



# Leukemia and Lymphoma Overview

Michael Perry, M.D., M.S., M.A.C.P.  
University of Missouri/Ellis Fischel Cancer Center

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*Slide 1*

## Topics

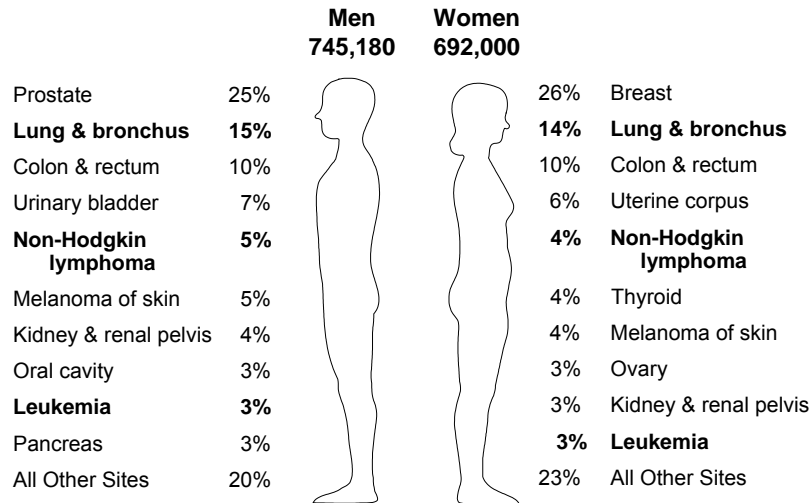
- Acute leukemias
  - Acute lymphocytic leukemia (ALL)
  - Acute myelogenous (granulocytic) leukemia (AML or AGL, rarely “ANLL”)
- Chronic leukemias
  - Chronic myelogenous (granulocytic) leukemia (CML, or CGL)
  - Chronic lymphocytic leukemia (CLL)
- Multiple myeloma (MM)

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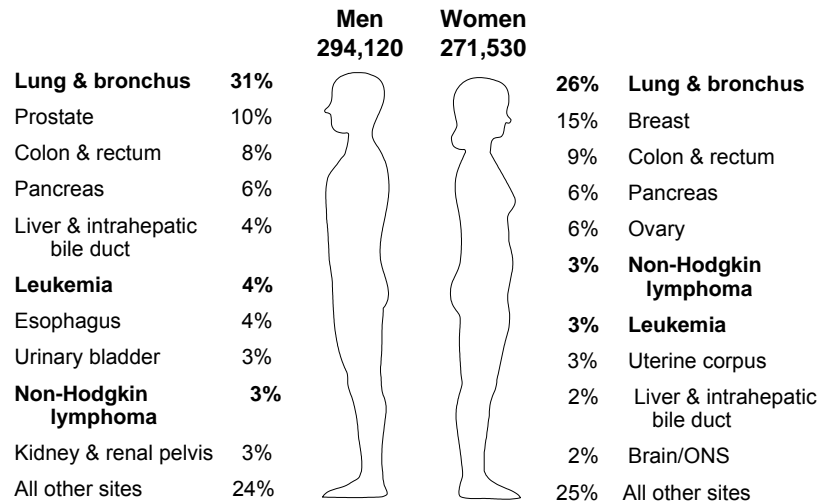
*Slide 2*

## 2008 Estimated US Cancer Cases\*



\*Excludes basal and squamous cell skin cancers and in situ carcinomas except urinary bladder.  
Source: American Cancer Society, 2008.

## 2008 Estimated US Cancer Deaths\*



ONS=Other nervous system.  
Source: American Cancer Society, 2008.

## Diagnostic Studies

- Peripheral blood
- Bone marrow
- Cytogenetics
- Flow cytometry
- Cytochemistry (special stains)
- Molecular markers
- For myeloma - SPEP, UPEP, Quantitative immunoglobulins, immunoelectrophoresis

## Staging

- Most leukemias are not staged
- Chronic lymphocytic leukemia (CLL)
  - 5 Stages (Rai-Sawitsky) classification), 0 - IV
  - Based upon lymphocyte numbers, adenopathy, anemia, thrombocytopenia
- Multiple myeloma
  - 3 stages, based upon multiple factors: hemoglobin, M protein, calcium, bone lesions

## Prognostic Factors

- Vary with leukemia type
  - AML
    - 7 subtypes, M1 through M7 (M3 especially important)
    - Cytogenetics
  - ALL
    - Cytogenetics
  - CGL
    - Stage: Chronic, accelerated, Blast crisis

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## Treatment – Acute Leukemias

- Chemotherapy
  - Induction
  - Consolidation/re-induction
  - Maintenance
- Central nervous system prophylaxis-  
intrathecal chemotherapy
- Supportive therapy
  - Growth factors

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## **Other Treatments – Acute Leukemias**

- High dose chemotherapy with stem cell rescue-autologous or allogeneic
- Monoclonal antibodies – Mylotarg, etc.
- For acute promyelocytic leukemia (M3)-All-trans retinoic acid (ATRA)

## **Treatment – Chronic Leukemias**

- CLL - chlorambucil, cyclophosphamide, prednisone, fludarabine, rituximab, Campath 1-H, now combinations
- CML - Hydroxyurea,  $\alpha$ -interferon, Gleevec
- MM - alkeran/prednisone, thalidomide, dexamethasone, VAD (vincristine, adriamycin, dexamethasone), bortezomib, stem cell transplant

## **Response Assessment**

- Complete (hematologic) response
- Partial response
- New categories of response: CR-platelet
- Relapse

## **Follow-up**

- Blood counts
- Bone marrows
- Cytogenetics
- Other genetic markers
- Myeloma - SPEP, UPEP, bone x-rays,
  - $\beta$ 2 microglobulin



## **CALGB CRA Orientation Disease Modules Lymphomas**

### **Two Major Types**

- Hodgkin's Disease (HD)
- Non-Hodgkin Lymphomas (NHL)

## **Lymphoma Pathology**

- Accurate diagnosis is key to good clinical trials and slide may be reviewed centrally to assure the correct diagnosis.
- Cytogenetics and molecular diagnostics may be needed to adequately diagnose a lymphoma.
- There are also benign conditions that mimic lymphomas.

## **Diagnostic Studies**

- Lymph node biopsy
- Bone marrow aspiration and biopsy
- Flow cytometry
- Genetic studies
- Cytogenetics

## Staging Studies

- Bone marrow aspiration and biopsy
- CTs
- Radionuclide scans: bone, Gallium, PET
- GI x-rays
- Spinal fluid analysis
- Others

## Staging

- Same system for HD and NHL
- Four Stages
  - I: One lymph node group
  - II: Two lymph node groups
  - III: Nodes above and below diaphragm
  - IV: Organ involvement
- Add "A" for no systemic symptoms. "B" for systemic symptoms of documented fever, night sweats, weight loss, "E" for extranodal disease, "X" for bulky adenopathy

## Prognostic Factors

- Stage - which factors in systemic symptoms, extranodal disease, and tumor bulk
- Histologic subtype
  - Hodgkin's Disease
    - Lymphocyte dominant
    - Nodular sclerosing
    - Mixed cellularity
    - Lymphocyte depletion

## Prognostic Factors

- Stage - which factors in systemic symptoms, extranodal disease, and tumor bulk
- Histologic subtype
  - Non-Hodgkin Disease (up to 17 subtypes)
    - Follicular/diffuse
    - Cell type
    - Patterns

## Prognostic Factors

- Histologic subtype
  - Non-Hodgkin Disease - many subtypes and variations
    - Low grade (indolent)
    - Intermediate grade
    - High grade (aggressive)

## Treatment

- Chemotherapy
- Radiation therapy
- Monoclonal antibodies - with or without radiolabel or toxin
- High dose chemotherapy with stem cell rescue

## Response Assessment

- Complete response
- Partial response
- Stable disease
- Progression/relapse

## Special Considerations

- Leukemia <-> lymphoma?
- Transformation from one cell type to another
- Composite lymphomas
- HD - nodal distribution until disseminated
- NHL - frequently extranodal, and may be only extranodal

## Follow-up

- Relapse (Progression free survival)
- Overall survival
- Toxicity (including second malignancies, fertility)
- Quality of life

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