BLOOD CANCER 101: THE BASICS ON DISEASE, TREATMENT, AND THE ROLE OF THE HEALTHCARE PROVIDER

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WELCOME AND INTRODUCTIONS

Amanda O’Neill, LMSW

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LEARNING OBJECTIVES

- Describe the different blood cancers, including diagnosis and treatment
- Describe the psychosocial impact of a blood cancer diagnosis
- Explain the role of the social worker, nurse, and other members of the healthcare team
- Educate patients and caregivers about clinical trial participation
- List resources for patients with blood cancers and how to access them

SPEAKERS

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Lynn Steele, LSW, OSW-C

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BEFORE WE GET STARTED

Is there a screening test for blood cancer?

A) YES

B) NO

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A) YES

B) NO

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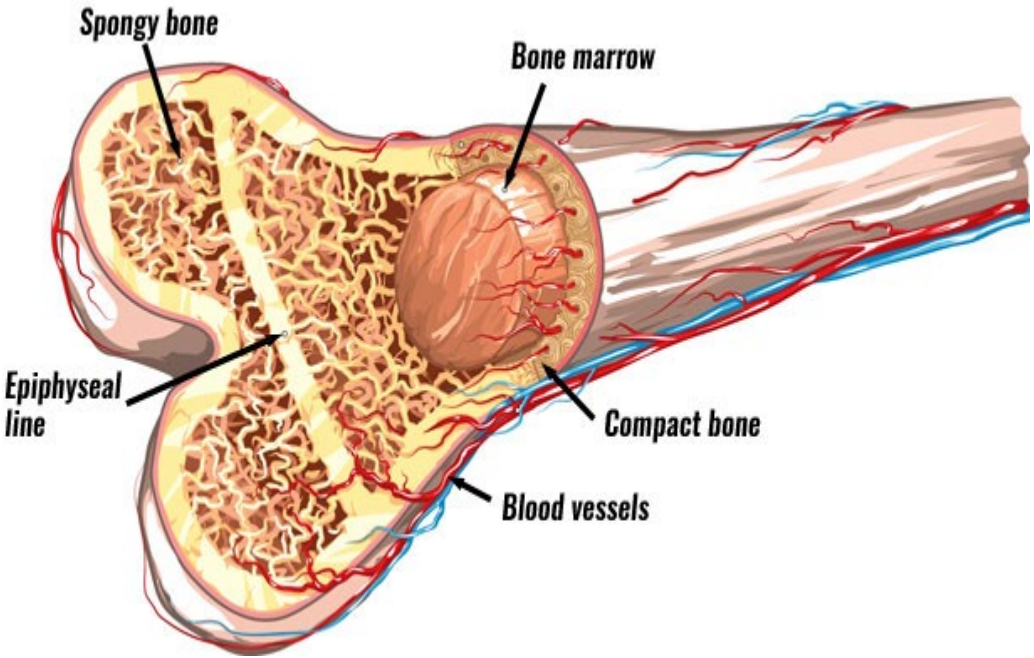
WHAT IS BLOOD CANCER?

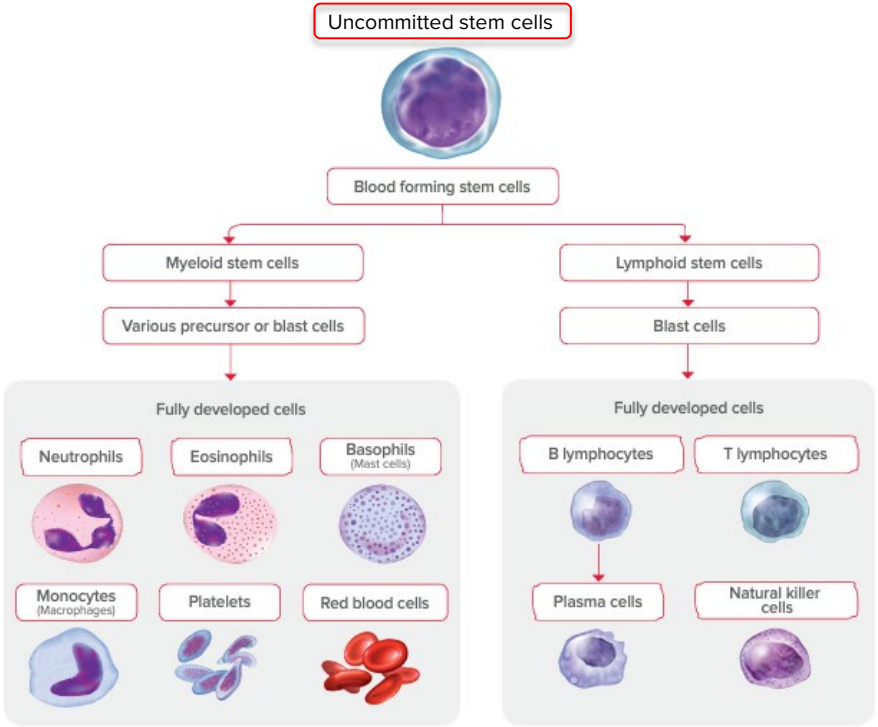
- Cancer arising from cells responsible for blood formation or immune function
- Commonly occurs in your bone marrow and lymphatic system where stem cells and immune cells are located and mature
- In the bone marrow, normal cell production is interrupted and abnormal cells begin to grow

WHAT IS BONE MARROW?



- **Bones are made up of 3 main parts:**
  - Compact bone
  - Spongy bone
  - Bone marrow
    - Red marrow
    - Yellow marrow

UNDERSTANDING BLOOD CELL FORMATION



Stem cells are multipotential cells (capable of developing into different types of blood cells). Some stem cells enter the blood and circulate.

Red blood cells carry oxygen from the lungs to cells throughout the body.

Platelets are fragments of cells that help to control bleeding or bruising.

White blood cells include neutrophils, monocytes (macrophages), lymphocytes, eosinophils and basophils. Each play a role in helping the body fight infection. For example, lymphocytes help create antibodies that attack the invading microbes and mark them for destruction by the neutrophils, monocytes and macrophages. Basophils and eosinophils are involved in the body's response to allergic reactions and eosinophils also help fight some parasitic infections.

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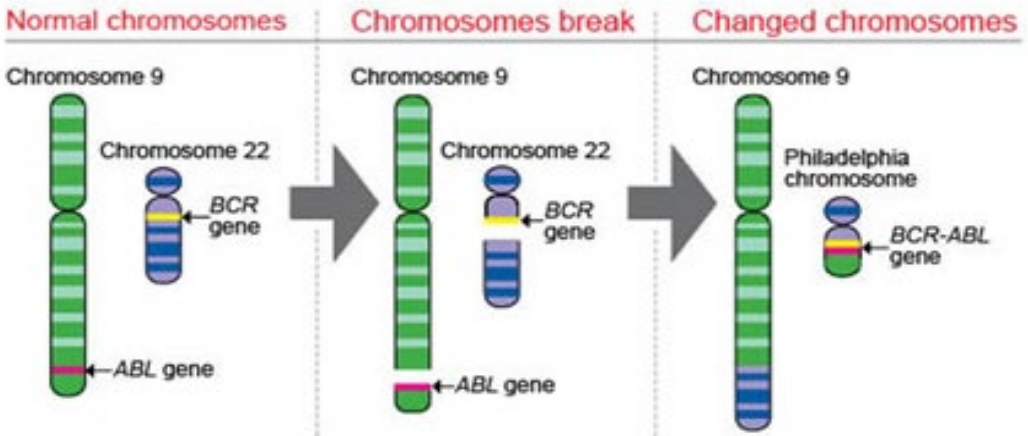
CANCER MOLECULAR PROFILING

- **Identifies DNA, RNA, or protein molecules associated with certain diseases**
- **Examples of types of tests:**
  - Immunohistochemistry (IHC)/Flow cytometry – antibodies/antigens
  - FISH – Fluorescence in situ Hybridization
  - NGS – Next-Generation Sequencing
  - qPCR – Quantitative Polymerase Chain Reaction



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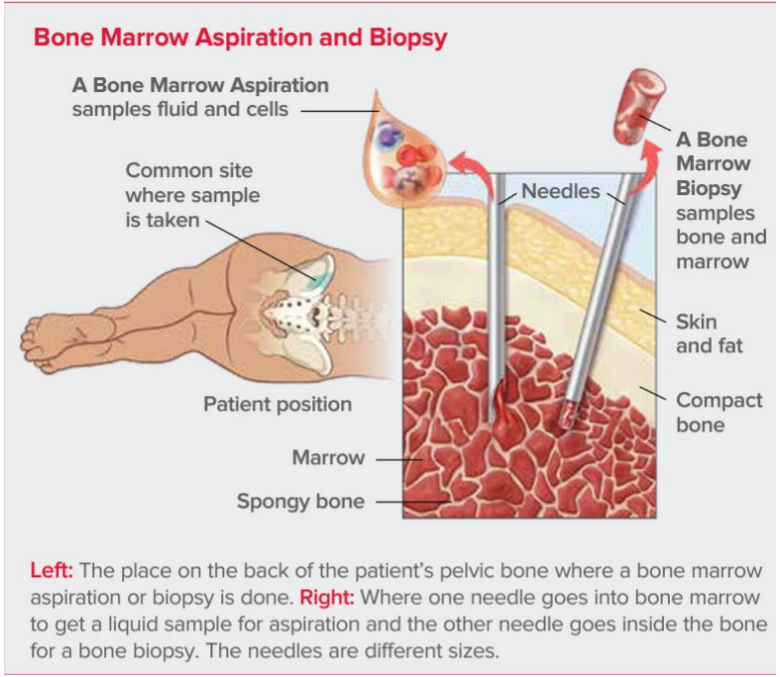
LEUKEMIA BASICS

- **Leukemic blasts prevent the production of normal blood cells, resulting in abnormal blood counts at diagnosis**
- **Four main types:**
  - Acute Lymphoblastic Leukemia (ALL)
  - Acute Myeloid Leukemia (AML)
  - Chronic Lymphocytic Leukemia (CLL)
  - Chronic Myeloid Leukemia (CML)
- ALL and AML come on quickly and must be treated urgently
- CLL and CML tend to have few to no blasts
- Each major type has its own subtypes



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LEUKEMIA BASICS

- **Acute Lymphoblastic Leukemia (ALL)**
  - Most common cancer seen in children
  - Risk peaks between 1-4, then decreases until about age 55
  - May also see Philadelphia chromosome – more common in adults (25% of cases vs 3% for pediatric ALL)

- **Acute Myeloid Leukemia (AML)**
  - Most common acute leukemia in adults
  - Has many subtypes based on differences in biomarkers

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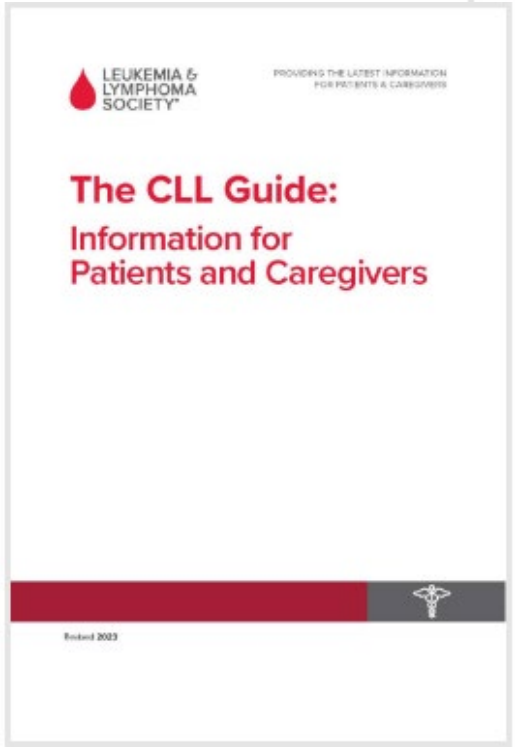
LEUKEMIA BASICS

- **Chronic Lymphocytic Leukemia (CLL)**
  - Most common type of leukemia in adults in Western countries
  - Can progress slowly or quickly depending on the form it takes
  - Some patients may have CLL for years and not need treatment, their doctor monitors them under “watch & wait” or as some patients refer to as “watch & worry”
- **Chronic Myeloid Leukemia (CML)**
  - Has 3 phases – chronic, accelerated, blast (often called “blast crisis”)
  - A diagnosis of CML **requires** oral treatment upon diagnosis to prevent it from becoming aggressive



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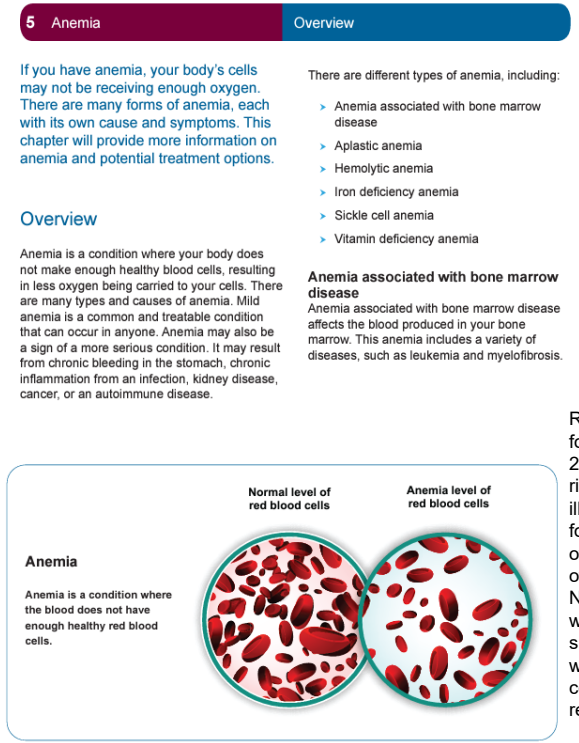
MYELODYSPLASTIC SYNDROMES (MDS)

- **Sometimes called "pre-leukemia"; affects myeloid cell line, where 5-19% blasts are present**
- **Risk factors**
  - Male sex, white
  - Older age (60+, typically)
  - No risks known for de novo MDS
  - Secondary MDS may be due to previous cancer treatment
- **Symptoms**
  - Possible to have none
  - Cytopenias (anemia, neutropenia, thrombocytopenia)



5 Anemia | Overview

If you have anemia, your body's cells may not be receiving enough oxygen. There are many forms of anemia, each with its own cause and symptoms. This chapter will provide more information on anemia and potential treatment options.

Overview

Anemia is a condition where your body does not make enough healthy blood cells, resulting in less oxygen being carried to your cells. There are many types and causes of anemia. Mild anemia is a common and treatable condition that can occur in anyone. Anemia may also be a sign of a more serious condition. It may result from chronic bleeding in the stomach, chronic inflammation from an infection, kidney disease, cancer, or an autoimmune disease.

There are different types of anemia, including:

- Anemia associated with bone marrow disease
- Aplastic anemia
- Hemolytic anemia
- Iron deficiency anemia
- Sickle cell anemia
- Vitamin deficiency anemia

Anemia associated with bone marrow disease
Anemia associated with bone marrow disease affects the blood produced in your bone marrow. This anemia includes a variety of diseases, such as leukemia and myelofibrosis.

Anemia

Anemia is a condition where the blood does not have enough healthy red blood cells.

Normal level of red blood cells

Anemia level of red blood cells

NCCN Guidelines for Patients®: Myelodysplastic Syndromes, 2021

39

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LYMPHOMA BASICS

- **Abnormal lymphocytes accumulate and form masses (tumors) in the lymphatic system**

- **Non-Hodgkin Lymphoma (NHL)**
  - B-cell lymphomas ~85% of all NHLs
  - T-cell and NK-cell lymphomas ~15% of all NHLs
  - More than 60 subtypes
  - Aggressive or indolent, sometimes intermediate

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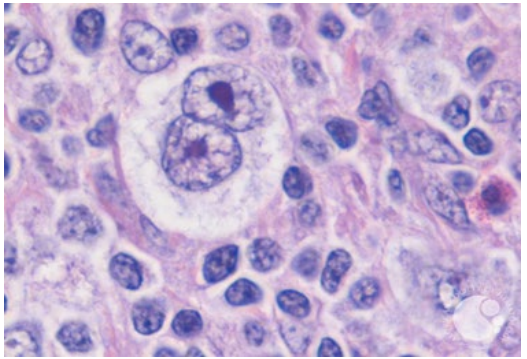
LYMPHOMA BASICS

- **Hodgkin Lymphoma**
  - Was initially named Hodgkin's Disease, this was later changed to Hodgkin Lymphoma
  - Is a B-cell Lymphoma
  - Distinguished from other lymphomas by the presence of the Reed-Sternberg cell
  - Hodgkin Lymphoma is most likely to be diagnosed in young adults, but then becomes more common again after age 65
  - Most forms are curable

Reed-Sternberg cell



ASH Image Bank

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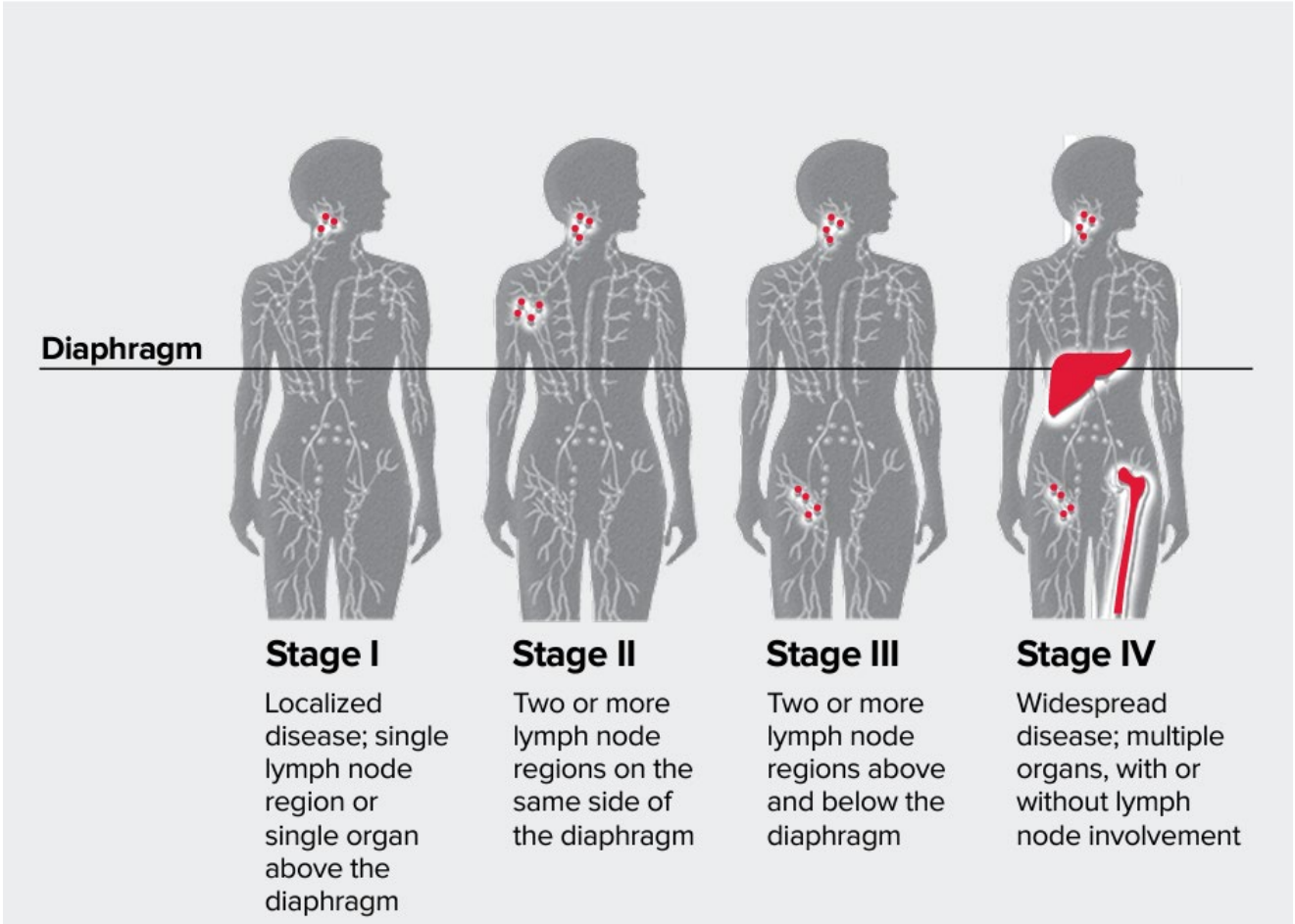
LYMPHOMA STAGING



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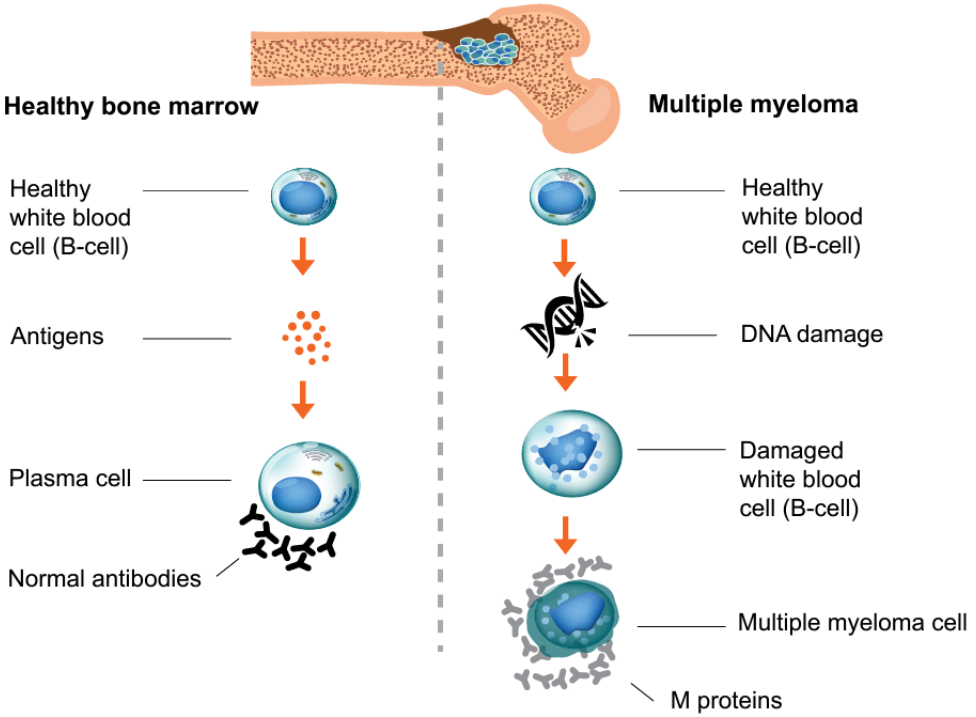
MYELOMA BASICS

- **Cancer of the plasma cells (product of B lymphocytes)**
- Can be classified as:
  - Plasmacytoma – single tumor
  - Smoldering – asymptomatic and slow growing
  - Multiple Myeloma – diffuse throughout the body
- **CRAB criteria are important to the diagnosis:**
  - **C**alcium is increased
  - **R**enal (kidney) failure or insufficiency
  - **A**nemia
  - **B**one lesions



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MYELOPROLIFERATIVE NEOPLASMS (MPNS)

- **Myelo** – of the bone marrow; **Proliferative** – to grow or reproduce quickly; **Neoplasm** – abnormal growth of cells
- Many subtypes, but 3 are considered “classic”:
  - **Polycythemia vera (PV)** – too many red blood cells are made
  - **Essential Thrombocythemia (ET)** – too many platelets are made
  - **Myelofibrosis (MF)** – scarring of the bone marrow after it has “exhausted” itself or as a primary disease

4 Clotting complications | **About blood clots**

Treatment of polycythemia vera and essential thrombocythemia focuses on preventing blood clots. Blood clots are the leading cause of death. With treatment, many people don’t get blood clots and live for many years.

About blood clots

A blood clot is a gel-like clump of blood. Blood clots develop to stop bleeding and then dissolve. A blood clot can form inside a blood vessel when there is no bleeding. This type of clot is called a thrombus or thrombi if referring to more than one.

People with polycythemia vera (PV) and essential thrombocythemia (ET) are prone to get thrombi. Thrombi are the most frequent, sometimes life threatening, complication of these two MPNs. Treatment reduces the chance of getting thrombi. With treatment, many people with PV or ET live for many years.

Cell congestion and clots

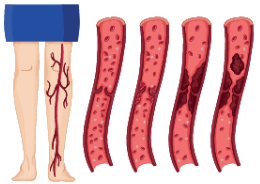
PV and ET may increase the chance of getting a blood clot in a similar way. Both MPNs increase the number of blood cells in the bloodstream. The extra blood cells cause a traffic jam and slow down blood flow in vessels. The extra blood cells also stick together more so than normal blood cells. Slow-moving, sticky blood cells are likely to form blood clots.

Fixed and free clots

There are two types of blood clots. Thrombi are attached to a base inside a blood vessel and don’t move. Sometimes, a thrombus breaks free and travels through the bloodstream. These moving blood clots are called emboli and may get stuck in another spot.

Blood clot in a leg

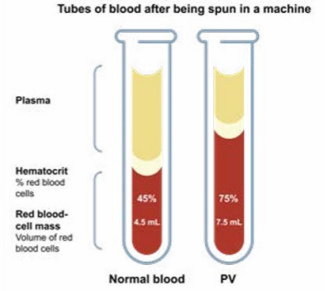
People with MPN are at risk for blood clots. This image shows a blood clot forming in a leg vein. On the far right, a piece of the blood clot has detached. It could travel through the heart to the lungs and get stuck. This is called a pulmonary embolism. Pulmonary embolisms can be deadly.



Polycythemia vera

The criteria for diagnosis are:

1. **High hematocrit, hemoglobin, or red cell mass**
2. **High number of cells in bone marrow**
3. **One of the following:**
   - ***JAK2* V617F or *JAK2* exon 12 mutation**
   - **Low EPO**



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HOW IS BLOOD CANCER TREATED?

A) Chemotherapy

B) Radiation Therapy

C) Targeted Therapy

D) Immunotherapy

E) Cellular Therapy

F) Clinical Trial

G) Palliative Care

H) All of the Above

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TREATMENT CASE STUDY

- 65-year-old female
- Diagnosis: **Myelodysplastic Syndrome**
- TP53 mutated
- Initial treatment with **Azacitadine**
- Proceeded to **Allogeneic stem cell transplant**–son was haploidentical donor
- Concern for relapse post transplant
- **Monitored and received supportive care with transfusions**
- Disease progressed to AML
- Began treatment on a **clinical trial**

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HOW IS BLOOD CANCER TREATED?

Treatment varies greatly based on key factors:

- **What type of blood cancer**
  - Leukemia vs Lymphoma
  - Acute vs Chronic
  - Myeloid vs Lymphoid
- **Molecular/genetic changes?**
  - BCR/ABL mutation (Philadelphia chromosome) – CML, ALL
  - FLT3, IDH1/2
- **Comorbidities of patient**
  - Heart, kidney, liver function OK to withstand chemotherapy

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CHEMOTHERAPY

Stops the growth of dividing cells

- Used in combinations to make other treatments more effective
- Can be used with surgery or radiation
- Can be given by many different routes
  - PO, IV, IM, IT, IP

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CHEMOTHERAPY SIDE EFFECTS

- Fatigue
- Alopecia
- Neuropathy/Confusion
- Mouth sores
- Nausea/Diarrhea
- Cytopenias – Neutropenia, Anemia, Thrombocytopenia
  - Infection
  - Bleeding
- Skin and nail changes
- Mood changes
- Infertility and changes in libido

Cancerresearchuk.org

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RADIATION THERAPY

- **Works by damaging DNA of cancer cells so that they cannot replicate**

- Types
  - **Internal**: put inside the target (ie, brachytherapy)
  - **External**: comes from a machine, targets certain area of your body
- Used in combination with chemotherapy and surgery

Linear Accelerator (linac)

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RADIATION THERAPY SIDE EFFECTS

- Fatigue
- Localized skin changes
- **Specific side effects related to the area being treated:**
  - Lung – fatigue, SOB, cough
  - Brain – fatigue, hair loss, nausea/vomiting
  - GI – nausea/vomiting, diarrhea, abdominal pain, bladder, fertility
  - Head/neck – sore throat, dry mouth, taste alteration, hair loss

TARGETED THERAPY

- **Specifically targets the changes found in cancer cells' DNA which makes it become cancerous**
- Types:
  - Monoclonal antibodies
  - Small molecule inhibitors:
    - Tyrosine kinase inhibitors: dasatinib, imatinib, nilotinib
    - Proteasome inhibitors: bortezomib
    - PI3K inhibitors: idelalisib
    - HDAC inhibitors: panobinostat, vorinostat
    - mTOR inhibitors: sirolimus, everolimus
    - Hedgehog pathway inhibitors: glasdegib

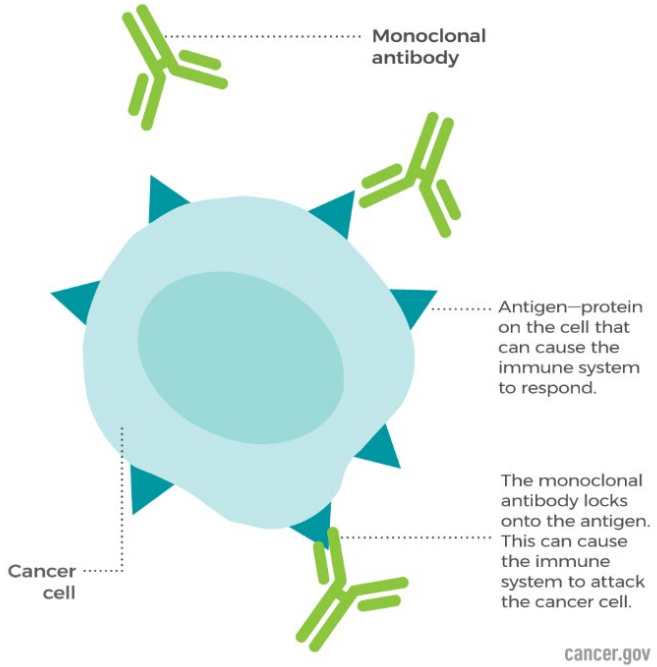
TARGETED THERAPY SIDE EFFECTS

- Fatigue
- Low blood counts
- Neuropathy, headache
- Gastrointestinal effects – nausea, vomiting, diarrhea, decreased appetite)
- Liver abnormalities
- Skin changes – rash
- Fluid retention, weight gain, swelling

IMMUNOTHERAPY

Harnesses your immune system to fight the cancer

- Types:
  - **Monoclonal antibodies**
    - Rituximab, obinutuzumab
  - **Bispecific antibodies**
    - Blinatumomab, teclistamab
  - **Checkpoint inhibitors**
    - Nivolumab, pembrolizumab
  - **Vaccines**
  - **Cytokines**



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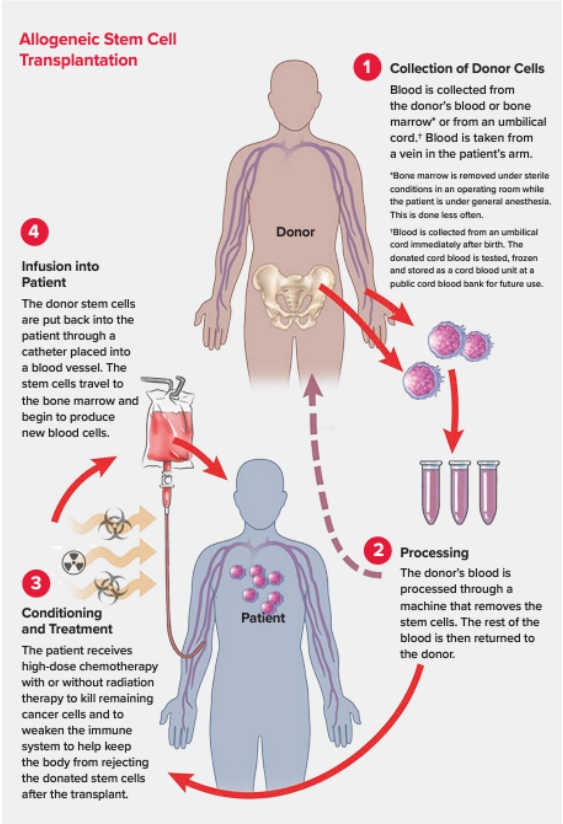
IMMUNOTHERAPY SIDE EFFECTS

- Skin reactions – itching and rash
- Fatigue
- Gastrointestinal effects – diarrhea
- Hormonal alterations
  - Thyroid, Pancreas, Pituitary
- Muscle and joint inflammation
- Organ inflammation
  - Colitis
  - Hepatitis
  - Pneumonitis

CELLULAR THERAPY

- **Hematopoietic Stem Cell Transplant**
  - Allows patient to receive high doses of chemotherapy to eradicate disease but then recover normal hematopoietic cell function
  - Types:
    - Autologous
    - Allogeneic



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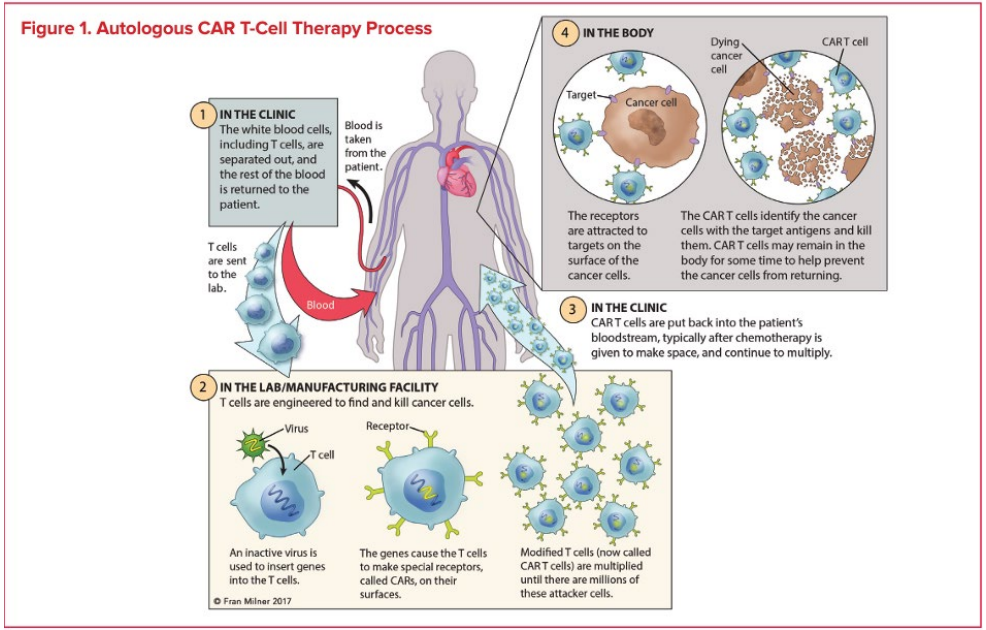
CELLULAR THERAPY

- **Chimeric Antigen Receptor T-cell Therapy**
  - T cells are removed from patient, engineered to produce chimeric antigen receptors and then injected back into the patient which then recognizes specific antigen on tumor cells



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CAR T-CELL THERAPY SIDE EFFECTS

- Cytokine release syndrome (CRS)
  - T cells naturally release cytokines, however in CRS there is a massive amount released which caused fever, hypotension
  - Anti-IL6 antibody: tocilizumab
- Neurotoxicity
  - Confusion, headache, seizure, cerebral edema
- B-cell aplasia
  - Late effect of treatment
  - Normal B cells often killed by infused CAR T cells since they express same targets
  - Patients will go on to receive immunoglobulin therapy

Credit: Cancer.gov

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CHIMERIC ANTIGEN RECEPTOR T-CELL THERAPY

- Since 2017, there have been 6 approved CAR T-cell products:
  - **Kymriah (tisagenlecleucel) – CD19**
  - **Yescarta (axicabtagene ciloleucel) – CD19**
  - **Tecartus (brexucabtagene autoleucel) – CD19**
  - **Breyanzi (lisocabtagene maraleucel) – CD19**
  - **Abecma (idecabtagene vicleucel) – BCMA**
  - **Carvykti (ciltacabtagene autoleucel) – BCMA**
- Cellular therapy continues to be highly studied with many new and exciting therapies coming down the pipeline

CLINICAL TRIALS

- Carefully controlled research studies conducted by doctors to improve the care and treatment of people with cancer or other illnesses
- Key step in advancing all cancer treatments
- Cancer clinical trials are 40-50% of all trials conducted in the United States
- Trials available for all stages of cancer journey – newly diagnosed, relapsed/refractory, remission/ongoing maintenance
- Can be very difficult to navigate available trials

RISKS & BENEFITS OF CLINICAL TRIALS

Benefits

- Contribution to present and the future
- The drug(s) being studied is free
- Early access to new therapies
- Access to physicians with extensive experience in the type of cancer
- Close monitoring and follow-up

Risks

- Possibility the treatment may not work
- Unknown/fear of side effects
- Randomized trials – risk of being in the standard-of-care arm
- Increase time away from home, work, and family

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ONCOLOGY NURSES ROLE WITH BLOOD CANCER PATIENTS AND CAREGIVERS

What to discuss with the patient and caregiver before and throughout treatment

- **Disease and Treatment Education**
  - Understand specifics of disease
  - Learn patient wishes and goals of care
  - Be the patient advocate
- **Fertility – Treatment Implications, Preservation**
- **Potential Side Effects**
  - Recognize adverse effects of treatment and **stress the importance of communicating with the healthcare team**
  - What are “normal” side effects and what needs immediate attention
  - What to do for fever and emergency management
  - 24-hour access to providers – who to contact and best method of communication

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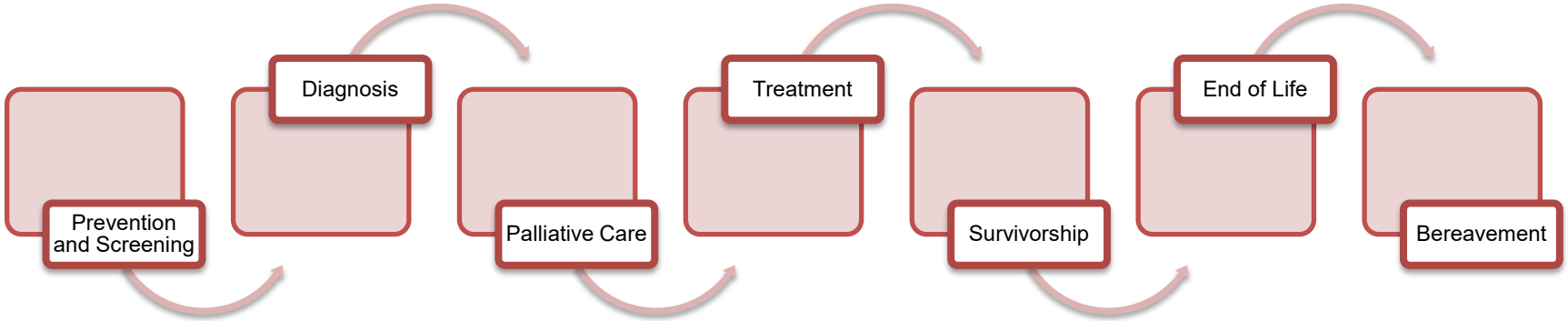
ONCOLOGY NURSES ROLE WITH BLOOD CANCER PATIENTS AND CAREGIVERS

What to discuss with the patient and caregiver before and throughout treatment

- **Nutrition**
  - Food safety guidelines are key
  - Small, frequent mini-meals and smart snacks
  - Real Food > Supplements
  - Eat a variety of foods
  - Be open to new foods, flavors, and tastes
  - Keep a stable body weight
  - Stick to what you know
  - Ask about any dietary restrictions
  - Discuss side effects and changes in appetite/intake
  - Use trusted sources of oncology nutrition information
  - Ask for a referral to an oncology registered dietitian

ONCOLOGY SOCIAL WORKER'S ROLE WITH BLOOD CANCER PATIENTS AND CAREGIVERS

Phases of Cancer Care



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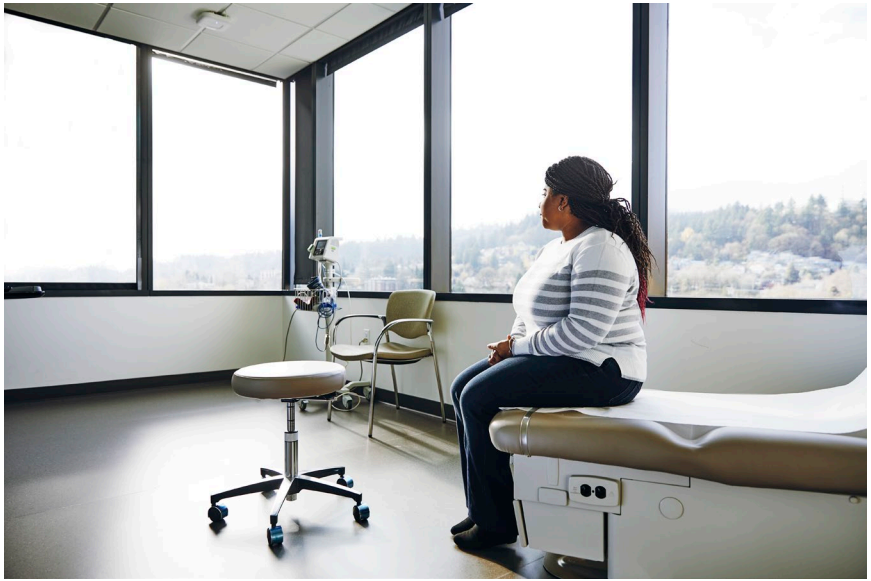
PSYCHOSOCIAL CONSIDERATIONS WHEN WORKING WITH ONCOLOGY PATIENTS AND THEIR CAREGIVERS

- **Physical concerns**
  - Diagnosis, physical symptoms or side effects, fertility planning, intimacy, and treatment planning
- **Emotional concerns**
  - Stress, fear, worry, anxiety, anger, frustration
- **Financial concerns**
  - Insurance, medical and prescription costs, employment, daily living expenses
- **Practical concerns**
  - Transportation, housing, childcare, school, daily tasks

PSYCHOSOCIAL CASE STUDY



- 54-year-old Black female
- Multiple Myeloma
- Disease information
- Financial concerns
- Employment concerns
- Social Security Disability questions
- Support resources

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WHAT TO CONSIDER: PSYCHOSOCIAL NEEDS

- **For the patient:**
  - Awareness of ethnic, cultural, and spiritual beliefs
  - May live alone, be unable to care for self or others
  - Concerns about how their cancer affects family members
  - Financial and employment concerns
  - Physical and cognitive side effects of treatment
  - May be predisposed to or develop mental health concerns
  - Emotional concerns
  - Self-care practices and positive coping strategies

WHAT TO CONSIDER: PSYCHOSOCIAL NEEDS

- **For the caregiver:**
  - Awareness of ethnic, cultural, and spiritual beliefs
  - Balancing employment and caregiver roles
  - Balancing family responsibilities
  - Traveling for treatment
  - May be predisposed to or develop mental health concerns
  - Emotional concerns
  - Self-care practices and positive coping strategies

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RELIABLE RESOURCES

- The Leukemia & Lymphoma Society – LLS.org
- National Cancer Institute – cancer.gov
- American Cancer Society – cancer.org
- CancerCare – cancercare.org
- Cancer Support Community – cancersupportcommunity.org
- Triage Cancer – triagecancer.org
- PubMed.gov
- OncLive.com

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WHAT TO CONSIDER: CANCER & COVID-19

COVID-19 continues to bring many concerns for all; even more for cancer patients. Fears are multiplied for immunocompromised patients and those undergoing treatments. Encourage patients to ask their doctor specific concerns; many factors need to be considered and the doctor would have information to determine next steps.

LLS offers support and guidance for blood cancer patients, caregivers, and HCPs to navigate both cancer & COVID-19.

COVID-19 and blood cancer related updates and support resources on the LLS website:

https://www.lls.org/covid-19-resources

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BLOOD CANCER 101: THE BASICS ON DISEASE, TREATMENT AND THE ROLE OF THE HEALTHCARE PROVIDER

Resources for HCPs

- ❑ Free CME & CE courses: www.LLS.org/CE
- ❑ Fact Sheets for HCPs: www.LLS.org/HCPbooklets
- ❑ Podcast series for HCPs – www.LLS.org/HCPPodcast
- ❑ HCP Patient Referral Form: www.LLS.org/HCPreferral
- ❑ LLS Other Helpful Organizations: www.LLS.org/OHO

Clinical Trials and Research

- ❑ Clinical Trials: Learn more about clinical trials: www.LLS.org/ClinicalTrials
- ❑ Research: Focused on finding cures and driving research: www.LLS.org/Research

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BLOOD CANCER 101: THE BASICS ON DISEASE, TREATMENT AND THE ROLE OF THE HEALTHCARE PROVIDER

Resources for Patients

- Telephone and Web Education Programs: www.LLS.org/Programs & www.LLS.org/Educationvideos
- Information Booklets: www.LLS.org/Booklets
- Free Mobile Apps: *LLS Health Manager™*: www.LLS.org/Health-Manager
- Support Resources: www.LLS.org/Support
  - LLS Regions
  - Online Chats
  - One-On-One Nutrition Consultations (Nutrition Education Services Center®)
  - LLS Community (social media platform)
  - Patti Robinson Kaufmann First Connection® Program (peer-to-peer)
- Financial Assistance
  - Co-Pay Assistance
  - Urgent Need
  - Travel Assistance
  - Referral to Medication Access programs

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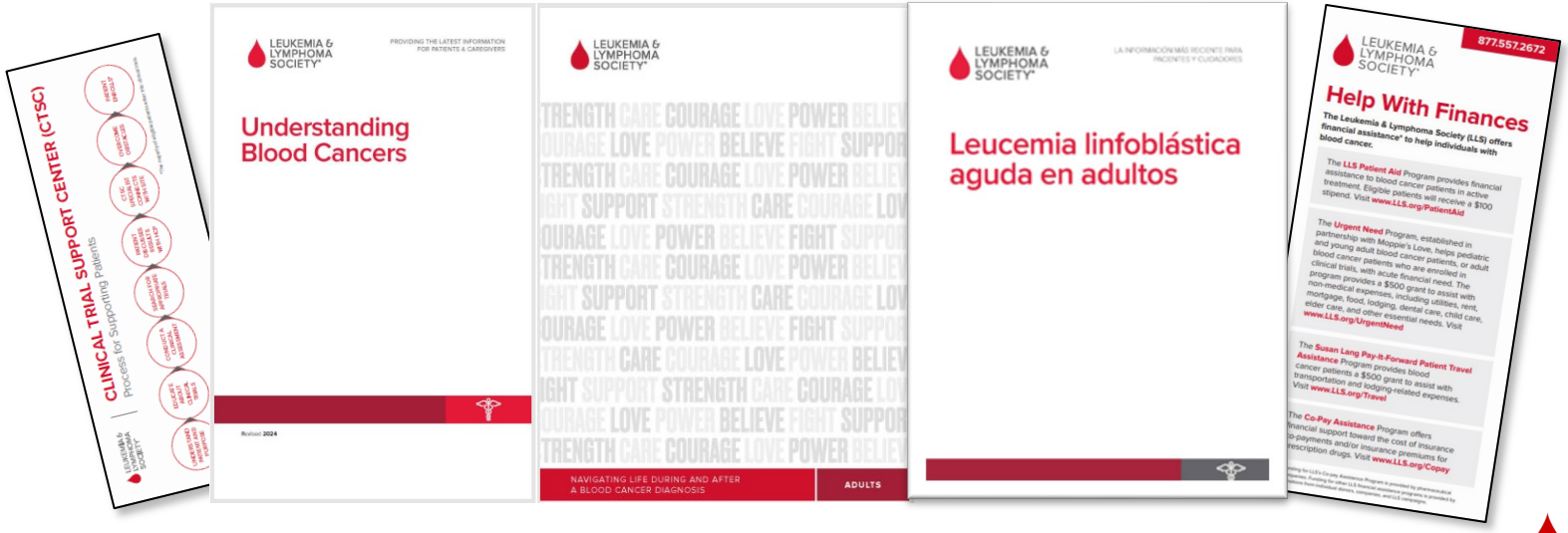
FREE GUIDES, BOOKLETS, AND FACT SHEETS

For Patients, Caregivers and Professionals

www.LLS.org/Booklets



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Resources for Patients

- **Information Specialists** – Personalized assistance for managing treatment decisions, side effects, and dealing with financial and psychosocial challenges.
- **Clinical Trial Nurse Navigators** – RNs and NPs navigate patients to find an appropriate clinical trial and sift through the information to bring back to the healthcare team.
- **Registered Dieticians** – (LLS) provides Nutrition Education Services Center® to patients/caregivers of all cancer types, free nutrition education, and one-on-one consultations by phone or email.
- **Reach out** **Monday–Friday, 9 am to 9 pm ET**
  - Phone: (800) 955-4572
  - Live chat and Email: www.LLS.org/IRC

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Q & A

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Thank you for participating.
Please complete the program evaluation

For a list of our CME and CE activities, podcasts and fact sheets, please visit: **www.LLS.org/CE.**

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