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# ACCO: ASCO Core Curriculum Outline

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## INTRODUCTION

*Purpose.* Medical Oncology is a rapidly growing specialty, not only in its membership, but in its knowledge base as well. In order to keep pace with the changing profile of health care delivery and still ensure uniform quality subspecialty training, a template for education is needed.

*Design and Results.* An Ad Hoc Committee was created from the American Society of Clinical Oncology (ASCO) membership in 1997. Goals of training were discussed, and curriculum guidelines were created. The great expansion in knowledge related to cancer care has led to this current revision of the initial curriculum. The goals of this second edition of ASCO curriculum remain the same and emphasize formal instruction in the following:

(1) the treatment of individual malignancies, with an emphasis on a coordinated multidisciplinary approach;

(2) a clinical experience that emphasizes patient management in both the inpatient and outpatient settings;

(3) the ability to perform specified procedures; and

(4) the key tools in basic science that apply to patient management.

This document should be considered the educational framework around which a training program is developed. The American Society of Clinical Oncology was founded in 1965, and by 1979, the membership had grown to 2,950. Today, more than 20,000 physicians are members of ASCO. Since the first subspecialty examination in medical oncology was offered in 1973, the number of certified medical oncologists has risen to over 8,000. Medical Oncology is not only one of the youngest subspecialties in internal medicine, but also one of the fastest growing.

The recent years have witnessed an explosion in medical technology. The pharmacopoeia of chemotherapeutic agents has grown from the three available agents in 1950 to over 50 antineoplastic agents. Molecular diagnostic testing is now commonplace, and more widespread use of genetic screening is on the horizon. Moreover, an entirely new area of clinical research trials has been initiated in pharmacologic cancer prevention.

At the same time, health care has become an "industry" that has resulted in the shift of the majority of cancer care to the outpatient setting, with a focus on cost-containment. It is a challenge to develop a curriculum for training physicians in so dynamic an environment.

While the American Board of Internal Medicine (ABIM) and Accreditation Council on Graduate Medical Education (ACGME) create a basic structure for subspecialty training, the specific items that are to be included in the training curriculum are not within their purview. ASCO leadership has thus taken on the task of creating a "Competence Comprising Curriculum" for

Medical Oncology subspecialty training, which emphasizes formal instruction in the following:

I. Basic Scientific Principles; including cancer biology and genetics, cancer etiology, tumor immunology, and epidemiology
II. Basic Principles in the Management and Treatment of Cancer; including pathology and laboratory medicine, radiology, surgical and radiation oncology, chemotherapy, biologic therapy, and hormonal therapy
III. Clinical Research; including design of clinical trails
IV. Cancer Types and Sites; 37 cancer types and sites, in alphabetical order
V. Other Treatment Related Issues; including oncological emergencies, paraneoplastic syndromes, bone marrow transplantation, local therapy of metastatic cancers, and management of malignant effusions
VI. Complications; including infections and other complications of treatment
VII. Supportive Care; including pain management, hematopoietic growth factors, transfusion therapy, nutritional support, sexual problems, end-of-life care, complementary and alternative medicine, and unproven methods of treatment
VIII. Survivorship; including follow-up care at end of treatment, prevention of second malignancies, employment and insurance, information and education, and advocacy
IX. Psychosocial Aspects of Cancer; including psychological stages of cancer, cultural issues, spirituality, adaptive and maladaptive behavior, coping, and the use of psychotropic drugs
X. Bioethics, Legal, and Economic Issues; including informed consent, research ethics, conflict of interest
XI. Communication Skills; including communication along the disease trajectory, delivering bad news, communication within the multidisciplinary team
XII. Procedures; including chemotherapy administration, tumor assessment, bone marrow aspiration, biopsy and interpretation
XIII. Information Systems in Oncology; including resources for patients and professionals, locating an oncologist, locating a clinical trial
XIV. Geriatric Oncology; including unique issues of cancer and aging, patient assessment, psychosocial implications

The following curriculum should be considered as the educational framework for the training of physicians in medical oncology.

## COMPETENCY COMPRISING CURRICULUM

### I. BASIC SCIENTIFIC PRINCIPLES

*A. Cancer Biology and Genetics*

1. Biology of normal cells and the basic processes of carcinogenesis
2. Genomics
   a. Gene structure
   b. Organization
   c. Expression
   d. Regulation
3. Cell cycle
   a. Mechanisms
   b. Control by oncogenes
   c. Interactions with therapies
4. Receptors and signal transduction
5. Tumor cells
   a. Kinetics
   b. Proliferation
   c. Programmed cell death
6. Cell proliferation and apoptosis
7. Tumor invasion and metastases
8. Angiogenesis
9. Molecular techniques
   a. Polymerase chain reaction (PCR)
   b. Chromosomal analyses and cytogenetics
   c. Tissue microarray analysis
   d. Other techniques of molecular and tumor cell biology

*B. Carcinogenesis*

1. Inherited and acquired genetic abnormalities
2. Environmental, chemical, and physical factors

*C. Tumor Immunology*

1. Cellular and humoral components of the immune system
2. Immune system recognition of substances including normal and malignant cells as "self" and "nonself"
3. Regulatory action of cytokines on the immune system
4. Interrelationship between tumor and host immune systems
   a. Tumor antigenicity
   b. Immune-mediated antitumor cytotoxicity
   c. Direct effect of cytokines on tumors

*D. Epidemiology of Cancer*

1. Cancer statistics
   a. Incidence rates
   b. Mortality rates
   c. International differences in incidence and mortality rates for different cancers
2. Staging of cancer
   a. Tumor-node-metastasis (TNM) system
   b. Other systems for specific tumor types
3. Epidemiologic methods

## II. BASIC PRINCIPLES IN THE MANAGEMENT AND TREATMENT OF CANCER

A. *General*
1. Contributions of each different subspecialty in diagnosis, staging and treatment
2. Multidisciplinary approach to cancer treatment
3. Effects of age and comorbidity on treatment
4. Physical assessment
5. Response assessment
   a. Response Evaluation Criteria in Solid Tumors (RECIST)
   b. Quality of life
   c. Other criteria

B. *Pathology/Laboratory Medicine*
1. Pathologist in cancer diagnosis
2. Histopathologic techniques in diagnosis
   a. Immunostaining
   b. Cytology
   c. Fine needle aspiration
   d. Cytogenetics and polymerase chain reaction (PCR)
   e. Flow cytometry
3. Prognostic factors and predictive markers

C. *Radiology*
1. Imaging/staging techniques in diagnosis, staging, and follow-up
   a. Radiographic
   b. Computed tomography (CT)
   c. Ultrasound
   d. Magnetic resonance imaging (MRI)
   e. Positron emission tomography (PET)
   f. Endoscopic imaging techniques
   g. Other imaging procedures
2. Use of imaging to assess treatment response

D. *Surgical Oncology*
1. Preoperative evaluation
2. Surgery for specific types and sites
   a. See section IV

E. *Radiation Oncology*
1. Principles of radiation biology
2. Normal tissue tolerance and toxicity
3. Interactions
   a. Chemotherapy
   b. Hormone therapy
   c. Biologic therapy
   d. Sequencing of therapy
4. Fractionation and dosing
5. Brachytherapy
6. Focused radiation therapies
   a. Gamma knife
   b. Intensity-modulated radiation therapy (IMRT)
   c. Other ablative techniques
7. Potentiation and protection
   a. Host and other physical factors
   b. Pharmacologic agents

F. *Chemotherapy*
1. Indications and goals
   a. Primary cancer
   b. Recurrent cancer
2. Pharmacology
   a. Pharmacokinetics
   b. Pharmacodynamics
   c. Metabolism and clearance
   d. Pharmacogenomics
   e. List of drugs
3. Dose and schedule
   a. Metronomic
   b. Dose-density
   c. Dose-intensity
   d. High-dose
   e. Other
4. Cancer drug development and testing
5. Drug resistance
6. Predicting response and toxicity

G. *Hormonal Therapies*
1. Estrogens
2. Selective estrogen response modifiers
3. Progestins and antiprogestins
4. Aromatase inhibitors
5. Androgens and antiandrogens
6. Gonadotropin-releasing hormone analogs
7. Glucocorticoids
8. Miscellaneous agents

H. *Biologic/Targeted Therapy*
1. Basic concepts of targeted molecular therapies
2. Monoclonal antibodies
3. Tumor vaccines
4. Cellular therapy
5. Antiangiogenic agents
6. Cytokines
7. Gene-directed therapy

## III. CLINICAL RESEARCH

A. *Design of Phase I, II, and III Trials*
1. Protocol development and implementation
   a. Defining trial objectives and outcomes (response criteria)
   b. Defining patient populations
   c. Use of surrogate end points
   d. Toxicity assessment and grading
   e. Quality of life assessment and end points
   f. Reporting responsibilities

g. Data collection
(1) Data capture and database development
(2) Maintaining quality and integrity
h. Statistical analysis
(1) Sample size determination
i. Early stopping roles
2. Meta-Analysis
3. Ethical, regulatory, and legal issues
a. Institutional Review Board
b. Informed consent
c. Conflict of interest
d. Other groups in trial development
(1) National Cancer Institute and cooperative groups
(2) Cancer centers
(3) Industry

*B. Tumor Assessment*
1. Measurement of masses
2. Imaging
a. CT
b. MRI
c. Nuclear medicine
d. Other imaging
3. Surrogate end points
a. biomarkers/pharmacodynamic end points

## IV. CANCER TYPES AND SITES

*A. Acute Leukemia and Myelodysplasia*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Exposures
(1) Radiation
(2) Chemicals
(3) Drugs
b. Specific associations of chromosomal translocations
(1) Duplications and deletions with disease subtypes
c. Activation of specific oncogene expression
(1) RAS
(2) MYC
(3) MDR
(4) Other
3. Diagnosis
a. Peripheral blood morphology
b. Bone marrow aspirate and biopsy
c. Flow cytometry and immunophenotyping
d. Cytogenetics, including karyotyping and fluorescent in situ hybridization
e. PCR for specific gene rearrangements (eg, bcr-abl)
4. Acute myeloid leukemia
a. Staging, prognostic factors, natural history
(1) French-American-British classification
(2) CNS, mediastinal involvement
(3) Prognostic factors
(4) Elderly
(a) Antecedent hematologic abnormalities
(b) Cytogenetic abnormalities
(c) Expression of drug-resistant genes
b. Treatment
(1) Current recommendations
(a) Induction
(b) Consolidation
(c) Bone marrow/stem cell transplantation
(d) Differentiation therapy
(2) Management of relapse
(3) Special problems in the elderly
5. Acute lymphoblastic leukemia
a. Staging, prognostic factors, natural history
(1) French-American-British classification
(2) CNS, mediastinal involvement
(3) Prognostic factors
(4) CNS, mediastinal or testicular involvement
(5) Molecular markers
b. Treatment
(1) Current recommendations
(a) Induction
(b) Consolidation
(c) CNS prophylaxis
(d) Bone marrow/stem cell transplantation
(2) Management of relapse
6. Myelodysplasia
a. Staging, prognostic factors, natural history
(1) French-American-British classification
(2) CNS involvement
(3) Prognostic factors
(a) Chromosomal abnormalities
(b) International Prognostic Scoring System

(4) Curability by age
(a) Likelihood of durable response in elderly
i. MDR
ii. Prognostic cytogenetics
(b) Treatment-related mortality in elderly
(c) Alternative treatment/supportive care options for elderly
b. Treatment
(1) Current recommendations
(a) Low-intensity therapy
(b) High-intensity therapy
(c) Bone marrow/stem cell transplantation
(d) Supportive care
(e) Standard adult population
7. Supportive care
a. Transfusions
(1) Red cell
(2) Platelet
b. Growth factors
c. Antibiotics/antifungal agents
d. Psychosocial

*B. AIDS-Related Malignancies*
1. Epidemiology
a. Incidence rates
b. Mortality rates
c. Lifestyle factors
d. Epidemiology of HIV infection
e. Highly active antiretroviral therapy
2. Pathogenesis, pathology, and tumor biology
a. Natural history of HIV infection
b. AIDS-defining
(1) Kaposi's sarcoma
(2) Systemic lymphoma
(3) Primary CNS lymphoma
(4) Cervical cancer
c. Non-AIDS defining malignancies
(1) Anogenital neoplasia
(2) Other malignancies
d. Risk factor
(1) Immunosuppression
(2) Organ transplantation
3. Prevention
a. HIV Prevention
b. Education on sexually transmitted diseases
4. Diagnosis
a. HIV
b. HIV-associated malignancy
(1) Kaposi's sarcoma
(2) Systemic lymphoma
(3) Primary CNS lymphoma
(4) Cervical cancer
c. Non-AIDS defining malignancies
(1) Anogenital neoplasia
(2) Other malignancies
5. Staging
a. Kaposi's sarcoma
b. Systemic lymphoma
c. Primary CNS lymphoma
d. Cervical cancer
6. Treatment and follow-up
a. Kaposi's sarcoma
b. Systemic lymphoma
c. Primary CNS lymphoma
d. Cervical cancer
7. Special issues
a. Antiretroviral therapy
b. Infection prophylaxis
c. Colony-stimulating factors

*C. Anal Cancer*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Premalignant lesion
(2) Histology
(a) Cloacogenic
(b) Squamous cell
b. Risk factors
(1) HPV infection
(2) Sexual activity
(3) Condylomata
(4) HIV infection
c. Assessment of risk
(1) Lifestyle factors
(2) HIV infection
3. Prevention
a. Lifestyle changes
4. Screening
a. Anal Papanicolaou tests
5. Diagnosis
a. Physical examination
b. Biopsy
c. Anoscopy/proctoscopy
d. Transrectal ultrasound
e. Aspiration of palpable inguinal nodes
6. Staging and Prognostic factors
a. TNM system
b. Symptoms
7. Treatment by stage
a. Stage 1
(1) Surgery

b. Local disease
(1) Combined modality
c. Positive inguinal nodes
(1) Combined modality
d. Recurrent or residual disease
(1) Surgery
(2) Radiation therapy
(3) Chemotherapy
e. Metastatic disease
(1) Chemotherapy
8. Follow-up
9. Special issues
a. Anorectal melanoma

*D. Biliary Tree Cancer*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
b. Risk factors
(1) Primary sclerosing cholangitis
(2) Gallstones
(3) Choledochal cysts
3. Diagnosis
a. Clinical signs and symptoms
b. Imaging
c. ERCP
d. Endoscopic biopsy
4. Staging and prognostic factors
a. TNM
b. Histologic grade
5. Treatment by stage
a. Resectable disease
(1) Surgery
(2) Radiation therapy
b. Unresectable disease
(1) Liver transplantation
c. Advanced or recurrent disease
(1) Chemotherapy
(a) Intravenous
(b) Hepatic infusion
(2) Radiation therapy
6. Supportive care
a. Biliary drainage

*E. Bladder and Other Urothelial Cancers (ureter, renal, pelvis)*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
b. Lifestyle and environmental exposures
(1) Cigarette smoking
(2) Phenacetin
(3) Schistosomiasis infection
(4) Chemical exposure
c. Field change in urothelium
d. Genetic and molecular abnormalities
3. Prevention
a. Smoking cessation
b. Environmental (OSHA) protection
c. Monitoring medication use
4. Screening
a. Urine cytology
b. CT/MRI
5. Diagnosis
a. Urine cytology
b. Cystoscopy and biopsy
c. CT/MRI scanning
6. Staging and prognostic factors
a. TNM system, tumor grading
b. Localized versus invasive disease
c. Histologic type
7. Treatment by stage
a. Superficial bladder cancer
(1) Intravesical
b. Early-stage and locally advanced
(1) Surgery
(2) Radiation therapy
(3) Chemotherapy
(a) Neoadjuvant
(b) Adjuvant
(4) Combination therapy for organ preservation
c. Recurrent and metastatic
(1) Surgery
(2) Radiation therapy
(3) Chemotherapy
(a) Neoadjuvant
(b) Adjuvant
(c) Concurrent with radiation
8. Follow-up
a. Urine cytology
b. Cystoscopy
c. Imaging
9. Supportive care
a. Urinary diversion
(1) Ileal conduit
(2) Continent urinary diversions
10. Special issues
a. Urachal carcinoma

*F. Bone Sarcomas*
1. Epidemiology
a. Incidence rates
b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Histologic types
         (a) Osteosarcoma
         (b) Chondrosarcoma
         (c) Ewing's
         (d) Other
   b. Cytogenetics and genetic syndromes
      (1) Li-Fraumeni syndrome
      (2) Retinoblastoma
      (3) Chromosomal signatures/gene mutations
   c. Radiation
3. Diagnosis
   a. Clinical presentation
   b. Radiologic-pathologic correlations
   c. Biopsy
   d. Special considerations
4. Staging and prognostic factors
   a. Staging: TNM and tumor grade
   b. Prognostic factors
   c. Radiographic evaluation
   d. Restaging after preoperative chemotherapy
5. Treatment
   a. Localized primary disease
      (1) Osteosarcoma
      (2) Chondrosarcoma
      (3) Ewing's
      (4) Other
      (5) Limb sparing treatment
   b. Local recurrence
   c. Metastatic disease
      (1) Clinical presentation
      (2) Surgical resection
      (3) Chemotherapy
6. Follow-up
   a. Radiographic evaluation

G. *Breast Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Premalignant
      (2) Malignant
         (a) Histologic types
   b. Genetics
      (1) *BRCA-1*
      (2) *BRCA-2*
      (3) Other genetic syndromes
      (4) Counseling and testing
   c. Assessment of risk
      (1) Family history
      (2) Lifestyle factors
      (3) Hormone replacement therapy
      (4) Gail, Claus, and other models
3. Prevention
   a. Lifestyle changes
   b. Chemoprevention
      (1) Tamoxifen and other SERMs
      (2) Other agents
   c. Prophylactic bilateral mastectomies
   d. Prophylactic bilateral oophorectomy
4. Screening
   a. Mammography
   b. Other imaging techniques
      (1) Ultrasound
      (2) MRI
   c. Breast examination
      (1) Self-examination
      (2) Examination by a health-care provider
   d. Ductal lavage
   e. Genetic screening
5. Diagnosis
   a. Management of a palpable mass
   b. Management of nonpalpable, image-detected abnormalities
   c. Biopsy techniques
      (1) Fine-needle aspiration
      (2) Core, excision, and needle localization biopsy
   d. Axillary dissection
      (1) Complete
      (2) Sentinel node
6. Staging and prognostic factors
   a. TNM system
   b. Histologic type
   c. Estrogen and progesterone receptors
   d. Other biologic and molecular markers
   e. Staging recommendations
7. Treatment by stage
   a. Premalignant
      (1) Atypical hyperlasia
   b. Carcinoma-in-situ
      (1) Lobular
      (2) Ductal
   c. Early-stage invasive carcinoma
      (1) Primary lesion
         (a) Surgery
         (b) Radiation
         (c) Chemotherapy
            i. Preoperative
            ii. Postoperative

(d) Endocrine
i. Preoperative
ii. Postoperative
(e) Trastuzumab and other biologic therapy
(f) Estimating the benefits of systemic adjuvant therapy
d. Locally advanced and inflammatory breast cancer
(1) Multimodal therapy
e. Locally recurrent
(1) In breast recurrence
(2) Chest wall recurrence
(3) Surgery
(4) Radiation therapy
(5) Systemic therapy
f. Metastatic breast cancer
(1) Surgery
(2) Radiation therapy
(3) Systemic therapy
(a) Endocrine therapy
(b) Chemotherapy
(c) Single-agent Versus combination therapy
(d) Monoclonal antibody therapy
8. Follow-up
a. ASCO and other guidelines
9. Supportive care
a. Psychosocial issues and support groups
b. Lymphedema
c. Bisphosphonates for bone metastases
d. Menopausal symptoms
e. Health maintenance for premature menopause
(1) Bone health
f. Sexuality and fertility
g. Cognitive dysfunction
h. Surgical reconstruction
10. Other/Special issues
a. Special problems in breast cancer management
(1) Male breast cancer
(2) Breast cancer in pregnancy
(3) Breast cancer in elderly women
(4) Breast cancer in very young women
(a) Oophorectomy
(5) Breast cancer presenting as axillary metastases
(6) Phyllodes tumors
(7) Paget's disease of the nipple

*H. Central Nervous System Malignancies*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Histologic types
(1) Progression from low-grade to high-grade tumors
(2) Cell type
(3) WHO grading system
b. Genetic syndromes
c. Environmental factors
3. Diagnosis
a. Clinical symptoms and signs
b. Imaging
(1) CT/MRI
(2) Magnetic resonance spectroscopy
(3) PET/single-photon emission computed tomography
4. Staging and prognostic factors
a. Staging
(1) Radiographic
(2) CSF evaluation
b. Prognostic factors
(1) Functional neurologic status
(2) Tumor histology
(3) Patient age
(4) Extent of tumor resection
(5) Tumor location
(6) Biogenetic markers
5. Treatment of primary CNS tumors
a. Low-grade astrocytoma
(1) Surgery
(2) Observation
(3) Immediate treatment
(a) Astrocytoma
(4) Radiation therapy
b. Malignant astrocytomas
(1) Surgery
(2) Radiation therapy
(3) Chemotherapy
(a) Systemic
(b) Intracavitary
c. Malignant oligodendrogliomas
(1) Surgery
(2) Chemotherapy
(a) Predictive factors
(3) Radiation therapy
d. Meningiomas
(1) Observation
(2) Surgery
(3) Radiation therapy
(4) Other
e. Primary CNS lymphomas
(1) Stereotactic biopsy
(2) Chemotherapy
(a) Intrathecal

(b) Systemic
(3) Radiation therapy
f. Medulloblastoma
(1) Surgery
(2) Neuraxis radiation therapy
(3) Chemotherapy
g. Ependymoma
h. Pinealoma
i. Metastases to CNS
(1) Brain
(a) Whole brain radiation therapy
(b) Focal brain radiation therapy
(c) Surgery
(d) Chemotherapy
(2) Leptomeninges
(a) Radiation therapy
(b) Chemotherapy
i. Intrathecal
1. Access devices
ii. Systemic
6. Follow-up
a. Serial imaging
7. Supportive care
a. Corticosteroids
b. Anticonvulsants
c. Deep vein thrombosis
d. Pneumocystis carinii pneumonia prophylaxis
e. Radiation toxicity
(1) Neurocognitive
(2) Radionecrosis

*I. Cervical Cancer*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
b. HPV and oncogenic types
c. Immunosuppression/HIV
d. Lifestyle factors
(1) Tobacco use
(2) Dietary
(3) Sexual history
3. Prevention
a. Education on sexually transmitted diseases
b. Treat precursor (cervical intraepithelial neoplasia) lesions
c. HPV vaccines
4. Screening
a. Cytology (routine Papanicolaou tests, Bethesda system, other)
5. Diagnosis
a. Pelvic examination
b. Cytology
c. Colposcopy and biopsy
d. Radiographic imaging
6. Staging and prognostic factors
a. Clinical FIGO staging
b. Surgical staging
c. Histologic factors
7. Treatment by stage
a. Microinvasive stage I
b. Other stage IA
c. Stage IB-IIA
(1) Surgery
(2) Radiation therapy
d. Locally advanced stages
(1) Surgery
(2) Radiation therapy
(3) Chemotherapy
8. Recurrent and metastatic disease
a. Chemotherapy
b. Radiation therapy
c. Surgery
9. Supportive care
a. Treatment-related complications
(1) Lymphedema
(2) Vaginal stenosis
(3) Premature menopause
(4) Other
b. Ureteral obstruction
10. Other/special issues
a. Cervical cancer during pregnancy

*J. Chronic Leukemias: Chronic Myeloid Leukemia (CML) and Chronic Lymphocytic Leukemia (CLL)*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. CML
(1) Bcr-abl and other genetic factors
(2) Radiation exposure
b. CLL
(1) Genetic and molecular abnormalities
3. Diagnosis
a. Peripheral blood smear
b. Genetic and molecular markers
c. PCR or FISH for specific gene rearrangements (CML)
4. Staging and prognostic factors
a. CML
(1) Chronic phase
(2) Accelerated phase
(3) Blast phase

(4) Sokol, synthesis prognostic model and others
b. CLL
(1) Rai and Binet staging classifications
(2) Genetic and molecular markers
5. Treatment
a. CML
(1) Observation
(2) Chemotherapy
(3) Monoclonal antibodies
(4) Biologic agents
(a) Imatinib
(b) Interferon
(c) Other
(5) Bone marrow/stem cell transplantation
(6) Management of blast phase and accelerated phase
(7) Chloroma (granulocytic sarcoma)
b. CLL
(1) Observation
(2) Purine analogs
(3) Alkylating agents
(4) Combination chemotherapy
(5) Monoclonal antibodies
(6) Bone marrow/stem cell transplantation
(7) Radiation therapy
(8) Splenectomy
(9) Transition to high-grade lymphoma (Richter's syndrome)
(10) Other
(a) Hypogammaglobulinemia and infection
(b) Autoimmune hemolytic anemia and thrombocytopenia

*K. Colorectal Cancer*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
b. Genetics and genetic syndromes
(1) Familial adenomatous polyps
(2) Hereditary nonpolyposis colorectal cancer
(3) Other
c. Pathogenesis
d. Assessment of risk
(1) Family history
(2) Dietary factors
(3) Lifestyle factors
(4) Medical history
(a) Inflammatory bowel disease
(b) Diabetes mellitus
3. Prevention
a. Lifestyle changes
b. Chemoprevention
(1) Anti-inflammatories
c. Colectomy
4. Screening
a. Rectal examination
b. Fecal occult blood test
c. Colonoscopy surveillance (general population)
d. Virtual colonoscopy
e. High-risk populations
(1) Inflammatory bowel disease
(2) Genetic abnormalities
(3) Use of risk criteria and models
5. Diagnosis
a. Clinical signs and symptoms
b. Imaging
c. Endoscopic biopsy
6. Staging and prognostic factors
a. TNM system
b. Histology and grade
c. Genetic and molecular abnormalities
7. Treatment
a. Treatment by stage
(1) Cancer in a polyp
(2) Stage II colorectal cancer
(a) Surgery
(b) Chemotherapy
(c) Radiation therapy
(3) Stage III colorectal cancer
(a) Surgery
(b) Chemotherapy
(c) Radiation therapy
(4) Metastatic and recurrent colorectal cancer
(a) Surgery
i. Resectable regional metastases
1. Liver only
2. Lung only
3. Liver plus lung
ii. Anastomotic recurrence
(b) Chemotherapy
i. Regional perfusion of chemotherapy
ii. Chemoembolization
iii. Chemotherapy
(c) Radiation therapy
(5) Special surgical issues
(a) Laparoscopy
(b) Sentinel node biopsy

(c) Total mesorectal excision in rectal surgery
8. Follow-up after curative resection
   a. ASCO and other guidelines
9. Supportive care
   a. Treatment-related toxicities
      (1) Ostomy care
      (2) Radiation proctitis
      (3) Diarrhea

*L. Esophageal Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Squamous cell
      (2) Adenocarcinoma
   b. Assessment of risk
      (1) Barrett's esophagus
      (2) Gastroesophageal reflux disease
      (3) Smoking and alcohol use
   c. Genetic and molecular abnormalities
3. Prevention
   a. Lifestyle changes
4. Diagnosis
   a. Clinical signs and symptoms
   b. Endoscopy and biopsy
   c. Imaging
5. Staging and prognostic factors
   a. TNM staging
6. Treatment
   a. Local-regional disease
      (1) Surgery
      (2) Radiation therapy
      (3) Chemotherapy
   b. Recurrent and metastatic disease
      (1) Chemotherapy
      (2) Radiation therapy
      (3) Surgery
7. Supportive care
   a. Management of obstruction
      (1) Endoscopic stenting
      (2) Other
   b. Supportive management

*M. Gallbladder Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Risk factors
      (1) Inflammatory bowel disease
      (2) Gallstones (cholesterol-type)
      (3) Chronic inflammation
3. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
   c. Surgery
   d. Cholangiography
   e. Bile cytology
4. Staging and prognosis
   a. TNM
5. Treatment by stage
   a. T1/T2 tumors
      (1) Surgery
   b. T3/T4 tumors
      (1) Surgery
      (2) Radiation therapy
      (3) Chemotherapy
   c. Evaluation after laparoscopic cholecystectomy
      (1) Surgery
   d. Recurrent or metastatic disease
      (1) Chemotherapy
      (2) Radiation therapy
6. Supportive care
   a. Biliary drainage

*N. Gastric Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Genetic and molecular factors
      (1) Precursor lesions
      (2) Adenomatous and gastric polyps
   c. Nutritional factors
      (1) Vitamin B12/pernicious anemia
      (2) Other
   d. Lifestyle
      (1) Tobacco use
      (2) Occupational exposure
      (3) Helicobacter pylori and other infections
3. Screening
   a. Endoscopy
   b. Imaging
4. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
   c. Endoscopy and biopsy
5. Staging
   a. TNM staging
6. Treatment
   a. Resectable
      (1) Surgery
      (2) Chemotherapy

(3) Radiation therapy
(4) Laparoscopy
(5) Combined modality
b. Unresectable and metastatic
(1) Chemotherapy
(2) Radiation therapy

*O. Germ Cell Tumors*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Seminoma
(2) Nonseminoma
b. Genetics and molecular characteristics
(1) Kleinfelter's syndrome
c. Risk factors
(1) Cryptorchism
d. Location
(1) Testes
(2) Pineal
(3) Mediastinum
(4) Retroperitoneum
3. Diagnosis
a. Clinical signs and symptoms
b. Imaging
c. Molecular markers
d. Biopsy
e. Serum markers
4. Staging and prognostic factors
a. TNM, International Germ Cell Consensus Classification, other systems
b. Histologic type
c. Serum markers
d. Clinical Versus surgical staging
5. Treatment
a. Management of testicular mass
(1) Inguinal orchiectomy
b. Seminoma
(1) Stage 1 disease
(a) Surgery
(b) Radiation therapy
(2) Stage II disease
(a) Surgery
(b) Radiation therapy
(c) Chemotherapy
(3) Stage III disease
(a) Surgery
(b) Radiation therapy
(c) Chemotherapy
(4) Metastatic or recurrent disease
(a) Chemotherapy
(b) Surgery
c. Nonseminoma
(1) Stage 1 disease
(a) Surgery
(2) Stage II disease
(a) Chemotherapy
(3) Stage III disease
(a) Chemotherapy
(4) Metastatic or recurrent disease
(a) Chemotherapy
(5) Late relapse
d. Management of residual disease
e. Observation
f. Surgery
g. Radiation therapy
6. Follow-up
a. Tumor markers
b. Imaging studies in patients treated by observation
7. Supportive care
a. Fertility and sexuality issues
b. Gynecomastia
8. Special issues
a. Growing teratoma
b. False-positive serum markers
c. Tumor sanctuary sites (CNS, testes)
d. Secondary malignancies
e. Non–germ cell testicular tumors

*P. Hairy Cell Leukemia*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
3. Diagnosis
a. Peripheral blood smear
b. Bone marrow biopsy and aspirate
c. Immunophenotyping
4. Treatment
a. Observation
b. Chemotherapy
(1) Purine analogs
(2) Other
c. Interferon and other biologics
5. Supportive care
a. Infection

*Q. Head and Neck Cancers*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Squamous cell
(2) Adenomatous

(3) Other
b. Genetic and molecular factors
(1) First-degree relatives
c. Lifestyle
(1) Tobacco
(2) Alcohol
d. Field cancerization
e. Viral factors
(1) HPV
(2) EBV
3. Prevention
a. Tobacco cessation
b. Alcohol cessation
4. Screening
a. Oral examination
5. Diagnosis
a. Clinical signs and symptoms
(1) Head and neck examination
(a) Oral examination
b. Endoscopy and biopsy
(1) Primary lesion
(2) Nodal sites
c. Imaging
6. Staging and prognostic factors
a. TNM system
7. Treatment
a. General principles
(1) Surgery
(a) Organ preservation strategies
(b) Postradiation neck dissection
(2) Radiation therapy
(3) Chemotherapy
(4) Combined modality
b. Specific sites
(1) Hypopharynx
(2) Larynx
(3) Nasal cavity
(4) Nasopharynx
(5) Oral cavity
(6) Oropharynx
(7) Paragangliomas
c. Nasopharyngeal tumor
d. Locally recurrent disease
e. Nodal presentation
f. Metastatic disease
8. Follow-up
a. Second malignancies
9. Supportive care
a. Dental care
b. Enteral and parenteral nutrition
c. Radioprotectants
(1) ASCO clinical practice guidelines
d. Rehabilitation
(1) Speech
(2) Swallow
(3) Voice
e. Disfigurement and dysfunction

*R. Hepatocellular Cancer*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Histologic variants
(2) Grade
b. Genetics and molecular markers
(1) Hemachromatoses
(2) Wilson's disease
(3) Alpha1-antitrypsin deficiency
c. Viral factors
(1) Hepatitis B
(2) Hepatitis C
d. Chemical exposure
(1) Alcohol
(2) Aflatoxin
e. Cirrhosis
3. Prevention
a. Hepatitis B vaccination
b. Alcohol cessation
c. Tobacco cessation
4. Screening
a. Alpha-fetoprotein
5. Diagnosis
a. Clinical signs and symptoms
b. Imaging
c. Biopsy
d. Tumor markers
6. Staging and prognostic factors
a. TNM staging
b. Histologic features
c. Grade
d. Fibrosis score
e. Alpha-fetoprotein
7. Treatment
a. Resectable disease
(1) Surgery
(2) Liver transplantation
b. Unresectable liver-only disease
(1) Ablative procedures
(2) Hepatic arterial embolization
(3) Chemotherapy
c. Metastatic disease
(1) Chemotherapy

*S. Hodgkin's Lymphoma*
1. Epidemiology
a. Incidence rates
b. Mortality rates

2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Histologic types (WHO classification)
   b. Lymphocyte predominant
   c. Lymphocyte depleted
   d. Mixed cellularity
   e. Nodular sclerosis
   f. Nodular lymphocyte predominant
   g. Viral factors
      (1) Epstein Barr virus
3. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
   c. Biopsy
      (1) Immunophenotypic profile
4. Staging and prognostic factors
   a. Ann Arbor staging system with the Cotswold modifications
      (1) Evaluation for B symptoms
   b. Staging procedures
      (1) Serum albumin
      (2) Imaging
   c. Gallium scan
   d. PET scan
   e. CT imaging
      (1) Bone marrow evaluation
   f. International Prognostic System
      (1) Prognostic factors
5. Treatment by stage
   a. Low stage (IA/IIA)
      (1) Very favorable disease
         (a) Extended field radiation therapy
      (2) Favorable disease
         (a) Short course chemotherapy plus involved field radiation therapy
   b. Stage IB/IIB
      (1) Full course chemotherapy
   c. Stage I/II with bulky mediastinal mass
      (1) Full course chemotherapy plus involved field radiation therapy
   d. Stage III/IV
      (1) Full course chemotherapy
   e. Persistent disease after primary chemotherapy
      (1) Radiation therapy
   f. Primary refractory or relapsed disease
      (1) Chemotherapy
      (2) Radiation therapy
      (3) Bone marrow/stem cell transplantation
   g. Frail patients
      (1) Radiation therapy for palliation
6. Follow-up
   a. International Lymphoma Consensus Panel recommendations
7. Supportive care
   a. Fertility and sexuality issues
   b. Treatment-related toxicities
      (1) Second malignancies
      (2) Cardiovascular
      (3) Hypothyroidism
8. Other/special issues
   a. Infertility (amenorrhea and azoospermia)
   b. Secondary malignancies
   c. Elderly patients
   d. Long-term cardiac complications
   e. Radiation therapy-related hypothyroidism
   f. Hodgkin's during pregnancy

*T. Lung Cancer*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Non-small-cell histology and biology
      (1) Adenocarcinoma
         (a) Bronchioalveolar
      (2) Squamous cell
      (3) Large-cell
   c. Small-cell histology and biology
   d. Risk factors
      (1) Lifestyle
         (a) Active and passive smoking
      (2) Environmental
         (a) Asbestos
         (b) Radon
         (c) Other
   e. Genetic and molecular markers
3. Prevention
   a. Smoking cessation
   b. Chemoprevention
4. Screening
5. Diagnosis
   a. Clinical signs and symptoms
   b. Sputum cytology
   c. Imaging
   d. Biopsy
   e. Immunohistochemistry
6. Staging and prognostic factors
   a. Non-small-cell lung cancer (NSCLC)
      (1) TNM system

b. Small cell lung cancer (SCLC)
(1) TNM system and/or limited versus extensive
7. Treatment
a. Non-small-cell lung cancer
(1) Preoperative evaluation
(2) Carcinoma-in-situ
(3) Early-stage disease (stage I, II, III, N0-1)
(a) Surgery
(b) Radiation therapy
(c) Chemotherapy
(4) Stage IIIA and IIIB
(a) Combined chemotherapy and radiation therapy
(b) Surgery
(5) Stage IIIB (with pleural effusion) and stage IV
(a) Chemotherapy
i. First-line
ii. Second-line
iii. Third-line and beyond
(b) Biologic agents
(c) Isolated metastases
b. Small-cell lung cancer
(1) Limited stage
(a) Combined chemotherapy and radiation therapy
(b) Prophylactic brain irradiation
(c) Solitary pulmonary nodule
(2) Extensive disease
(a) First-line chemotherapy
(b) Second-line treatment
(c) Treatment of brain metasteses
8. Follow-up
a. ASCO and other guidelines
9. Supportive care
a. Pulmonary rehabilitation post resection and/or radiation therapy
10. Other/Special issues
a. Bronchoalveolar carcinoma
b. Pancoast tumors

*U. Melanoma*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Dysplastic nevi
(2) Melanoma in situ
(3) Invasive melanoma
b. Risk factors
(1) Skin type
(2) Precursor lesions
(3) Sun exposure
(4) Family history (affected relatives)
c. Genetics - p16 mutations
(1) CDKN2A, MTS-1
(2) CDK4
(3) FAMM (DNS)
3. Prevention
a. Lifestyle changes
(1) Sun avoidance
b. Use of sunscreen
4. Screening
a. Skin examination
b. Genetic testing and genetic counseling
5. Diagnosis
a. Clinical signs and symptoms
(1) ABCD of melanoma identification
b. Biopsy of suspicious lesion (excisional versus incisional versus shave)
c. Imaging
6. Staging and prognostic factors
a. TNM system
b. Location of primary
7. Treatment by stage
a. Melanoma in situ
(1) Surgery
b. Invasive melanoma
(1) Surgery
(a) Wide local excision
(b) Sentinel node mapping
(2) Adjuvant therapy
(a) Interferon
(b) Vaccines
(3) Estimating the benefits of adjuvant therapy
c. Regional nodal metastasis/in-transit metastasis
(1) Surgery
(2) Adjuvant therapy
(a) Interferon
(b) Other
(c) Limb perfusion
d. Metastatic disease
(1) Surgical resection (solitary metastasis)
(2) Chemotherapy
(3) Biologic therapies
(a) Interferon
(b) Interleukin-2
(4) Biochemotherapy
(5) Radiation therapy
8. Follow-up
a. National Comprehensive Cancer Network (NCCN) guidelines

9. Supportive care
   a. Lymphedema
10. Other/special issues
   a. Unknown primary
   b. Mucosal primary
      (1) Oral
      (2) Anorectal
      (3) Vaginal/vulvar
   c. Ocular primary

*V. Mesothelioma (pleural)*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Epithelioid
      (2) Sarcomatoid
      (3) Mixed
   b. Risk factors
      (1) Asbestos
3. Prevention
   a. Decrease occupational exposure
4. Diagnosis
   a. Signs and symptoms
   b. Imaging
   c. Cytology
      (1) Effusion
   d. Biopsy
      (1) Thoracoscopy
5. Staging and prognostic factors
   a. International Mesothelioma Interest Group
6. Treatment by stage
   a. Stage I
      (1) Extrapleural pneumonectomy
      (2) Adjuvant chemotherapy
      (3) Adjuvant radiation therapy
   b. Unresectable disease
      (1) Radiation therapy
      (2) Chemotherapy
      (3) Combination chemoradiotherapy
   c. Recurrent and metastatic disease
      (1) Chemotherapy
      (2) Radiation therapy
7. Supportive care
   a. Management of effusions
8. Special issues
   a. Peritoreal mesothelioma
      (1) Presentation and diagnosis
      (2) Pathology
      (3) Treatment
   b. Benign mesotheliomas

*W. Multiple Myeloma and Plasma Cell Dyscrasias*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Clonal B-cell origin
   b. Risk factors
      (1) Radiation
      (2) Aromatic and organic compounds
   c. Pathogenesis
      (1) IL-6 and other cytokines
      (2) Molecular and genetic alterations
      (3) Adhesion molecules
3. Diagnosis
   a. Clinical signs and symptoms
   b. Serum and urine evaluations for paraproteins
   c. Bone marrow aspirate and biopsy
   d. Skeletal survey
   e. Tissue biopsy if plasmacytoma suspected
   f. Quantitative analysis of serum immunoglobulins
   g. Laboratory studies
   h. Criteria for the different plasma cell dyscrasias
      (1) Multiple myeloma
      (2) Plasmacytoma
      (3) Plasma cell leukemia
      (4) Polyneuropathy, organomegaly, endocrinopathy, monoclonal protein, skin changes (POEMS)
      (5) Primary amyloid
      (6) Cryoglobulinemia
      (7) Monoclonal gammopathy of uncertain significance (MGUS)
      (8) Waldenstrom's macroglobulinemia (lymphoplasmacytic lymphoma with serum immunoglobulin-M)
4. Staging and prognostic factors
   a. Durie-Salmon staging system
   b. Serum creatinine substaging
   c. Prognostic factors
      (1) Paraprotein type and levels
      (2) B2-microglobulin
      (3) Bone marrow plasma cell labeling index
      (4) Bone marrow cytogenetics
      (5) Thrombocytopenia
      (6) C-reactive protein
5. Treatment by stage and type
   a. Multiple myeloma/plasma cell leukemia/POEMS
      (1) Uncomplicated stage I

(a) Observation
(2) Complicated stage I, or stage II-III
(a) Chemotherapy
(b) Biologics
i. Thalidomide with/without dexamethasone + full-dose warfarin
ii. Antiproteosome therapy
(c) Bone marrow/stem cell transplantation
(d) Solitary plasmacytoma
(3) Relapsed or refractory disease
(a) Chemotherapy
(b) Corticosteroids
(c) Thalidomide
(d) Bortezomib
(e) Combination therapy
b. Solitary plasmacytoma
(1) Soft tissue
(a) Radiation therapy
(2) Bone
c. Primary amyloid
(1) Autologous stem-cell transplant
(2) Chemotherapy
(3) Thalidomide
(4) Interferon and dexamethasone
d. Cryoglobulinemia
(1) Systemic therapy with/without plasma exchange
(2) Hepatitis C
e. MGUS (monoclonal gammopathy of unknown significance)
(1) Observation
f. Waldenstrom's marcoglobulinemia
(1) Plasma exchange for hyperviscosity signs/symptoms
(2) Chemotherapy with or without rituximab
6. Follow-up
a. No consensus
7. Supportive care
a. Bisphosphonates
b. Hemodialysis for renal failure
c. Infection
(1) Penicillin (or appropriate substitute) for infection prophylaxis
(2) Hypogammaglobulinemia
(3) Vaccinations against common infectious agents
d. Hyperviscosity

*X. Neuroendocrine (carcinoid) Tumors*

1. Epidemiology
a. Incidence rates
b. Mortality rates
c. Hereditary syndromes
(1) MEN
d. Second neuroendocrine tumor
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) Defined by amine precursor uptake and decarboxylation (APUD) cell of origin
(2) Classification by site of primary
(a) GI tract
i. Foregut
ii. Midgut
iii. Hindgut
(b) Lung
(c) Pancreas
(d) Thymus
(3) Histochemistry and products
(a) Serotonin
(b) Calcitonin
(c) Gastrin
(d) VIP
(e) Glucagon
(f) Insulin
(g) Other
b. Genetic factors
(1) MEN
3. Prevention
a. Genetic counseling
4. Diagnosis
a. Clinical signs and symptoms
(1) Symptoms related to hormone produced
(2) Carcinoid syndrome
(3) Carcinoid crisis
b. Biopsy
(1) Positive staining for chromogranin and neuron-specific enolase
c. Measurement of secretary product
(1) 24-hour 5-hydroxy-indole acetic acid
d. Imaging
e. Endoscopy as appropriate by site
f. Radiolabeled octreotide for somatostatin receptor scintigraphy
5. Screening and prognostic factors
a. No standard staging
b. Prognostic factors
(1) 5HIAA levels
(2) Primary site
(3) Liver metastases
(4) Histologic features
6. Treatment
a. Observation

b. Surgery
c. Somatostatin analog
d. Chemotherapy
e. Palliation of symptoms
(1) Diarrhea
(2) Bronchospasm
(3) Cardiac disease
f. Interferon
g. Liver directed therapy
7. Follow-up
a. No standard follow-up

*Y. Non-Hodgkin's Lymphoma*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
(1) WHO classification
(a) Lymphocyte lineages
i. B-cell (pre- and mature types)
ii. T-cell [pre- and mature (peripheral)] types
iii. NK-cell
b. Genetic factors
(1) Chromosomal translocations
(2) Oncogene amplification
c. Immunodeficiency
(1) Inherited immunodeficiency states
(2) Acquired immunodeficiency states
d. Infectious agents
(1) Viral
(2) Bacterial
3. Prevention
a. Treatment of Helicobacter pylori benign gastric disease
4. Diagnosis
a. Clinical signs and symptoms
b. Biopsy
(1) Fine needle aspiration
(2) Excisional lymph node biopsy (gold standard)
(3) Bone marrow aspirate and biopsy
(4) Typical diagnostic profiles
(a) Morphology/histology
(b) Immunophenotyping
(c) Cytogenetic analysis
(d) Molecular diagnostics
c. Imaging
5. Staging and prognostic factors
a. Ann Arbor Staging system with Cotswold modifications
(1) Procedures
(a) Serum LDH
(b) Bone marrow biopsy
(c) Lumbar puncture
(d) PET scan
(e) CT scan
b. Prognostic factors
(1) Indolent versus aggressive disease
(2) Histology
(a) Low-grade
(b) Intermediate-grade
(c) High-grade
c. International Prognostic Index
6. Treatment by histologic grade
a. Indolent disease
(1) Observation
(2) Chemotherapy
(3) Radiation therapy
(4) Immunotherapy
(5) Bone marrow/stem-cell transplantation
(a) Relapsed
(b) Refractory
(c) Histologically transformed
(6) Monoclonal antibodies
(7) Combination therapy
b. Aggressive disease
(1) Intermediate grade
(a) Chemotherapy
(b) Immunotherapy
(c) Monoclonal antibodies
(d) Combination therapy
(e) Radiation therapy
(2) High grade
(a) Chemotherapy
i. CNS prophylaxis
(b) Chemotherapy with monoclonal antibodies
(3) Relapsed or refractory disease
(a) Salvage chemotherapy
(b) Bone marrow/stem cell/allogeneic transplantation
c. Special histologies
(1) Mucosa-associated lymphoid tissue (MALToma)
(2) HIV-associated (see AIDS malignancies)
(3) Human T-lymphotropic virus type-1 associated (adult T-cell leukemia/lymphoma)
(4) Primary testicular large-cell lymphoma

(5) Mycosis fungoides
(6) Primary CNS lymphoma
(7) Post-transplant lymphoproliferative syndromes
(8) Primary sclerosing mediastinal B-cell lymphoma
(9) Primary cutaneous lymphomas
(10) Gastric lymphoma
(11) Other primary site

7. Follow-up
   a. International Lymphoma Consensus Panel recommendations
8. Supportive care
   a. Fertility and sexuality
   b. Secondary malignancies
   c. Long-term cardiac complications

*Z. Ovarian Cancer*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Histologic variant (WHO classification)
   b. Genetics
      (1) BRCA1
      (2) BRCA2
      (3) Family history
      (4) Hereditary nonpolyposis colorectal cancer syndrome
   c. Genetic and molecular factors
3. Prevention
   a. Prophylactic oophorectomy in high-risk women
   b. Chemoprevention
      (1) Oral contraceptives
      (2) Others
   c. Genetic counseling
4. Screening
   a. No standard
   b. Clinical guidelines for women at high-risk
5. Diagnosis
   a. Clinical signs and symptoms
   b. Imaging
      (1) Endovaginal ultrasound with Doppler
   c. Diagnostic laparoscopy and biopsy
   d. Surgery
   e. Serum marker
      (1) CA-125
      (2) B HCA Need to spell out
      (3) APP Need to spell out
   f. Prognostic factors
      (1) Histologic factors
      (2) Postoperative residual disease volume
      (3) Patient age
6. Staging and prognostic factors
   a. International Federation of Gynecology and Obstetrics (FIGO) stage
      (1) Clinical
      (2) Pathologic
7. Treatment by stage
   a. Stage I
      (1) Surgery
      (2) Chemotherapy
      (3) Radiation therapy
   b. All stages except FIGO stage IA, well-differentiated cancers
      (1) Surgery
      (2) Chemotherapy
         (a) Induction
         (b) Consolidation
         (c) Maintenance
      (3) Radiation therapy
         (a) External beam
         (b) Intraperitoneal
      (4) Combination therapy
   c. Secondary surgical procedures
      (1) Resection of residual mass
      (2) Second-look surgery
   d. Recurrent or metastatic disease
      (1) Chemotherapy
      (2) Radiation therapy
      (3) Hormonal therapy
8. Follow-up
9. Supportive care
   a. Treatment-related toxicities
   b. Refractory ascites
   c. Intestinal and ureteral obstruction
      (1) Premature menopause
      (2) Neuropathy
10. Other/special issues
   a. Nonepithelial cancer
      (1) Stromal
         (a) Diagnosis
         (b) Biology
         (c) Chemotherapy
      (2) Germ cell tumors
         (a) Diagnosis
         (b) Therapy
   b. Low-malignant potential cancers (borderline)
   c. Fallopian tube tumors
   d. Primary peritoneal tumors

AA. *Pancreatic Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Progression from ductal epithelial dysplasia
   c. Genetic and molecular factors
      (1) p16 mutations
      (2) Other
   d. Pancreatic cystic neoplasms
3. Risk factors
   a. Tobacco use
   b. Pancreatitis
   c. Genetic factors
      (1) BRCA2
      (2) Familial pancreatic cancer
      (3) MEN
      (4) Others
4. Prevention
   a. Smoking cessation
   b. Genetic counseling
5. Diagnosis
   a. Clinical signs and symptoms
   b. Endoscopy and biopsy
      (1) ERCP
   c. Laparoscopy
   d. Imaging
   e. Imaging-directed biopsy
   f. Surgery
6. Staging and prognostic factors
   a. TNM
7. Treatment
   a. Resectable disease-surgery
      (1) Observation
      (2) Chemotherapy
         (a) Preoperative
         (b) Postoperative
      (3) Radiation therapy
         (a) Postoperative
      (4) Combined radiation therapy/chemotherapy
   b. Unresectable disease
      (1) Radiation therapy and chemotherapy
      (2) Chemotherapy
   c. Metastatic and recurrent disease
8. Follow-up after curative resection
9. Supportive care
   a. Pain
      (1) Celiac block
   b. Obstruction
      (1) Biliary stenting
      (2) Endoscoping stenting of gastric outlet obstruction
   c. Malabsorption

AB. *Penile Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Human papilloma virus (HPV)
   c. Circumcision
   d. Premalignant lesions
   e. Lifestyle factors
3. Prevention
   a. Lifestyle changes
      (1) Sexual practices
   b. Circumcision
4. Screening
   a. Identity premalignant lesions
5. Diagnosis
   a. Clinical signs and symptoms
   b. Biopsy
6. Staging
   a. TNM system
   b. Prognostic factors
7. Treatment by stage
   a. Treatment of the primary lesion
      (1) Surgery
      (2) Surgery with radiation therapy
   b. Management of regional nodes
      (1) Sentinel node evaluation
   c. Metastatic or recurrent disease
      (1) Chemotherapy
8. Supportive care
   a. Sexuality
   b. Ureteral stenosis

AC. *Prostate Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
   c. Differences among ethnic groups
   d. Genetic abnormalities
   e. Age distribution
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Prostatic intraepithelial neoplasia
   b. Genetic factors
      (1) Family history
   c. Risk factors
      (1) Established risk factors
      (2) Dietary factors
3. Prevention
   a. Chemoprevention

(1) Finasteride
b. Dietary factors
4. Screening
a. PSA
(1) PSA velocity
(2) Free PSA
b. Digital rectal examination
c. Transrectal ultrasound
5. Diagnosis
a. Clinical signs and symptoms
b. Digital rectal examination
c. PSA versus modifications of PSA (ie, free PSA)
d. Transrectal ultrasound guided biopsy
e. Imaging
6. Staging and prognostic factors
a. TNM system
b. Prognostic factors
(1) Gleason grading
(2) DNA analysis by flow cytometry
(3) PSA
(4) Predictive models for organ-confined versus nonorgan confined disease
7. Treatment by stage
a. Organ confined
(1) Observation
(2) Radiation therapy
(a) External beam
(b) Brachytherapy
(c) Radioactive seeds
(3) Surgery
(4) Cryosurgery
(5) Hormonal therapy
(a) Neoadjuvant
(b) Adjuvant
b. Rising PSA level
(1) Guideline - prostate specific antigen working group
c. Locally recurrent
(1) Surgery
(2) Radiation therapy
(3) Hormonal therapy
d. Metastatic disease
(1) Surgery
(2) Radiation therapy
(3) Hormonal therapy
(a) Early versus delayed
(b) Antiandrogen
(c) Gonadatrophin releasing hormone agonists
(d) "Maximal" androgen blockade
(e) Other
(4) Chemotherapy
(5) Bisphosphonates
(6) Radiopharmaceuticals
8. Follow-up
a. PSA
b. Imaging techniques
(1) Bone scan
(2) Prostascint scan
9. Supportive care
a. Sexual function
b. Urinary incontinence
c. Proctitis/diarrhea
d. Urinary frequency
e. Osteoporosis
f. Hot flashes
10. Special issue
a. Small-cell carcinoma

*AD. Renal Cell Cancer*

1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Pathology
b. Genetic factors
(1) Chromosomal abnormalities
(2) Von Hippel-Lindau
(3) Li-Fraumeni
c. Risk factors
(1) Family history
(2) Tobacco use
(3) Environmental exposures
(4) Occupation exposures
3. Prevention
a. Lifestyle changes
(1) Smoking cessation
b. Monitoring of those at increased risk
(1) First-degree relatives
(2) Genetic syndromes
4. Screening
a. Familial and genetic aspects
b. Increased detection on CT scans performed for other purposes
5. Diagnosis
a. Classic signs and symptoms
b. Imaging
c. Surgery
6. Staging and prognostic factors
a. TNM system
b. Prognostic factors
(1) Histology
c. Prognostic factors with metastatic disease
7. Treatment by stage
a. Localized disease
(1) Surgery

(2) Management of vena cava involvement
b. Metastatic disease
(1) Surgery
(2) Biologic response modifiers
(a) Interleukin-2
(b) Interferon
(c) Newer cytokines
8. Follow-up
9. Supportive care
10. Other/special issues
a. Bilateral renal tumors
b. Wilms' tumor
c. Oncocytoma
d. Collecting system tumor

*AE. Salivary Gland Tumors*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Histologic types
3. Diagnosis
a. Physical examination
(1) Major salivary glands
(2) Minor salivary glands
b. Imaging
4. Staging
a. TNM
5. Treatment
a. Resectable disease
(1) Surgery
(2) Radiation
b. Unresectable/locally advanced disease
c. Metastatic disease
6. Other/special issues
a. Paraneoplastic syndromes
(1) Pure Red Cell Aplasia
(2) Myasthenia Gravis

*AF. Soft Tissue Sarcomas*
1. Epidemiology
a. Incidence rates
b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
a. Histologic subtypes
(1) Fibrosarcoma
(2) Leiomyosarcoma
(3) Rhabdosarcoma
(4) Angiosarcoma
(5) GIST (gastrointestinal stromal tumors)
(6) Other
b. Cytogenetics
3. Risk factors
a. Genetic syndromes
(1) Li-Fraumeni syndrome
(2) Neurofibromatosis type I
(3) Retinoblastoma
(4) Gardner's syndrome
(5) Werner's syndrome
(6) Gorlin's syndrome
b. Environmental exposure
(1) Vinyl chloride
(2) Radiation
c. Lymphedema
d. Human herpes virus
4. Diagnosis
a. Clinical signs and symptoms
b. Biopsy
c. Imaging
d. Chromosomal signatures/gene mutations
5. Staging and prognostic factors
a. AJCC staging system
b. Prognostic factors
(1) Histologic subtype
(2) Patient age
(3) Primary site
(4) Molecular markers
6. Treatment
a. Localized primary disease
(1) Surgery
(a) General issues
(b) Amputation
(c) Combined modality limb-sparing treatment
(2) Radiation therapy
(a) Essential elements in treatment planning
(b) Preoperative
(c) Postoperative
(3) Chemotherapy
(a) Adjuvant
(b) Neoadjuvant
(c) Intraarterial administration
(d) Hyperthermia and limb perfusion
b. Local recurrence
(1) Surgery
(a) Dermatofibrosarcoma protuberans
c. Metastatic disease or distant recurrence
(1) Surgery
(2) Chemotherapy
(a) Single agent
(b) Combination
(3) Radiation therapy
7. Follow-up
8. Other/special issues
a. GIST

*AG. Thymomas and Thymic Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
3. Risk factors
4. Diagnosis
   a. Clinical signs and symptoms
      (1) Associated systemic syndromes
         (a) Autoimmune/immune (ie, myasthenia gravis)
         (b) Endocrine
         (c) Other
   b. Imaging
   c. Biopsy
5. Staging and prognostic factors
   a. TNM system
   b. Resectable versus nonresectable
   c. Prognostic factors
6. Treatment by stage
   a. Localized disease
      (1) Surgery
      (2) Radiation therapy
      (3) Chemotherapy
      (4) Combined-modality therapy
   b. Recurrent or metastatic disease
      (1) Surgery
      (2) Radiation therapy
      (3) Chemotherapy

*AH. Thyroid Cancer*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
      (1) Papillary carcinoma
      (2) Follicular carcinoma
      (3) Anaplastic carcinoma
      (4) Medullary carcinoma
   b. Genetics and genetic syndromes
      (1) Familial medullary cancer/multiple endocrine neoplasia (MEN)
      (2) RET proto-oncogene in medullary thyroid cancers
      (3) K-ras in radiation therapy-induced cancers
   c. Assessment of risk
      (1) Family history
         (a) MEN syndromes
         (b) Familial adenomatous polyposis
         (c) Cowden's Disease
      (2) Radiation exposure
3. Diagnosis
   a. Evaluation of a thyroid nodule
   b. Imaging studies
   c. Biopsy
      (1) Use of FNA
   d. Calcitonin stimulation testing
4. Screening
   a. Genetic testing for medullary thyroid cancer
   b. Calcitonin stimulation of high-risk family members
5. Staging
   a. TNM staging
6. Treatment
   a. Well-differentiated cancers
      (1) Partial or complete thyroidectomy with/without lymph node
      (2) Role of $I^{131}$ (iodine 131)
   b. Anaplastic cancers
      (1) Thyroidectomy and lymph node dissection
      (2) Surgery for maintenance of airway
      (3) Doxorubicin and external beam radiation therapy
   c. Medullary thyroid cancer
      (1) Thyroidectomy and lymph node dissection
      (2) Resection guided by venous sampling after calcitonin stimulation
7. Follow-up
   a. Determination of thyroid hormone status
   b. Hypocalcemia after total thyroidectomy
8. Supportive care
   a. Thyroid and calcium supplementation

*AI. Unknown Primary Site*
1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Histologic types
      (1) Undifferentiated malignancy
      (2) Undifferentiated carcinoma
      (3) Small blue cell tumor
      (4) Adenocarcinoma
      (5) Squamous cell carcinoma
      (6) Germ cell tumor
   b. Diagnostic techniques
      (1) Immunohistochemical stains
      (2) Molecular pathology
      (3) Electron microscopy
   c. Metastatic patterns predictive of potentially curable diseases

3. Diagnostic evaluation
   a. History and physical examination
      (1) Source of the unknown primary
   b. Laboratory
      (1) Sensitivity and specificity of tumor markers in predicting the source of an unknown primary tumor
   c. Imaging
      (1) PET
      (2) MRI
      (3) CT
      (4) Nuclear medicine
   d. Specific tumor characteristics that suggest the primary site
4. Treatment
   a. Surgery
   b. Chemotherapy-responsive tumors
   c. Radiation therapy

*AJ. Uterine (endometrial) Cancer*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Genetics and genetic syndromes
      (1) HNPCC
   c. Assessment of Risk
      (1) Unopposed estrogens and tamoxifen
      (2) Obesity
      (3) Diabetes mellitus
      (4) Hypertension
3. Diagnosis
   a. Postmenopausal and abnormal vaginal bleeding
   b. Imaging
      (1) Ultrasonography
      (2) MRI
   c. Endometrial biopsy
4. Staging
   a. FIGO surgical staging
   b. Lymph node sampling
5. Treatment by stage
   a. Stage I
      (1) Curative surgery
   b. Positive lymphovascular space and deep myometrial invasion
      (1) Radiation therapy
   c. FIGO stages III and IV
      (1) Chemotherapy and radiation therapy
6. Other/special issues
   a. Uterine sarcoma
      (1) Leiomyosarcoma
         (a) Diagnosis/history
         (b) Adjuvant therapy
         (c) Local therapy
         (d) Recurrent disease
      (2) Mixed mesodermal tumor
         (a) Diagnosis
         (b) Histology
         (c) Adjuvant therapy
         (d) Recurrent disease
      (3) Other sarcomas
   b. Gestational trophoblastic disease
      (1) Diagnosis
      (2) Low-risk disease
      (3) High-risk disease
      (4) Recurrent disease
      (5) Complications

*AK. Vulvar and Vaginal Cancers*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates
2. Pathogenesis, pathology, and tumor biology
   a. Pathology
   b. Pathogenesis
      (1) Infection with specific HPV types, and molecular sequelae
   c. Assessment of risk
      (1) Exposure to specific HPV types
      (2) Immunosuppression
      (3) Tobacco use
3. Diagnosis
   a. Gynecologic examination
   b. Biopsy
4. Staging
   a. Clinical FIGO staging
5. Treatment by stage
   a. Microinvasive stage I
      (1) Techniques for excising
   b. Early stages
      (1) Surgery
   c. Locally advanced stages
      (1) Surgery with or without chemotherapy and radiation therapy
6. Other/special issues
   a. Lymphedema
   b. Vaginal stenosis

## V. OTHER TREATMENT RELATED ISSUES

*A. Oncologic Emergencies*

1. Epidemiology
   a. Incidence rates
   b. Mortality rates

c. Association of specific primary tumors to produce acute medical problems
(1) Melanoma and brain metastasis
(2) Squamous cell cancers and hypercalcemia

2. Pathogenesis, pathology, and tumor biology
a. Anatomy and pattern of metastasis with emergent problems
(1) Batson's plexus and spinal metastasis with prostate cancer
b. Cytokines in hypercalcemia

3. Risk factors
a. Advanced stage and uncontrolled disease
b. Unique primary tumors/clinical settings for acute medical problems
(1) Tumor lysis with high-grade lymphomas undergoing chemotherapy

4. Diagnosis
a. Clinical examination to identify patients at risk for developing an emergent medical problem
(1) Back pain antedating signs of spinal cord compression
b. Appropriate diagnostic tests
(1) MRI for brain metastases

5. Staging and prognostic factors
a. Disease status and underlying malignancy

6. Treatment by stage
a. Based on definitive diagnosis
b. Underlying malignancy
(1) Acute medical problems
(a) Palliative treatment
i. Hydration and bisphosphonates for hypercalcemia

7. Supportive care
a. Palliation

8. Other/special issues
a. Brain metastasis
(1) Surgical resection before radiation therapy
b. Spinal cord compression
(1) Surgical stabilization before radiation therapy
c. Pericardial tamponade
(1) Video-assisted thoracoscopic window
d. Bilateral ureteral obstruction
(1) Stents
e. Tumor lysis
(1) Dialysis
(a) Severe electrolyte abnormalities
(b) Ureteral obstruction
f. Hypercalcemia
(1) Bisphosphonates
g. Superior vena cava syndrome

*B. Paraneoplastic Syndromes*

1. Epidemiology
a. Incidence rates
b. Mortality rates
c. Specific syndromes with underlying tumor types
(1) Hypercalcemia and squamous cell cancers
(2) Hyperviscosity syndrome and gastrointestinal adenocarcinomas

2. Pathogenesis, pathology, and tumor biology
a. Cytokines
(1) Cancer anorexia/cachexia syndrome
(2) Hypercalcemia and myeloma
b. Immunologic basis
(1) Anti-hu antibodies
(2) Myasthenic syndrome

3. Risk factors
a. Advanced stage and uncontrolled disease
b. Primary tumor types recognized to produce
(1) Hypercoagulable states
(a) Primary lung cancer
(b) Gastrointestinal cancers

4. Diagnosis
a. Suggestion of underlying malignancy
(1) Inconsistency between the syndrome and the usual natural history of the malignancy
b. Association of paraneoplastic syndromes with every organ system
c. Cutaneous syndromes associated with cancer
d. Appropriate tests
(1) EMG in myasthenic syndrome
(2) Anti-yo antibodies

5. Staging and prognostic factors
a. Assessment of disease status to determine treatment of underlying malignancy
b. Measurement of antibody and/or hormone production when indicated

6. Treatment by stage
a. Based on definitive diagnosis
b. Underlying malignancy
(1) Paraneoplastic syndrome
(a) Palliative treatment
i. Corticosteroids for polymyositis

ii. Bisphosphonates for hypercalcemia
7. Supportive care
   a. Plasmapheresis in antibody-mediated processes
      (1) Myasthenia gravis
      (2) Thymoma
   b. Tumor debulking to control humoral-mediated syndromes
      (1) Diarrhea with VIPomas
8. Other/special issues

*C. Stem Cell and Bone Marrow Transplantation*
1. General principles
   a. Autologous
   b. Allogeneic
2. Complications
   a. Acute
      (1) Veno-occlusive disease
      (2) Graft-versus-host disease
      (3) Infection
   b. Long-Term
      (1) Infertility
      (2) MDS

*D. Local Therapy of Metastatic Cancers*
1. Liver metastases
2. Lung metastases
3. Brain metastases
4. Bone metastases

*E. Management of Malignant Effusions*
1. Pleural
2. Pericardial
3. Ascitic

## VI. COMPLICATIONS

*A. Infections*
1. Risk factors
2. Bacterial
3. Viral
4. Fungal
5. Neutropenic fever

*B. Other Complications of Treatment*
1. Adrenal Insufficiency
2. Alopecia
3. Bleeding and thrombosis
4. Cardiac toxicity
5. Catheter management
   a. Infection
   b. Thrombosis
   c. Extravasation
6. Drug extravasation
7. Fatigue
8. Hepatotoxicity
9. Hypersensitivity
10. Hypothyroidism
11. Infertility/sterility/sexuality
12. Lymphedema
13. Nephrotoxicity
14. Myelosuppression
15. Nausea and vomiting
16. Neurotoxicity
17. Oral complications
    a. Mucositis
    b. Xerostomia
18. Pulmonary toxicity
19. Second malignancy
20. Skin toxicity

## VII. SUPPORTIVE CARE

*A. Pain*
1. Comprehensive assessment
   a. Location and severity
      (1) Objective scale
         (a) Numeric
         (b) Thermometer
   b. History and physical examination
2. Management
   a. World Health Organization analgesic pain ladder
      (1) Acetaminophen
      (2) Nonsteroidal anti-inflammatory agents
      (3) Opioids
         (a) Pharmacology
            i. Efficacy
            ii. Toxicity
         (b) Legal and regulatory issues
   b. Adjuvant drugs
      (1) Anticonvulsants
      (2) Anxiolytics
   c. Treatment selection
      (1) Comorbidities
         (a) Psychologic
         (b) Medical
            i. AIDS
         (c) Surgical
      (2) Physiology
      (3) Age
      (4) Other drugs
   d. Multimodal treatment
      (1) Radiation therapy
      (2) Surgery
      (3) Radiopharmaceuticals
      (4) Epidural anesthesia
   e. Consultation

*B. Treatment of Symptoms and Cancer-Related Complications*

1. Anorexia, cachexia
2. Coagulation disorders
3. Delirium
4. Depression
5. Diarrhea/constipation
6. Dysphagia
7. Dyspnea
8. Fatigue
9. Malignant bowel obstruction
10. Nausea and vomiting

C. *Hematopoietic Growth Factors*
1. General principles and biology
2. Indications
   a. ASCO guidelines
      (1) Erythropoietin, darbepoetin
   b. Granulocyte stimulating factors

D. *Transfusion Therapy and Apheresis*
1. Red cell transfusion
2. Platelet transfusion
3. Granulocyte transfusion
4. Preparation and administration of products
5. Apheresis

E. *Nutritional Support*
1. Dietary assessment and counseling
2. Enteral nutrition
3. Parenteral nutrition
4. Pharmacologic interventions

F. *Sexual Problems and Fertility*

G. *End-of-Life Care*
1. Patient assessment
2. Stopping treatment
3. Hospice and home care
4. The bereavement process

H. *Complementary and Alternative Medicine*

I. *Unproven Methods of Treatment*

## VIII. SURVIVORSHIP

A. *Follow-Up Care at End of Treatment*
1. Surveillance
2. Screening for second cancers
3. Monitoring for short and long-term toxicity

B. *Prevention of Second Malignancies*

C. *Special Populations*
1. Hereditary predisposition

D. *Psychosocial Issues*

E. *Employment and Insurance*

F. *Information and Education*

G. *Advocacy*

## IX. PSYCHOSOCIAL ASPECTS OF CANCER

A. *Psychosocial Support*
1. Incidence and relevance of psychosocial distress
   a. Anxiety, depression, adjustment disorders
   b. Serious mental illness
2. Managing the anxious and difficult patient and family members
3. When to make a referral to a mental health care professional
4. Identification of mental health professional and other resources
5. Introducing the need for a mental health referral
6. Healthy self-care
   a. Managing demands
   b. Setting limits
   c. Emotional regulation
   d. Coping and problem-solving skills

B. *Psychosocial Stages of Cancer*

C. *Cultural Issues That Impact on the Management of Disease*

D. *Spiritual Conflicts Associated With the Diagnosis and Treatment of Cancer*

E. *Adaptive and Maladaptive Behavior in Coping With Disease*

F. *Acceptable Coping Mechanisms for Patients and Families Within the Context of the Cancer Diagnosis*

G. *Indications and Uses of Psychotropic Drugs*
1. Delirium
2. Depression
3. Dementia

H. *Physicians' Personal Coping*

I. *Integration of Care*
1. Family members
2. Pastoral care
3. Nursing support
4. Hospice
5. Cancer support groups

## X. BIOETHICS, LEGAL, AND ECONOMIC ISSUES

A. *Legal Requirements for Obtaining Informed Consent*

B. *Research Ethics*

C. *Legal Issues and Life Support and Withdrawal of Support*

D. *Cost Effectiveness and Cancer Prevention and Treatment*

E. *Conflict of Interest*

F. *Professionalism*
1. The Medical Professionalism Charter
   a. Fundamental principles
   b. Professional responsibilities

G. *Medical Humanism*

## XI. COMMUNICATION SKILLS

A. *Communication Along the Disease Trajectory*
1. Prognosis
2. Treatment options
3. Patient's goals of care
4. Cancer recurrence
5. Shifting treatment goals

B. *Delivering Bad News*
1. Patient's coping skills
2. Support to family
3. Preference for end-of-life care
   a. Explaining advanced directives

C. *Cross Cultural Issues*

D. *Multidisciplinary Teams*
1. Communicating within the team

## XII. PROCEDURES

A. *Chemotherapy Administration*
1. Indwelling venous catheters
   a. Accessing
   b. Care
2. Handling
3. Disposal

B. *Bone Marrow Aspiration, Biopsy, and Interpretation*
1. Performance
2. Interpretation

C. *Lumbar Puncture and Ommaya Reservoir*
1. Performance of a lumbar puncture
2. Administration of chemotherapy by the lumbar route
3. Use of the Ommaya reservoir

D. *Tumor Assessment*
1. Measurement of masses
2. Imaging
   a. CT
   b. MRI
   c. Nuclear medicine
   d. Other imaging

E. *Thoracentesis*
1. Performance of thoracentesis
2. Administration of chemotherapy to the pleural cavity

F. *Paracentesis*
1. Performance of paracentesis
2. Administration of chemotherapy to the abdominal cavity

## XIII. INFORMATION SYSTEMS IN ONCOLOGY

A. *Patient Resources*

B. *Health Care Professional Resources*

C. *The World Wide Web*

D. *ASCO on the Web*

E. *Locating an Oncologist*

F. *Locating Clinical Trials*

## XIV. GERIATRIC ONCOLOGY

A. *Unique Issues of Cancer and Aging*
1. Epidemiology
   a. Age-adjusted incidence rates
   b. Age-adjusted mortality rates
2. Biology of cancer and aging
   a. Susceptibility to cancer
   b. Molecular mechanisms leading to malignant transformation
3. Physiologic changes in aging
   a. Multiorgan system changes
   b. Increased risks
      (1) Falls
      (2) Sarcopenia
      (3) Malnutrition
      (4) Acute infection
      (5) Hospitalization
      (6) Dependency
      (7) Death
4. Drug therapy and aging
   a. Impact of comorbidities and functional changes
      (1) Treatment planning
      (2) Drug dosing
      (3) Drug toxicity
   b. Impact of polypharmacy in prescribing anticancer agents
   c. Efficacy and safety of opioids

B. *Patient Assessment*
1. Clinical examination
   a. Comprehensive Geriatric Assessment (CGA)
   b. Functionality
2. Geriatric syndromes
   a. Impact on treatment planning
3. Comorbidities

a. Impact on treatment
b. Impact on patient-provider communication

4. Frailty

C. *Psychosocial Implications of Cancer in the Elderly*

1. Unique care needs
   a. Transportation
   b. Nursing care
   c. Personal care
   d. Homemaking
   e. Legal affairs
   f. Financial affairs
2. Depression and delirium

## Appendix

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