 - 1995
DISTRIBUTION BY AGE AT DIAGNOSIS
(Total of 72 Patients)

<table>
<thead>
<tr>
<th>AGE</th>
<th>CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>0</td>
</tr>
<tr>
<td>80 - 89</td>
<td>10</td>
</tr>
<tr>
<td>70 - 79</td>
<td>13</td>
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<td>60 - 69</td>
<td>15</td>
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<td>50 - 59</td>
<td>8</td>
</tr>
<tr>
<td>40 - 49</td>
<td>8</td>
</tr>
<tr>
<td>30 - 39</td>
<td>11</td>
</tr>
<tr>
<td>0 - 29</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>72</td>
</tr>
</tbody>
</table>

Excludes 4 patients with lymphomas of the soft tissues.

According to SEER Program Data, 1973-1987, a well defined peak (increase) in incidence of bone sarcomas occurs in the second decade of life. The second peak would then occur in patients older than 60 years of age. At St. Luke's, peaks in incidence were not noted. Here the small volume of cases tended to be distributed evenly across the age groups.


A Statistical Review of Soft Tissue Tumors

## CONNECTIVE, SUBCUTANEOUS, AND OTHER SOFT TISSUE TUMOR HISTOLOGIES 1990 - 1995

<table>
<thead>
<tr>
<th>HISTOLOGY</th>
<th>CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibrous Histiocytoma, Malignant</td>
<td>23</td>
</tr>
<tr>
<td>Leiomyosarcoma, NOS</td>
<td>8</td>
</tr>
<tr>
<td>Sarcoma, NOS</td>
<td>5</td>
</tr>
<tr>
<td>Fibrosarcoma, NOS</td>
<td>5</td>
</tr>
<tr>
<td>Myxoid Liposarcoma</td>
<td>4</td>
</tr>
<tr>
<td>Liposarcoma, Well Differentiated</td>
<td>3</td>
</tr>
<tr>
<td>Ewing's Sarcoma</td>
<td>2</td>
</tr>
<tr>
<td>Synovial Sarcoma, NOS</td>
<td>2</td>
</tr>
<tr>
<td>Myxoid Chondrosarcoma</td>
<td>2</td>
</tr>
<tr>
<td>Neurofibrosarcoma</td>
<td>2</td>
</tr>
<tr>
<td>Liposarcoma, NOS</td>
<td>2</td>
</tr>
<tr>
<td>Hemangiopericytoma, Malignant</td>
<td>2</td>
</tr>
<tr>
<td>Malignant Lymphoms, Large Cell, Diffuse, NOS</td>
<td>2</td>
</tr>
<tr>
<td>Primitive Neuroectodermal Tumor</td>
<td>1</td>
</tr>
<tr>
<td>Dedifferentiated Liposarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Synovial Sarcoma, Biphasic</td>
<td>1</td>
</tr>
<tr>
<td>Fibromyxosarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Mixed Liposarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Epithelioid Sarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Epithelioid Leiomyosarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Hemangiosarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Carcinosarcoma, NOS</td>
<td>1</td>
</tr>
<tr>
<td>Giant Cell Sarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Clear Cell Sarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Myeloid Sarcoma</td>
<td>1</td>
</tr>
<tr>
<td>Malignant Lymphoms, Immunoblastic, NOS</td>
<td>1</td>
</tr>
<tr>
<td>Malignant Lymphoms, Large Cell, Cleaved, Diffuse</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>76</td>
</tr>
</tbody>
</table>

According to the 1995 Cancer Facts & Figures Publication, 6,000 new soft tissue malignancies were predicted for the United States in 1995. (3,300 male, 2,700 female). Soft tissue malignancies would account for .5% of the new cancers expected in 1995. (Based on an estimate of 1,252,000 new cancers for the U.S. in 1995). In 1995, at St. Luke's, 29 soft tissue tumors were diagnosed and/or treated. These cases accounted for 1.7% of the new 1995 cases. (Based on a total of 1,733 actual cases at SLMC). 1995 estimates show a higher incidence of males with soft tissue tumors than females. The higher incidence of males to females is also reflected here at St. Luke's. In 1994, (most current actual figures available) 202 soft tissue tumors were reported in Wisconsin. (108 male, 94 female). The 202 patients accounted for .9% of the 23,711 cases reported in 1994. At St. Luke's in 1994, soft tissue tumors accounted for 1.6% of the total cases for the year.
A Statistical Review of Bone Tumors

According to the data collected by the SEER Program during 1973-1987, osteosarcoma was the most frequently diagnosed primary sarcoma of the bone, followed by chondrosarcoma, Ewing's sarcoma, chordoma, and malignant fibrous histiocytoma, including fibrosarcoma. At St. Luke's during the years of 1990-1995, chondrosarcomas were the most frequently diagnosed primary bone tumors, accounting for 41.2% of the bone tumors.

Primary bone tumors are comparatively uncommon among the wide array of human neoplasms. According to SEER Program Data, 1973-1987, bone tumors constitute only .2% of all tumors for which data was collected. According to the 1995 Cancer Facts & Figures Publication, 2,070 new bone tumors were predicted for the United States in 1995. (1,100 male, 970 female). Bone tumors would account for .2% of the new cancers expected in 1995. (Based on an estimate of 1,252,000 new cancers for the U.S. in 1995) In 1995, at St. Luke's, 6 bone tumors were diagnosed and/or treated. These cases accounted for .3% of the new 1995 cases. (Based on a total of 1,733 actual cases at SLMC). 1995 estimates show a higher incidence of males with bone tumors than females. Possibly due to the low volume, this trend is not reflected here at St. Luke's. In 1994, (most current actual figures available) 60 bone tumors were reported in Wisconsin. (37 male, 23 female). The 60 patients accounted for .3% of the 23,711 cases reported in 1994. At St. Luke's in 1994, bone tumors accounted for .2% of the total cases for the year.
The Role of Physical Therapy, Occupational Therapy, and Rehabilitation

The Rehabilitation Services Department at St. Luke's Medical Center frequently works with patients who have tumor resections. Depending on the site and size of the resection, this can leave the patient with limitations of range of motion, flexibility of tissues, or strength and decreased functional independence. The goals of Physical and Occupational Therapy are to maximize function, safety, and independence.

With a physician's referral, the therapist will provide an Initial Evaluation and establish an individualized treatment program for that patient. Treatment may include exercises, mobility and safety training, activities of daily living, and energy conservation techniques. The therapist will also assess for any equipment needs.

Support Programs for Amputees

Many changes may occur following an amputation. Besides the physical changes, an amputation may affect the emotional, social, and vocational aspect of one's life. Amputee Support Programs are available to help individuals and families face the challenges of life following an amputation and to learn of the potentials for recovery from others who have successfully adapted to life with an amputation.

Amputee Support Group
A support group consisting of amputees, their families, and friends, who come together to:

- share common feelings and experiences
- find acceptance
- give and receive support
- talk about coping, problem solving, and positive experiences.

The group is coordinated by the St. Luke's Rehabilitation staff and meets from 1:30 - 3:30 p.m. on the third Thursday of each month at St. Luke's Medical Center.

Amputee Peer Visitation Program
This program offers an opportunity for the individual and family to meet with someone who has successfully adjusted to an amputation. The visit can take place before surgery or at any time during the course of rehabilitation. The peer visits are scheduled and supervised by the Rehabilitation staff and take place at the Medical Center. The program is available to St. Luke's inpatients and outpatients.

These programs are offered free of charge to amputees and their families as a service to the community by St. Luke's Medical Center.

For more information or to refer an individual and/or family to either of our programs, please contact Chris Truskowski in the Physical Therapy department at 649-6400.
Musculoskeletal Tumor Expert Featured at Schroeder Fellows Program

On November 29, 1995, the St. Luke's Musculoskeletal Cancer Service and the Schroeder Fellows Program in Clinical Oncology sponsored a Grand Rounds featuring William F. Enneking, MD, an internationally known expert on the surgical care and management of bone and soft tissue sarcomas. Dr. Enneking has devoted his career to advancing the surgical approaches for patients with musculoskeletal soft tissue and primary bone sarcomas. His outstanding contributions include involvement in research, training tumor fellows, an extensive list of publications, and a variety of national and international presentations.

The event drew approximately 90 physicians from Southeastern Wisconsin and Northern Illinois. Following Dr. Enneking's presentation titled “Rational Limb Salvage for the 1990's”, Dr. Donald A. Hackbarth, (Orthopedic Oncology) and residents presented him with current and retrospective cases for discussion. Objectives for Dr. Enneking's presentation were: 1) to enhance attendees understanding of the rational for pre-op tumor staging, 2) to present indications for limb salvage in the treatment of bone and soft tissue extremity sarcomas, and 3) to address advances in the surgical management and outcomes for patients with sarcoma limb salvage procedures.

A formal luncheon following Grand Rounds provided Cancer Services physicians and staff an opportunity for round table discussion with Dr. Enneking.

The program and luncheon were made possible through support of the Schroeder Fellows Program in Clinical Oncology.

Orthopedic Grand Rounds “Potpourri of Musculoskeletal Tumor Pathology”


“Potpourri of Musculoskeletal Tumor Pathology” was presented by Donald A. Hackbarth, MD, Orthopedic Oncology, and Cynthia Rubert, MD, MCW orthopedic resident. A variety of benign and malignant bone and soft tissue tumor cases were presented. Residents were given the opportunity to evaluate films, arrive at a differential diagnoses and make staging and surgical recommendations. Definitive surgical interventions and outcomes were reviewed.

Elizabeth Hansen, RN
Musculoskeletal Tumor Coordinator
Program Highlights

Immunotherapy and Gene Therapy: Current Treatments and Future Directions

Gene Therapy:
The transfer of functioning gene(s) into somatic cells to treat disease.

Translation for Our Program in Cancer Therapy:
The transfer of genes into immune cells to increase targeting and killing of tumor cells.

History:
The St. Luke's Immunotherapy Research and Treatment Institute was established in 1987 as an outgrowth of collaborative efforts between Dr. John P. Hanson, Jr., here at St. Luke's Medical Center and Dr. Steven Rosenberg, a pioneer in immunotherapy at the National Cancer Institute. The initial focus was to offer innovative cellular immunotherapies for the treatment of patients with renal cell carcinoma and malignant melanoma. At that time, the William Schuett Immunotherapy Cell Laboratory was established to expand immune cells for cellular gene therapy. Adoptive immunotherapy using immune cells or biologic response modifiers such as alpha-interferon and interleukin-2 (IL-2) are now recognized as approved treatments for a number of malignancies.

Background:
The strategy of enhancing the patient's own cellular immunity (T cells) to destroy cancer cells is now considered an important adjunct to the modalities of surgery, chemotherapy, radiation therapies, or high dose chemoradiotherapy regimens involved in autologous bone marrow transplantation. In March 1995, St. Luke's recruited Dr. Lawrence G. Lum as the Scientific Director of the Immunotherapy Research and Treatment Institute. His goal is to establish an interdisciplinary program involving elements of cell therapy, gene therapy, and ABMT using activated T cells (ATC) or tumor infiltrating lymphocytes (TIL) as delivery vehicles for cytokines or genes that will express receptors that target tumor cells. The existing programs in Immunotherapy and ABMT provide a unique opportunity for synergies between the research and clinical elements of the Institute. The research strategy combines clinical translational research elements of immunotherapy, genetic engineering, and stem cell transplantation technology to develop more effective treatments for cancer patients.

Gene Therapy for Cancer:
Current gene therapy approaches for the treatment of cancer include strategies that:

1. Enhance the immunogenicity of the tumor by inserting cytokine genes or genes for a specific HLA-antigen and expressing them in the tumor cell;

2. Confer chemotherapy resistance to hematopoietic stem cells, so that a patient can be treated with supralethal doses of chemotherapy to increase the number of tumor cells that can be eliminated above that seen in conventional chemotherapy;

3. Enhance the ability of T cells to kill tumor by engineering the T cells to produce cytokines that augment anti-tumor responses; and

4. Engineer T cells to express an antibody onto the surface of the T cell to target tumor “antigens”.

The Research Staff:
The current research activity focuses on the engineering killer T cells to be more effective killer cells by introducing cytokines or targeting antibodies. To achieve these goals, the Institute has expanded its team to include research scientists, research staff, post-doctoral trainee, and students with expertise in immune cell biology, molecular biology, and genetic engineering. We take this opportunity to briefly introduce members of the laboratory research team.

Lawrence G. Lum, MD., the Scientific Director, Senior Investigator and Head of Cellular Activation Studies, works together with Dr. John P. Hanson, Jr., the Medical Director, to coordinate the development of new clinical protocols that involve immune cells and gene therapy. Dr. Lum obtained his B.S. in Chemistry from the University of Redlands in Redlands, California, and his M.D. from the University of California, San Francisco. He did his residency in Pediatrics at the University of California, San Francisco and University of Colorado Health Sciences Center, Denver, Colorado. He was a Clinical Associate and Expert Consultant in Metabolism Branch of the National Cancer Institute at the NIH in Bethesda, Maryland (1976-1978). He worked with the Seattle BMT Team as Assistant and Associate Professor at the University of Washington and as Assistant and Associate Member of the Fred Hutchinson Cancer Research Center between 1979 and 1986. In Seattle he was funded by the NIH to perform studies on immune reconstitution after allogeneic and autologous BMT in Seattle. Dr. Lum spent 3 years at the Medical College of Wisconsin as Professor of Medicine and Pediatrics on the BMT team between 1986 and 1989 where he had an American Cancer Society Grant to study antibody synthesis by bone marrow B cells and immune reconstitution after T cell depleted BMT. Before joining St. Luke’s, he was Professor of Medicine and Pediatrics and a member of Wayne State University’s BMT team for 6 years where he was responsible for immune reconstitution studies after
BMT, the development of adoptive immunotherapy approaches using activated T cell infusions after ABMT, molecular methods to determine chimerism or relapse allogeneic BMT, and the development of a gene therapy program using T cells at Wayne State University, Detroit, Michigan. Dr. Lum has an appointment in the Center for Molecular Medicine and Genetics, Wayne State University as Adjunct Faculty.

Ann LeFever, Ph.D., Senior Investigator and Head of Immunotherapy Laboratory, is responsible for the expansion of immune cells required for cell therapy, the processing of stem cells for A3MT or PBSCT, and directs research involving the functional aspects of T cells and immunoregulation in patients with cancer. Dr. LeFever received her B.S. degree from Northwestern University, M.S. from the University of Oklahoma Health Sciences, and Ph.D. from Marquette University. Her post-doctoral experience focused her interest in the development of immune cells capable of killing tumors and was done in the Winter Research Laboratory of Mount Sinai Hospital. From 1984 to 1993, Dr. LeFever conducted clinical and basic research as an Associate Professor in the Department of Pediatrics, Medical College of Wisconsin. In 1993, she was recruited to head the clinical cell laboratory, which, under her direction, has been accredited by the American Association of Blood Banks, and has provided immune cells for therapy as well as generating research on cell functions. Dr. LeFever has been supported by NIH, the American Cancer Society, and the MACC fund. She is a recipient of a Vince Lombardi Cancer Research Committee grant to study immune interactions that promote tumor cell kill in lung cancer patients.

Katrina Trevor, Ph.D., Senior Investigator and head of Molecular Studies, directs the molecular studies for genetic engineering of T cells in order to enhance T cell killing of tumor cells. Dr. Trevor graduated with a B.S. in Chemistry from the University of Denver and received her Ph.D. in Experimental Pathology from the University of Colorado Health Sciences Center. Dr. Trevor continued her training as a Postdoctoral Research Associate at the La Jolla Cancer Research Foundation in La Jolla, California. From 1988 through 1995, she was an Assistant Professor in the Center of Molecular Medicine & Genetics at Wayne State University Medical School in Detroit, Michigan. There she initiated her own program investigating aspects of epithelial cell differentiation and cancer with emphasis on the role of the cytoskeleton. Dr. Trevor was selected as a Basil O'Connor Fellow by the March of Dimes Foundation and served as Principal Investigator on a personal 5 year grant from the NIH. In addition, Dr. Trevor was the co-director of the Gene Therapy Unit and began collaborative studies with Dr. Lum that involve introduction of genes into T cells. In July 1995, Dr. Trevor joined the Immunotherapy Research and Treatment Institute as Senior Investigator. Dr. Trevor continues to have a Wayne State University Appointment in the Center for Molecular Medicine and Genetics as an Adjunct Faculty member.

Neng-Ren Jin, MD., Senior Investigator and Head of Preclinical Studies is responsible for the human and murine preclinical studies to establish safety and efficacy parameters of the engineered T cell products as well as provide consultative hematolgy and bone marrow transplantation expertise. Dr. Jin obtained his M.D. from Beijing Medical University and completed his residency in Internal Medicine at Beijing Friendship Hospital and his fellowship in Hematology at Beijing Medical University. He was a visiting scientist as the Fred Hutchinson Cancer Research Center where he worked with members of the Seattle BMT Team. When he returned to China, he became Associate Professor of Medicine at Beijing Medical College where he helped establish an allogeneic and autologous bone marrow transplantation unit at Beijing Medical College. In addition, his research involved transplantation immunology and experimental hematology. Dr. Jin moved from Wayne State University to St. Luke's in April of 1995.

Jonathan S. Treisman, MD., joined Dr. John P. Hanson, Jr.'s practice of Hematology and Oncology and the research staff of the Immunotherapy Research and Treatment Institute as a Senior Investigator. He earned his B.S. in chemistry from the University of Michigan, Ann Arbor, and his M.D. at Wayne State University, Detroit, Michigan. He did his internship and residency in Internal Medicine at the University of Michigan, in Ann Arbor, Michigan, and his fellowship training in Medical Oncology at the Fred Hutchinson Cancer Research Center and University of Washington, Seattle, Washington, between 1987 and 1990. He was a
Senior Staff Fellow in the surgery Branch of the National Cancer Institute, NIH in Bethesda, Maryland before joining Dr. Hanson's practice. At the NIH, Dr. Treisman developed expertise in the genetic engineering of T cells and will be working with the research team on program development.

The Institute is actively involved in training graduate students and has an active post-doctoral fellowship in immunobiology and molecular medicine.

**Current Focus of Clinical Protocols:**
The clinical goals of the program are being driven by the preclinical and translational research laboratories at St. Luke's Medical Center. Food and Drug Administration and Human Research Committee approved adoptive immunotherapy protocols involving Investigator sponsored investigational new drug applications (IND's) are already in place that involve clinical research protocols using TIL and ATC for renal cell carcinoma, malignant melanoma, colon, lung, and breast cancer that are refractory to standard treatments. In addition, the investigators have an IND to infuse ATC after ABMT for acute leukemia, non-Hodgkin's lymphomas, Hodgkin's Disease, and Multiple Myeloma in a Phase I dose-escalation trial that Dr. Lum recently received funding from the American Cancer Society to support his Phase I study.

The immediate clinical goal is to assure the safety of ATC infusions in the presence of low dose IL-2 infusions for the treatment of refractory tumors and for the treatment of breast cancer using ABMT. This strategy should optimize the clinical benefits from ATC in Phase I/II settings as well as in combination with stem cell transplantation.

After our initial clinical trials, the goal will be to focus on increasing tumor kill by arming T cells with genetically engineered bifunctional monoclonal antibodies (mAB) that bind to both T cells and tumor "antigens". In this manner, ATC can be engineered to bind and kill specific tumors. Obviously, different bifunctional mAB's could be used to coat ATC for the treatment of different target cancers.

**Research Focus:**
The long-term goal is to genetically engineer ATC to more effectively kill tumor cells. We plan to insert cytokine genes into T cells to increase the level of cytokine secreted at local tumor sites to enhance tumor kill and to insert genes that will express the antibody binding regions on the surface of ATC to increase binding and targeting to specific tumors of the breast, colon, or lung.

The new and developing strategies provided by the Immunotherapy Research and Treatment Institute offer hope for today's cancer patient and has tremendous potential for even more effective treatment in the future.

*Lawrence G. Lum, MD  
Scientific Director  
Immunotherapy*
High Dose Rate Brachytherapy

The practice of radiation therapy encompasses the use of different methods of treating patients with high doses of x-rays. The most common form of radiation therapy is the use of linear accelerators delivering a radiation dose to the target for a source placed outside the patient. This is called external beam therapy. Another method of treatment enlists the use of radioactive sources in which the radiation therapy is delivered from within the patient. The advantage of this type of treatment is that the radiation dose is confined to the treatment area and little normal tissue is irradiated.

Radioactive implants have been used in the treatment of cancer since the turn of the century. The traditional use of radioactive sources includes the placement of a hollow catheter inside a cavity or tissue which is invaded by cancer. The radioactive source is then slipped inside the hollow tube and left in place a period of time (usually 24-72 hours) to deliver a dose to the tumor. The patients have to be hospitalized and confined to their rooms to avoid exposing the general public to the radioactivity. Radiation oncology and nursing personnel who took care of the patients would be exposed to the radioactivity. Some patients have to be placed on bed-rest. Due to the longer time it takes to deliver the radiation therapy, this approach is now called Low Dose Rate (LDR) implants.

In the late 1960's, German and Japanese radiation oncologists began to construct and use a higher activity source in the treatment of malignancies. This method uses a machine containing a single source to deliver a biologically equivalent dose in a short time to the tumor. The treatment is delivered in minutes instead of days (Figure 1) by varying the time of the high activity source. In addition, the exposure to personnel is minimized due to the short duration of treatment. The differences between low and high dose rate implants are outlined below in Table 1.

The Radiation Oncology section has installed a dedicated high-dose rate suite centered around a HDR unit (Figure 2). Protocols were developed for the treatment of gynecologic, lung, and esophageal carcinomas. In general, patients have their implant catheters/devices placed under conscious sedation in conjunction with pulmonary, gastroenterology or surgery in the diagnostic and treatment center. The patients are then transferred to radiation oncology for treatment. The entire process from patient entry to discharge varies from 2 to 6 hours. High dose rate has been well received by patients due to its outpatient nature. Patients locally and from as far away as northern Wisconsin and Illinois have been treated on a same day basis.

William J. Pao, MD
Radiation Oncology

Table 1

<table>
<thead>
<tr>
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<th>High Dose Rate Implants (HDR)</th>
<th>Low Dose Rate Implants (LDR)</th>
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<tr>
<td>Hospitalization</td>
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<td>In-Patient</td>
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<tr>
<td>Time for treatment</td>
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<td>24-72 Hours</td>
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<tr>
<td>Number of implants</td>
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<td>1 to 2</td>
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<tr>
<td>Personnel Exposure to Radioactivity</td>
<td>Minimal</td>
<td>Higher</td>
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Figure 1

Low Dose Rate Implants: Multiple radioactive sources left in place for 24-72 hours.

High Dose Rate Implants: A single high activity radioactive source traveling in a catheter during the treatment in minutes.
Program Highlights

Vince Lombardi Cancer Clinic Update

The staff at the Vince Lombardi Cancer Clinic (VLCC) utilizes advanced technology, leading edge research and support from cancer services to provide expert, personalized care to all patients and their families. The VLCC multidisciplinary team is available to collaborate to meet individual patient goals. The team consists of specialized physicians, registered nurses, clinical nurse specialists, oncology technicians, social workers, chaplains and pharmacists. Multiple support services are available including patient and family counseling, nutrition services and rehabilitation services. The clinic supports the Autologous Bone Marrow Transplant and Immunotherapy programs.

In 1995, a Spirituality corner was created in the clinic to further meet patient and family recovery needs. The corner contains books, pamphlets and audiotapes that relate to meditation, prayer and relaxation. It is open to all patients, families, staff and community residents.

The Vince Lombardi Clinic is fulfilling the goal of providing high quality personalized care to patients in Washington County. In November 1995, the first satellite site of the Vince Lombardi Cancer Clinic was opened in Slinger. This satellite clinic offers comparable services and the care is based on the same advanced technology and leading edge research.

Patty Abella, RN, BSN
Manager VLCC

The Power of Prayer: Spirituality and Cancer

People who are diagnosed with cancer often face a spiritual crisis in their lives. They frequently articulate spiritual or existential concerns. Cancer survivors frequently ask themselves many questions, including:

"Why is this happening to me?"

"What is the meaning of my life, and how does cancer change this?"

"How can God help me through this time?"

"What is my unfinished spiritual business (e.g., guilt, need for reconciliation, etc.)?"

Chaplains are clinically trained to offer spiritual support to cancer survivors, their families, and professional staff who care for them. One could define spiritual care as “touching the spirit of another person in an intense and purposeful way”. Chaplains can help people to find meaning and hope in the midst of painful or difficult situations.

Much research is currently being done in the area of spirituality and illness. A research profile of the U.S. population revealed that 96% of Americans “believe in God”. For 66%, “religion is important”. 40% attend services weekly. The importance of prayer has also been studied. 91% of women and 85% of men state that they actively engage in prayer. 78% of Americans pray at least once a week, 57% pray at least once a day.

Chaplains work with cancer survivors to assist them in utilizing their spiritual resources (including contact with their priest/minister/rabbi/imam, etc.). Chaplains also work with cancer survivors to learn new spiritual skills or to develop already existing strengths (e.g., prayer, journaling, meditation, etc.).

Chaplains are available 24 hours daily at St. Luke’s Medical Center. The Pastoral Care staff is a diverse group of chaplains representing many faith groups.

Rev. Marcia Marino
Chaplaincy Services
St. Luke's Cancer Services Support Groups

Education, inspiration and a sharing of experiences for people whose lives have been touched by cancer.

Your Caring Connection
For people who have experienced cancer, their families and friends. Topics of discussion focus on many aspects of cancer education, with presentations given by St. Luke's doctors, nurses, social workers, psychologists, chaplains, and other health care professionals.

Meets the second and fourth Monday of each month from 6:30 to 8 p.m. in the Radiation Oncology Room at St. Luke's Medical Center. Registration is not required.

Make Today Count
For people with cancer or other life-threatening illnesses. Co-sponsored by St. Luke’s and the American Cancer Society, this support group helps improve the quality of life for people with a serious illness through positive support and open communication.

Meets the fourth Thursday of each month from 7:30 to 9 p.m. at Cudahy United Methodist Church, 5865 South Lake Drive.

Prostate Cancer Support Group
For men who have experienced prostate cancer, their families and friends. Sessions are facilitated by a clinical nurse specialist, chaplain, physician and/or other health care professionals.

Meets the first Thursday of each month from 1 to 2:30 p.m. or 7 to 8:30 p.m. at St. Luke’s Medical Center.

Meets the first Wednesday of each month from 7 to 8:30 p.m. at St. Luke’s New Berlin Health Care Center, 14555 West National Avenue.

Meets the first Wednesday of each month from 10 to 11:30 a.m. at Aurora Medical Group Northshore, 8706 North Port Washington Road.

Ovarian Cancer Awareness Group
For women who are at risk for or have been diagnosed with ovarian cancer. Health care professionals offer educational information on risk factors and the latest treatment options, and provide an opportunity for communication and emotional support.

Meets the first Tuesday of each month from 6:30 to 8 p.m. in the Vince Lombardi Cancer Clinic at St. Luke’s Medical Center.

The Kid’s Connection
For children ages 5 through 18 whose parent or loved one has cancer. Participation helps children learn about cancer, express their feelings and discuss their experiences with other children. Sessions are facilitated by St. Luke’s child life and cancer nursing specialists.

Meets for four weekly sessions at St. Luke’s Medical Center. Registration is required.

The ABMT Support Group
For people who have undergone an autologous bone marrow transplant (ABMT). Facilitated by members of the St. Luke's ABMT team, this group offers support and a wealth of educational information in a nurturing environment.

Meets in the Vince Lombardi Cancer Clinic at St. Luke’s Medical Center. For information on dates and times, please call the Vince Lombardi Cancer Hotline at 649-7200 or 1-800-252-2990.

Look Good...Feel Better
For people who are undergoing cancer treatment, this program presents techniques to help people gain control and even triumph over the cosmetic side effects of treatment. Topics of discussion and demonstration include hair styling, wigs, scarves, nails, skin care, and makeup. This program is sponsored by St. Luke's Medical Center and the American Cancer Society in affiliation with experts from the cosmetics industry.

Meets six Mondays per year from 1 to 4 p.m. Call 649-7200 or 1-800-252-2990 for specific dates and to register.

All of the St. Luke’s support groups listed above were organized specifically to support people with cancer and their families and friends. There is no charge for attending these groups. Patients and families are encouraged to attend as many sessions as they wish.

For more information about St. Luke’s cancer support groups, please call the Vince Lombardi Cancer Hotline at 649-7200 in Milwaukee or 1-800-252-2990 outside Milwaukee.
Breast Friends was started in 1995 to provide an opportunity for women who have been diagnosed with breast cancer to come together and receive support, inspiration, and information from each other. Women at all stages attend, including those who are newly diagnosed, those who are undergoing treatment and those women who have completed their treatment. The support group meets monthly. Some months the session is devoted to talking about concerns, coping, problem-solving and sharing, other times a speaker presents information on a topic of interest. Several times a year women are invited to bring their “support person” to meetings, where this group then has their own meeting.

Some of the topics presented in 1995 include: “Life After Breast Cancer”; “Menopause, Estrogen and Related Topics”; “Lymphedema and Exercise”; and “Spirituality”. Many of the topics are suggested by group members.

Breast Friends meets the last Tuesday of each month from 6:00 PM to 8:00 PM in the Vince Lombardi Cancer Clinic. The group is facilitated by the Breast Care Program Coordinator and another health care professional.

Kathy Schroeder, RN
Breast Care Program Coordinator

At St. Luke’s Medical Center, a team of caring professionals with expertise in breast care and breast cancer have joined together to help the patient understand and make informed decisions about their breast health. The team includes radiologists, technicians, surgeons, nurses, pathologists, medical oncologists, plastic surgeons, psychologists, physical therapists and other health care professionals who work with the patient and their doctor to provide breast care that is both personalized and technologically advanced. The Breast Care Program at St. Luke’s Medical Center is committed to prevention and early detection of breast cancer, and caring, state-of-the-art treatment.
Community Education Events

January 14, 1995
"Building Your Dreams"
Featuring Kaye Lani Rae Rafko, RN, a cancer nurse and former Miss America - 1988
Serb Memorial Hall
Sponsored by Women's Healthcare Services and St. Luke's Medical Center

April 5, 1995
"Breast Cancer Update 1995"
John P. Hanson, MD
James E. Bruckman, MD
Lawrence A. Sterkin, MD
Geraldine Banks, Ph.D
Hartford Memorial Hospital
Sponsored by St. Luke's Medical Center

April 5, 1995
"ABMT for Breast Cancer"
Robert F. Taylor, MD
Whitefish Bay Women's Club
Sponsored by St. Luke's Medical Center

May 2, 1995
"The Use of Seed Implants in the Treatment of Prostate Cancer"
Mitchell H. Pincus, MD
Mark J. Waples, MD
Waukesha Aurora Health Care Center
Sponsored by St. Luke's Medical Center

May 31, 1995
"Skin Cancer: The Great Cover-Up"
A discussion of the prevention, diagnosis, and treatment of skin cancer.
James E. Ethington, MD
Vernon D. Casterline, MD
Anthony G. Yug, MD
St. Luke's Medical Center - Auditorium
Sponsored by St. Luke's Medical Center

June 4, 1995
"National Cancer Survivor's Day"
Southshore Park
Sponsored by The American Cancer Society, St. Luke's Medical Center, St. Luke's South Shore, West Allis Memorial Hospital, WTMJ, TV-4, and WOKY

August 29, 1995
"Reconstructive Surgery after Breast Cancer"
Lawrence A. Sterkin, MD
New Berlin Health Care Center
Sponsored by St. Luke's Medical Center

October, 1995
"Women's Ovarian, Cervical, Uterine, and Endometrial Cancers"
Elmer G. Lehman, MD
Waukesha Aurora Health Care Center
Sponsored by St. Luke's Medical Center

October 16, 1995
"Breast Cancer and Wisconsin's Environment"
Women's Health and the Environment Network Conference at MECCA
Co-sponsored by St. Luke's Medical Center

October 25, 1995
"Your Breast Health: Choices and Challenges for Women"
Marcia J.S. Richards, MD
Mark S. Wenzel, MD
Kathy Schroeder, RN
Sponsored by Boston Store, Brookfield Square, and St. Luke's Medical Center

November 17, 1995
Distribution of "Look at Me Tobacco Free" book covers to requesting MPS schools in conjunction with the Great American Smoke-Out.
Sponsored by St. Luke's Medical Center
In 1995, the Cancer Registry at St. Luke's Medical Center (SLMC) accessioned 1,733 new cases, 95 of which were St. Luke's South Shore (SLSS) campus cases. This reflects a 9.2% increase since 1994. Class of case distribution revealed 1,505 analytic and 228 non-analytic cases. According to Cancer Facts & Figures - 1995, prostate cancer was predicted to be the most common cancer that would be diagnosed in 1995, with breast cancer being the second. The five most frequently diagnosed cancers at St. Luke's in 1995 were breast, lung, skin, prostate, and colon cancer. Although, prostate cancer was one of the top five sites diagnosed, breast was the most frequently diagnosed cancer at SLMC. These "top five" cancers made up 56% of all the cancer cases for the year. (Cancer Facts & Figures do not include basal cell or squamous cell carcinomas of the skin, but St. Luke's does include these). At St. Luke's, adenocarcinoma was the most frequent histology diagnosed, followed by infiltrating duct cell carcinoma, squamous cell carcinoma and basal cell carcinoma.

St. Luke's Medical Center was surveyed in 1995 by the American College of Surgeons Commission on Cancer and granted a three approval. A recommendation was made by the ACoS for Cancer Committee quality monitoring of registry abstracting. After the survey, we initiated a policy of reviewing registry abstracts before each Cancer Committee meeting. The Cancer Committee was also very instrumental in selecting new software for the Cancer Registry. Various demonstrations from software vendors led to a decision in 1995 to replace the current outdated cancer registry program with Medical Registry Services, Inc. (MRS). This PC based system was selected because of the following advantages: 1) vendor support availability, 2) ability to create customized data collection fields, 3) ability to create reports internally, 4) ability to create customized follow-up letters, and 5) overall ease of system navigation. Installation was scheduled for January of 1996. The new reference date for the Cancer Registry would be January 1, 1985.

Also in 1995, St. Luke's Medical Center purchased Trinity Memorial Hospital, renaming it St. Luke's South Shore. It was considered a second campus. The recommendation of the American College of Surgeons was to not incorporate the cancer registry data from Trinity with that of St. Lukes. The "Trinity Memorial Hospital" database was retained for historical purposes only. Follow-up for the patients would not be done, therefore survival data would not be available. Requests for data such as site distributions, stage at diagnosis, and details on treatment, etc. would be welcomed. As of October 1, 1995, any cancer patients diagnosed or treated at St. Luke's South Shore were entered into the St. Luke's Cancer Registry.

By the end of 1995, there were over 24,000 cancer cases in the Cancer Registry data base. Approximately 6,900 of these cases were living patients followed on an annual basis. With the assistance of physicians, office staff, area hospitals and fellow cancer registrars, we maintained a 97.5% successful follow-up rate. The remaining 2.5% were considered lost to follow-up but well within the 10% allowed by the American College of Surgeons for approved programs.

Throughout 1995, the Cancer Registry responded to 34 requests for data to physicians, administrative staff, cancer support staff and other requesters for purposes such as research, surveys and marketing. This was a 41.7% increase over the number of requests completed in 1994. We participated in the Patient Care Evaluation study for esophageal cancer, a Quality Assurance Mini-Study, the Breast Cancer Treatment study and the TRIAD study. In addition, the Cancer Committee initiated internal studies on Intraoperative Radiation for Referred Patients and on Pelvic Radiation and Continuous 5-FU for Colorectal Cancer Patients. The Registry has appreciated the opportunity to supply the needed data to our requesters and we look forward to the continued use of our data throughout the hospital.

The graphs and charts throughout this 1995 Cancer Program Report represent a small overview of cancer diagnosis and treatment at St. Luke's Medical Center. This year's report has also focused on soft tissue and connective tissue tumors. Comparisons with state and national figures, as well as narratives, have been furnished when available.

For further information or questions, please direct your requests to the Cancer Registry staff at 649-6720.

Sandy Blixt, R.R.A
Cancer Registry Coordinator
<table>
<thead>
<tr>
<th>SITE DISTRIBUTION</th>
<th>NUMBER OF CASES</th>
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<td></td>
<td>MALES</td>
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<td>301</td>
<td>304</td>
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<tr>
<td>Bronchus &amp; Lung</td>
<td>141</td>
<td>88</td>
<td>229</td>
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<tr>
<td>Skin</td>
<td>103</td>
<td>75</td>
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<td>Prostate</td>
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<tr>
<td>Ureter/Bladder</td>
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<td>48</td>
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<td>25</td>
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<td>Endometrium</td>
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<td>Unknown &amp; Ill-defined</td>
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<td>32</td>
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<td>Ovary &amp; Unspecified Female Genitalia</td>
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<td>30</td>
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<td>Stomach</td>
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<td>Brain, CNS, Peripheral Nerves</td>
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<td>15</td>
<td>25</td>
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<td>Liver, Gallbladder, Bile Ducts</td>
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<td>11</td>
<td>22</td>
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<td>Thyroid/Endocrine</td>
<td>6</td>
<td>13</td>
<td>19</td>
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<td>Larynx</td>
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<td>2</td>
<td>14</td>
<td></td>
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<tr>
<td>Bone</td>
<td>7</td>
<td>4</td>
<td>11</td>
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<tr>
<td>Testis</td>
<td>9</td>
<td>0</td>
<td>9</td>
<td></td>
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<tr>
<td>Female Genitalia (Vulva &amp; Vagina)</td>
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<td>10</td>
<td>10</td>
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<tr>
<td>Thymus, Heart, Mediastinum</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Eye &amp; Lacrimal Gland</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td></td>
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<tr>
<td>Small Intestine</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Accessory Sinuses</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
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<tr>
<td>Retroperitoneum/Peritoneum</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td></td>
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<tr>
<td>Nasal Cavity &amp; Middle Ear</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
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<tr>
<td>TOTAL</td>
<td>819</td>
<td>914</td>
<td>1733</td>
<td></td>
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</tbody>
</table>
Annual Report Statistics

MOST FREQUENT HISTOLOGIES DIAGNOSED IN 1995

<table>
<thead>
<tr>
<th>Histology Distribution</th>
<th>Number of Cases</th>
</tr>
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<tbody>
<tr>
<td>Adenocarcinoma</td>
<td>442</td>
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<tr>
<td>Infiltrating Duct Cell Carcinoma</td>
<td>194</td>
</tr>
<tr>
<td>Squamous Cell Carcinoma</td>
<td>133</td>
</tr>
<tr>
<td>Basal Cell Carcinoma</td>
<td>103</td>
</tr>
<tr>
<td>Epithelial Tumor/Carcinoma</td>
<td>70</td>
</tr>
<tr>
<td>Papillary Transitional Cell Carcinoma</td>
<td>34</td>
</tr>
<tr>
<td>Renal Cell Carcinoma</td>
<td>33</td>
</tr>
<tr>
<td>Small Cell Carcinoma</td>
<td>31</td>
</tr>
<tr>
<td>Transitional Cell Carcinoma</td>
<td>30</td>
</tr>
<tr>
<td>Lobular Carcinoma</td>
<td>29</td>
</tr>
<tr>
<td>Squamous Cell Carcinoma, Keratinizing</td>
<td>25</td>
</tr>
<tr>
<td>Mucinous Adenocarcinoma</td>
<td>24</td>
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<tr>
<td>Melanoma/Pigment Nevus</td>
<td>18</td>
</tr>
<tr>
<td>Malignant Lymphoma, Diffuse, Large Cell</td>
<td>18</td>
</tr>
<tr>
<td>Papillary Adenocarcinoma</td>
<td>16</td>
</tr>
<tr>
<td>Epithelial Tumor/Carcinoma In Situ</td>
<td>16</td>
</tr>
<tr>
<td>Neoplasm, Malignant</td>
<td>16</td>
</tr>
<tr>
<td>All Others (138 with counts not displayed)</td>
<td>501</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,733</td>
</tr>
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</table>

1994 incidence for the state of Wisconsin (most current figures available) showed that individuals under the age of 65 accounted for 37% of newly diagnosed reportable cancer cases. A comparison can be made with 1995 incidence at St. Luke's where this age group accounted for 41% of the newly diagnosed cases.

AGE AT DIAGNOSIS BY GENDER

According to Cancer Facts & Figures - 1995, cancer incidence rises with age, with most cases affecting adults in the mid life or older. At St. Luke's, 70% of the patients diagnosed in 1995 were between the ages of 50 and 79, with 13.1% of the patients diagnosed in the 80+ age group.
When reviewing St. Luke's new cancer cases for 1995, a comparison of AJCC stage at diagnosis by gender revealed females being diagnosed with earlier stage disease for lung and bladder cancer, but males being diagnosed earlier for colon, oral, and skin cancers. Overall, when all cancers were reviewed, females were more likely to have a stage 0 or 1 cancer than males.

### ALL CANCERS - 1995

**Distribution by AJCC Stage and Gender**

<table>
<thead>
<tr>
<th>AJCC Stage</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>STAGE 0</td>
<td>35</td>
<td>4.3%</td>
<td>64</td>
<td>7.1%</td>
</tr>
<tr>
<td>STAGE 1</td>
<td>218</td>
<td>26.6%</td>
<td>322</td>
<td>35.2%</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>161</td>
<td>19.7%</td>
<td>168</td>
<td>18.4%</td>
</tr>
<tr>
<td>STAGE 3</td>
<td>117</td>
<td>14.3%</td>
<td>121</td>
<td>13.2%</td>
</tr>
<tr>
<td>STAGE 4</td>
<td>178</td>
<td>21.7%</td>
<td>132</td>
<td>14.4%</td>
</tr>
<tr>
<td>STAGE 9</td>
<td>110</td>
<td>13.4%</td>
<td>107</td>
<td>11.7%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>819</td>
<td>100%</td>
<td>914</td>
<td>100%</td>
</tr>
</tbody>
</table>

### LUNG CANCER - 1995

**Distribution by AJCC Stage and Gender**

<table>
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<th>AJCC Stage</th>
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<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>STAGE 1</td>
<td>35</td>
<td>24.8%</td>
<td>22</td>
<td>25.0%</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>9</td>
<td>6.4%</td>
<td>5</td>
<td>5.7%</td>
</tr>
<tr>
<td>STAGE 3</td>
<td>36</td>
<td>25.5%</td>
<td>30</td>
<td>34.1%</td>
</tr>
<tr>
<td>STAGE 4</td>
<td>52</td>
<td>36.9%</td>
<td>24</td>
<td>27.3%</td>
</tr>
<tr>
<td>STAGE 9</td>
<td>9</td>
<td>6.4%</td>
<td>7</td>
<td>7.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>141</td>
<td>100%</td>
<td>88</td>
<td>100%</td>
</tr>
</tbody>
</table>

### SKIN CANCER - 1995

**Distribution by AJCC Stage and Gender** (Includes Basal Cell & Squamous Cell Carcinomas)

<table>
<thead>
<tr>
<th>AJCC Stage</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>STAGE 0</td>
<td>8</td>
<td>7.8%</td>
<td>4</td>
<td>5.3%</td>
</tr>
<tr>
<td>STAGE 1</td>
<td>75</td>
<td>72.8%</td>
<td>51</td>
<td>68.0%</td>
</tr>
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<td>8</td>
<td>7.8%</td>
<td>5</td>
<td>6.7%</td>
</tr>
<tr>
<td>STAGE 3</td>
<td>1</td>
<td>0.9%</td>
<td>2</td>
<td>2.7%</td>
</tr>
<tr>
<td>STAGE 9</td>
<td>11</td>
<td>10.7%</td>
<td>13</td>
<td>17.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>103</td>
<td>100%</td>
<td>75</td>
<td>100%</td>
</tr>
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</table>

### COLON CANCER - 1995

**Distribution by AJCC Stage and Gender**

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<th>AJCC Stage</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>STAGE 0</td>
<td>9</td>
<td>14.5%</td>
<td>4</td>
<td>7.4%</td>
</tr>
<tr>
<td>STAGE 1</td>
<td>10</td>
<td>16.1%</td>
<td>11</td>
<td>16.2%</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>10</td>
<td>16.1%</td>
<td>19</td>
<td>27.9%</td>
</tr>
<tr>
<td>STAGE 3</td>
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<tr>
<td>STAGE 4</td>
<td>13</td>
<td>21.0%</td>
<td>16</td>
<td>23.5%</td>
</tr>
<tr>
<td>STAGE 9</td>
<td>9</td>
<td>12.9%</td>
<td>2</td>
<td>2.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>62</td>
<td>100%</td>
<td>68</td>
<td>100%</td>
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</table>

### URETER AND BLADDER CANCER - 1995

**Distribution by AJCC Stage and Gender**

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<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>STAGE 0</td>
<td>11</td>
<td>20.0%</td>
<td>8</td>
<td>30.8%</td>
</tr>
<tr>
<td>STAGE 1</td>
<td>20</td>
<td>36.4%</td>
<td>9</td>
<td>34.6%</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>11</td>
<td>20.0%</td>
<td>4</td>
<td>15.4%</td>
</tr>
<tr>
<td>STAGE 3</td>
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<td>3.6%</td>
<td>1</td>
<td>3.8%</td>
</tr>
<tr>
<td>STAGE 4</td>
<td>2</td>
<td>3.6%</td>
<td>1</td>
<td>3.8%</td>
</tr>
<tr>
<td>STAGE 9</td>
<td>9</td>
<td>16.4%</td>
<td>3</td>
<td>11.6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>55</td>
<td>100%</td>
<td>26</td>
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### ORAL CANCERS - 1995

**Distribution by AJCC Stage and Gender**

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<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>STAGE 1</td>
<td>7</td>
<td>31.8%</td>
<td>3</td>
<td>15.8%</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>5</td>
<td>22.7%</td>
<td>3</td>
<td>15.8%</td>
</tr>
<tr>
<td>STAGE 3</td>
<td>0</td>
<td>0%</td>
<td>5</td>
<td>26.3%</td>
</tr>
<tr>
<td>STAGE 4</td>
<td>9</td>
<td>40.9%</td>
<td>7</td>
<td>36.8%</td>
</tr>
<tr>
<td>STAGE 9</td>
<td>1</td>
<td>4.6%</td>
<td>1</td>
<td>5.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>22</td>
<td>100%</td>
<td>19</td>
<td>100%</td>
</tr>
</tbody>
</table>
A comparison of extent of disease at diagnosis between St. Luke's, Wisconsin and SEER data follows. 1994 Wisconsin figures, (most current available), reveal that 48% of the cancers were diagnosed at in situ (non-invasive) or localized stages. At St. Luke's, in situ and localized cancers comprised 48.9% of all cases with 23.5% and 20.0% at regional and distant stages respectively. (These figures include basal cell and squamous cell carcinomas of the skin). St. Luke's also noted a lower percent of localized colon cancer patients and a higher percent of regional staged prostate cancer than both Wisconsin and SEER. Other cancer stages, when compared, vary with our facility averaging between those of Wisconsin and SEER.

A comparison of extent of disease at diagnosis between St. Luke's, Wisconsin and SEER data follows. 1994 Wisconsin figures, (most current available), reveal that 48% of the cancers were diagnosed at in situ (non-invasive) or localized stages. At St. Luke's, in situ and localized cancers comprised 48.9% of all cases with 23.5% and 20.0% at regional and distant stages respectively. (These figures include basal cell and squamous cell carcinomas of the skin). St. Luke's also noted a lower percent of localized colon cancer patients and a higher percent of regional staged prostate cancer than both Wisconsin and SEER. Other cancer stages, when compared, vary with our facility averaging between those of Wisconsin and SEER.
Top Five Sites for 1995 - General Summary Stage at Diagnosis

**BREAST (304 CASES)**

- In Situ: 8.6% 1995 SLMC, 10.3% 1994 WI*, 8.6% 1983 - 87 SEER
- Local: 54.9% 1995 SLMC, 55.3% 1994 WI*, 53% 1983 - 87 SEER
- Regional: 27.6% 1995 SLMC, 26.0% 1994 WI*, 27% 1983 - 87 SEER
- Distant: 6.6% 1995 SLMC, 4.0% 1994 WI*, 7% 1983 - 87 SEER
- Unknown: 2.3% 1995 SLMC, 4.2% 1994 WI*, 2.3% 1983 - 87 SEER

**BRONCHUS & LUNG (229 CASES)**

- Local: 24.9% 1995 SLMC, 22.1% 1994 WI*, 16% 1983 - 87 SEER
- Regional: 34.1% 1995 SLMC, 29.2% 1994 WI*, 32% 1983 - 87 SEER
- Distant: 38.4% 1995 SLMC, 36.2% 1994 WI*, 27% 1983 - 87 SEER
- Unknown: 2.6% 1995 SLMC, 12.6% 1994 WI*, 22.6% 1983 - 87 SEER

**SKIN (178 CASES)**

- Local: 37.2% 1995 SLMC, 69.3% 1994 WI*, 89.3% 1983 - 87 SEER
- Regional: 0.6% 1995 SLMC, 0.6% 1994 WI*, 0.6% 1983 - 87 SEER
- Distant: 1.12% 1995 SLMC, 1.12% 1994 WI*, 1.12% 1983 - 87 SEER
- Unknown: 2.3% 1995 SLMC, 2.3% 1994 WI*, 2.3% 1983 - 87 SEER

**PROSTATE (157 CASES)**

- Local: 67.5% 1995 SLMC, 68.1% 1994 WI*, 58% 1983 - 87 SEER
- Regional: 19.1% 1995 SLMC, 13.3% 1994 WI*, 14% 1983 - 87 SEER
- Distant: 11.5% 1995 SLMC, 6.4% 1994 WI*, 18% 1983 - 87 SEER
- Unknown: 1.9% 1995 SLMC, 11.7% 1994 WI*, 18% 1983 - 87 SEER

**COLON (130 CASES)**

- In Situ: 8.5% 1995 SLMC, 5.2% 1994 WI*, 34% 1983 - 87 SEER
- Local: 22.3% 1995 SLMC, 30.2% 1994 WI*, 40% 1983 - 87 SEER
- Regional: 40.0% 1995 SLMC, 42.4% 1994 WI*, 40% 1983 - 87 SEER
- Distant: 23.8% 1995 SLMC, 14.7% 1994 WI*, 20% 1983 - 87 SEER
- Unknown: 5.4% 1995 SLMC, 7.4% 1994 WI*, 5.4% 1983 - 87 SEER

*1994 Wisconsin figures do not equal 100% due to the exclusion of "Non-localized" tumors.
Annual Report Statistics

TYPES OF DEFINITIVE TREATMENT
A COMPARISON BETWEEN ST. LUKE'S 1995 CASES AND WISCONSIN 1994 CASES

<table>
<thead>
<tr>
<th>SITE</th>
<th>Surgery Only</th>
<th>Surgical And Non-Surgical</th>
<th>Non-Surgical Only</th>
<th>No Cancer Directed Treatment Reported</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SLMC WI</td>
<td>SLMC WI</td>
<td>SLMC WI</td>
<td>SLMC WI</td>
<td></td>
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<tr>
<td>Breast</td>
<td>91 (29.9%)</td>
<td>204 (67.1%)</td>
<td>1669 (47.3%)</td>
<td>7 (2.3%)</td>
<td>304</td>
</tr>
<tr>
<td></td>
<td>1366 (38.7%)</td>
<td>1366 (38.7%)</td>
<td>204 (67.1%)</td>
<td>209 (5.9%)</td>
<td>3530</td>
</tr>
<tr>
<td>Lung</td>
<td>62 (27.1%)</td>
<td>33 (14.4%)</td>
<td>203 (6.6%)</td>
<td>102 (44.5%)</td>
<td>229</td>
</tr>
<tr>
<td></td>
<td>510 (16.6%)</td>
<td>510 (16.6%)</td>
<td>102 (44.5%)</td>
<td>948 (30.9%)</td>
<td>3069</td>
</tr>
<tr>
<td>Prostate</td>
<td>61 (38.9%)</td>
<td>22 (14.0%)</td>
<td>259 (7.2%)</td>
<td>65 (41.4%)</td>
<td>157</td>
</tr>
<tr>
<td></td>
<td>1407 (38.9%)</td>
<td>1407 (38.9%)</td>
<td>65 (41.4%)</td>
<td>829 (22.9%)</td>
<td>3614</td>
</tr>
<tr>
<td>Colorectal</td>
<td>96 (51.9%)</td>
<td>66 (35.7%)</td>
<td>537 (17.5%)</td>
<td>10 (5.4%)</td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>1885 (61.1%)</td>
<td>1885 (61.1%)</td>
<td>537 (17.5%)</td>
<td>253 (8.2%)</td>
<td>3083</td>
</tr>
<tr>
<td>All Cancers</td>
<td>683 (39.4%)</td>
<td>510 (29.4%)</td>
<td>4180 (17.7%)</td>
<td>395 (22.8%)</td>
<td>1733</td>
</tr>
<tr>
<td></td>
<td>9084 (38.3%)</td>
<td>9084 (38.3%)</td>
<td>4180 (17.7%)</td>
<td>5367 (22.6%)</td>
<td>23711</td>
</tr>
</tbody>
</table>

According to Cancer Facts & Figures - 1995, smoking is the most preventable cause of death in our society. Cigarette smoking is responsible for 90% of lung cancers among men and 79% among women - about 87% overall. Smoking accounts for about 30% of all cancer deaths. People who smoke 2 or more packs of cigarettes a day have lung cancer mortality rates 12 to 25 times greater than non-smokers. After reviewing St. Luke's cases it is noted that of the 1,523 cases of new cancer (210 cases did not have smoking habits documented), 62% of the patients were currently using cigarettes at the time of diagnosis or had a history of cigarette use. The American Cancer Society estimated that in 1995 about 170,000 lives would be lost to cancer because of tobacco use.

FIVE YEAR OBSERVED SURVIVAL RATES
ST. LUKE'S MEDICAL CENTER 1990 CASES

<table>
<thead>
<tr>
<th>STAGE</th>
<th>Breast (167 Cases)</th>
<th>Lung (154 Cases)</th>
<th>Colon (86 Cases)</th>
<th>Prostate (114 Cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>81.6%</td>
<td>19.1%</td>
<td>63.0%</td>
<td>73.6%</td>
</tr>
<tr>
<td>Regional</td>
<td>58.4%</td>
<td>16.6%</td>
<td>52.7%</td>
<td>77.8%</td>
</tr>
<tr>
<td>Distant</td>
<td>33.2%</td>
<td>3.0%</td>
<td>4.7%</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

St. Luke's Medical Center rates are based on 1990 analytic cases followed through 1995. Patients lost to follow-up are counted as expired for survival. Follow-up is based on the date of last contact. Patients are considered "lost to follow-up" if no contact has been able to be made within 15 months of the last follow-up date. Cases that are "lost" remain in the follow-up process until information is obtained or they can be confirmed as deceased.
Tumor Conferences

General multi-disciplinary Tumor Conferences are held on the first, second, and fourth Mondays of each month at St. Luke's Medical Center. On the third Monday of the month, a Head and Neck Tumor Conference is held. In November of 1995, Tumor Conferences resumed at the St. Luke's South Shore Campus (formerly Trinity Memorial). Tumor Conference at St. Luke's South Shore is held on the third Friday of every other month.

Each conference focuses on the diagnosis, pretreatment evaluation, staging, treatment strategy, and rehabilitation of cancer patients. Approximately 2-3 cancer cases requiring treatment decisions are presented at each conference. All physicians involved in the cases are invited to attend. Each conference thus provides an opportunity for interdisciplinary discussion of treatment options while serving as an educational tool for residents, medical students and hospital employees. The exchange of information allows all participants to teach and learn.

The conferences have an average attendance of 35 health care providers. Attendees include physicians, residents, students, nurses, pharmacy, support staff and other allied health professionals. For more information regarding Tumor Conference, or to make arrangements to have a case presented, please contact the Cancer Registry at 649-6720.

<table>
<thead>
<tr>
<th>Tumor Conference - Review of Cancer Sites Presented</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE</td>
</tr>
<tr>
<td>Oral Cavity</td>
</tr>
<tr>
<td>Breast</td>
</tr>
<tr>
<td>Lung</td>
</tr>
<tr>
<td>Colon</td>
</tr>
<tr>
<td>Bladder</td>
</tr>
<tr>
<td>Brain/CNS</td>
</tr>
<tr>
<td>Lymphoma</td>
</tr>
<tr>
<td>Kidney</td>
</tr>
<tr>
<td>Rectum</td>
</tr>
<tr>
<td>Prostate</td>
</tr>
<tr>
<td>Unknown Primary</td>
</tr>
<tr>
<td>Thyroid</td>
</tr>
<tr>
<td>Testis</td>
</tr>
<tr>
<td>Ovary</td>
</tr>
<tr>
<td>Leukemia</td>
</tr>
<tr>
<td>Cervix</td>
</tr>
<tr>
<td>Pancreas</td>
</tr>
<tr>
<td>Sarcoma</td>
</tr>
<tr>
<td>Esophagus</td>
</tr>
<tr>
<td>Endometrium</td>
</tr>
<tr>
<td>Stomach</td>
</tr>
<tr>
<td>Melanoma</td>
</tr>
<tr>
<td>Skin (BCC/SQ)</td>
</tr>
<tr>
<td>Ureter</td>
</tr>
<tr>
<td>Myeloma</td>
</tr>
<tr>
<td>Liver</td>
</tr>
<tr>
<td>Uterus</td>
</tr>
<tr>
<td>Female Genital</td>
</tr>
</tbody>
</table>

| Total cases          | 35              |
St. Luke's Cancer Conferences

February 16, 1995

Genetic Mutations in Colon Cancer
Philip Redlich, MD
Stiemke Auditorium

May 10, 1995

Lung Nodules and Hilar Adenopathy
Irwin Margolis, MD
Health Science Building, Classroom 3

April 13, 1995

Molecular Pathogenesis of Lung Cancer
John D. Minna, MD
Security Bank Cancer Lectureship Series

June 1, 1995

Indolent Non-Hodgkin's Lymphomas
Sandra J. Horning, MD
Stiemke Auditorium

April 28, 1995

The Breast Care Program at St. Luke's Medical Center
Schroeder Fellows Program in Clinical Oncology

September 27, 1995

Prostate Cancer
Jeffrey A. Derus, MD
Health Science Building, Classrooms 1 & 2

April 13, 1995

"Value of a Hospital-Based Comprehensive Breast Care Program"
Steven D. Bines, MD
Assistant Professor of Surgery
Rush Medical College
Surgeon, Comprehensive Breast Center, S.C., an affiliate of the Rush Cancer Center
Rush - Presbyterian - St. Luke's Medical Center
Chicago, Illinois

November 1, 1995

Skin Cancers and Benign Tumors
William LeFeber, MD
Health Science Building, Classroom 3

April 28, 1995

"Use of Somatostatin and its Analogs in Breast Cancer"
Eugene A. Woltering, MD
The James D. Rives Professor of Surgery
Chief, Section of Surgical Endocrinology
Louisiana State University School of Medicine
New Orleans, Louisiana
Glossary

**Allogeneic:** The infusion of bone marrow from one individual (donor) to another.

**Analytic Cases:** Cases which are first diagnosed and/or given their first course of treatment at St. Luke's Medical Center and/or St. Luke's South Shore.

**Antigen:** Any substance that causes the body to produce natural antibodies.

**Autologous:** The infusion of a patient's own bone marrow previously taken and stored.

**Biopsy:** A procedure where a piece of tissue or fluid (a group of cells) is taken from a person's body and examined with a microscope to see if the cells are normal or not.

**Bone Marrow:** The spongy material found inside the bones. Most blood cells are made in the bone marrow.

**Bone Marrow Transplant:** The addition of bone marrow into a patient who has been treated with high-dose chemotherapy or radiation therapy.

**Bone Scan:** A picture of the bones using a radioactive dye that shows any injury, disease, or healing. A valuable test to determine if cancer has spread to the bone, if anticancer therapy is successful, and if affected bony areas are healing.

**BRM: (Biological Response Modifier)** Any agent that boosts the body's immune system by stimulating it, modifying it or restoring it.

**CAT scan:** A test using computers and x-rays to create images of various parts of the body.

**Chondrosarcoma:** A malignant tumor of cartilage usually occurring near the ends of the long bones.

**Clinical Trials:** Studies designed to evaluate promising new treatments by helping researchers learn which approaches are more effective than others.

**Distant Stage:** A neoplasm that has spread to other organs or lymph nodes from the primary tumor.

**Ewing's Sarcoma:** A malignant tumor starting in the bone, affecting the bones of the extremities. It often appears before the age of 20.

**First Course Treatment:** The tumor-directed treatments started within the first four months after diagnosis.

**Immunotherapy:** The artificial stimulation of the body's immune system to treat or fight disease.

**In situ:** A tumor classified microscopically as in situ, non-invasive, pre-invasive, non-infiltrating, intraductal, intraepithelial or intraepidermal.

**Interferon:** A naturally occurring body protein capable of killing cancer cells or stopping their growth.

**Interleukin-2:** (IL-2) A growth factor that stimulates cells of the immune system to fight cancer.

**Local Stage:** Tumor restricted to the organ of origin, but may be invasive or infiltrating within the organ or origin.

**MRI (Magnetic Resonance Imaging):** A sophisticated test that provides in-depth images of organs and structures in the body.

**Metastasis:** The spread of cancer from its original site to distant areas. The cancer cells are carried to distant sites by blood and lymph.

**Non-Analytical:** Cases which are seen at St. Luke's Medical Center or St. Luke's South Shore after the first course of treatment.

**Oncology Clinical Nurse Specialist:** A registered nurse with a masters degree who specializes in the education and treatment of cancer patients.

**Pathological Fracture:** A break in a bone usually caused by cancer or some disease condition.

**Regional Stage:** A tumor that has extended beyond the limits of organ of origin into 1) surrounding organs or tissues by direct extension, 2) regional lymph nodes by metastasis, or 3) a combination of 1 and 2 and appears to have spread no further.

**Recurrence:** The return of cancer after a disease-free interval.

**Sarcoma:** A malignant tumor of muscles or connective tissues such as bone and cartilage.

**Stage:** A term used to describe the size and extent of spread of the cancer.
References


*Cancer in Wisconsin*, 1994, Wisconsin Department of Health and Family Services, Division of Health, Center for Health Statistics.


Ibid., p. 45.
