Information for Patients With Acute Myeloid Leukemia (AML)

LEUKEMIA & LYMPHOMA SOCIETY® fighting blood cancers

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Welcome and Introductions

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Disclosures

- Has no affiliations with commercial interests to disclose

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Objectives of the Talk

- To learn about AML and subtypes
- To review current and emerging treatments
- To discuss managing side-effects from the AML and treatment
- To review the importance of communicating with your team

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Etiology of AML

- A disease derived from a new, single, genetically aberrant cell
- Family factors – some families have increased susceptibility to accumulate genetic injury during life
- Environment – medications, harmful chemicals, radiation, chemotherapy can cause problems
- Time (age) – allows accumulation of events

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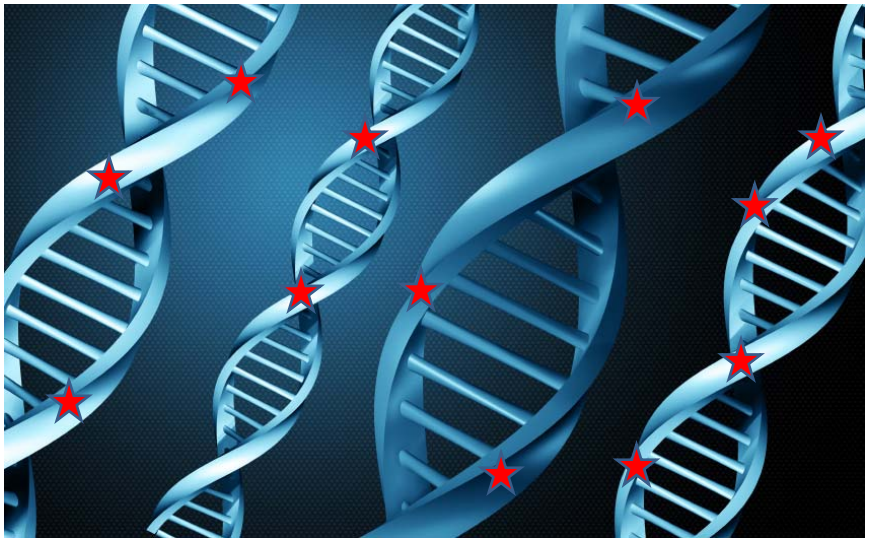
As We Live, Mutations Accumulate



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Mutations Accumulate and Get Fixed (Mostly When We're Young)

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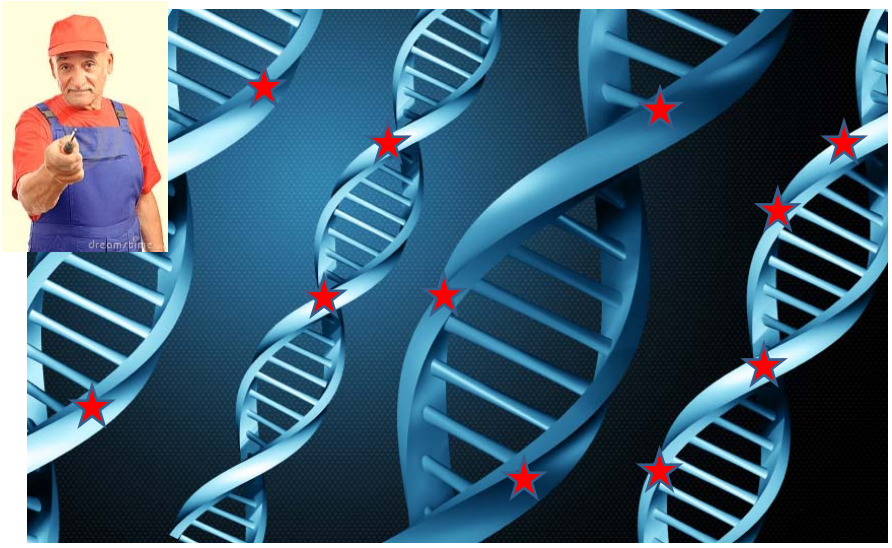
Mutations Accumulate and Get Fixed (Less Well as We Age)



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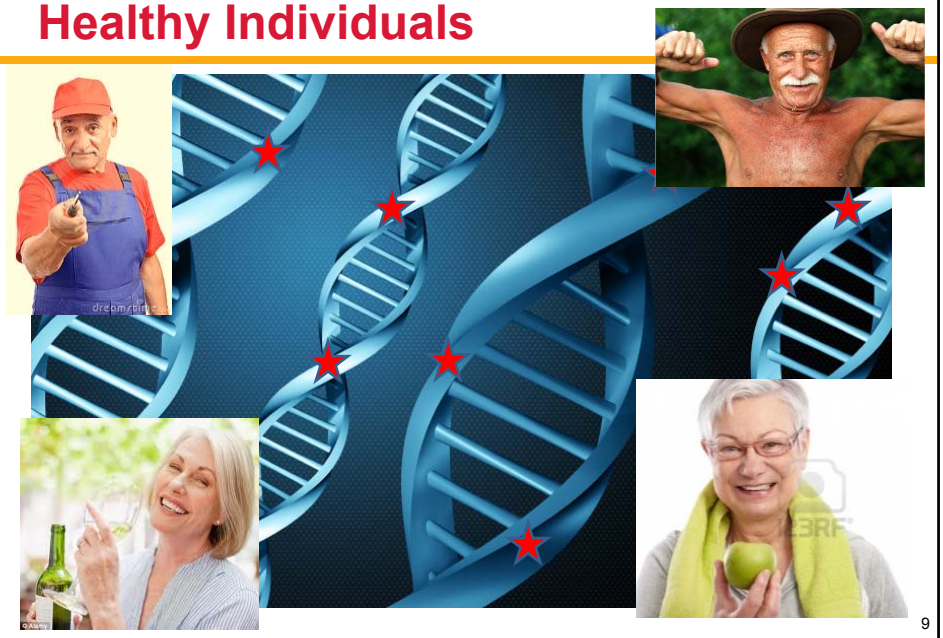
Fewer Mutations Accumulate in Healthy Individuals



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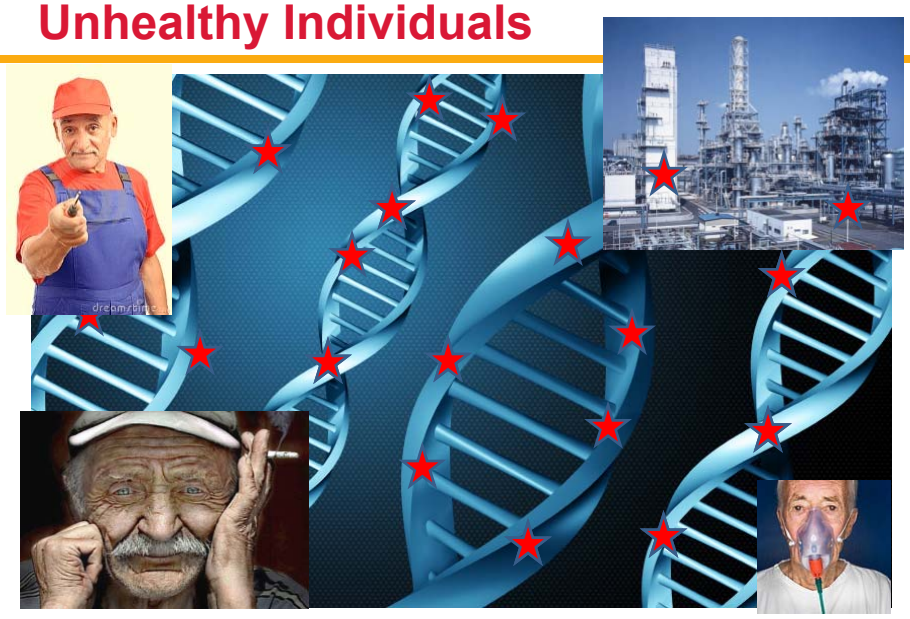
More Mutations Accumulate in Unhealthy Individuals



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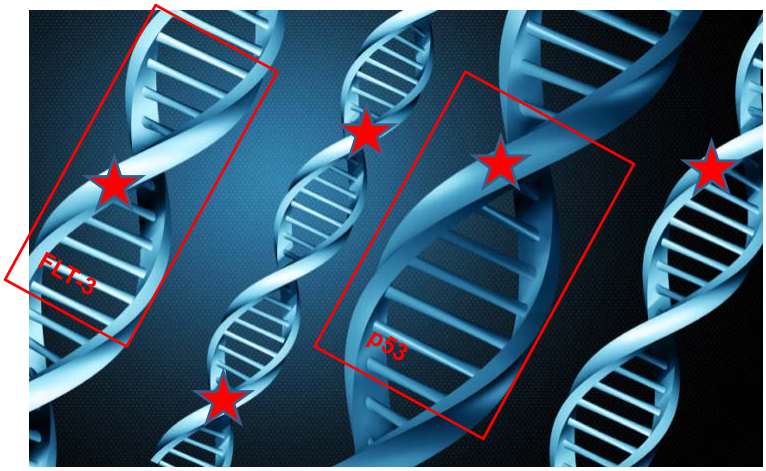
Mutations May Occur in Critical Areas of Our Genes



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Mutations May Occur in Critical Areas of Our Genes

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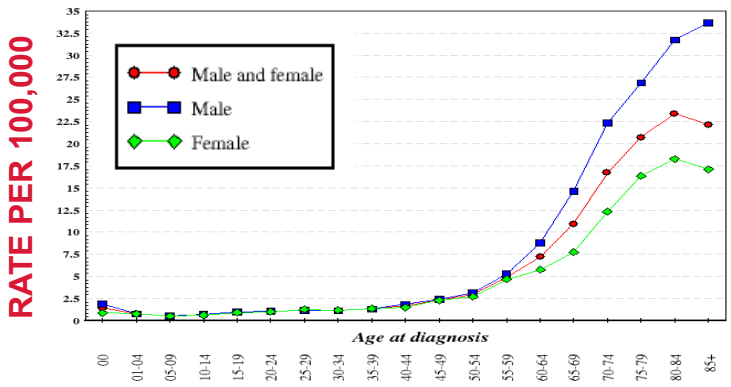
AML Incidence By Age In the United States



AGE AT DIAGNOSIS

SEER database

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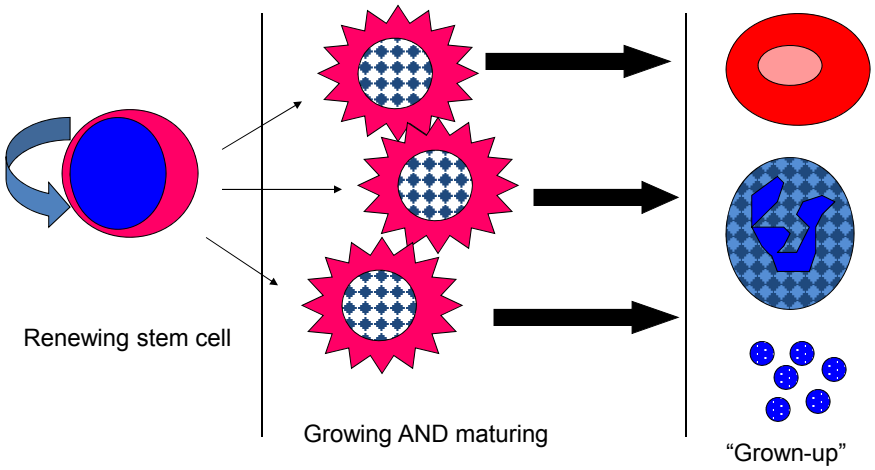
Stem Cells Grow and Mature to Make Blood Cells



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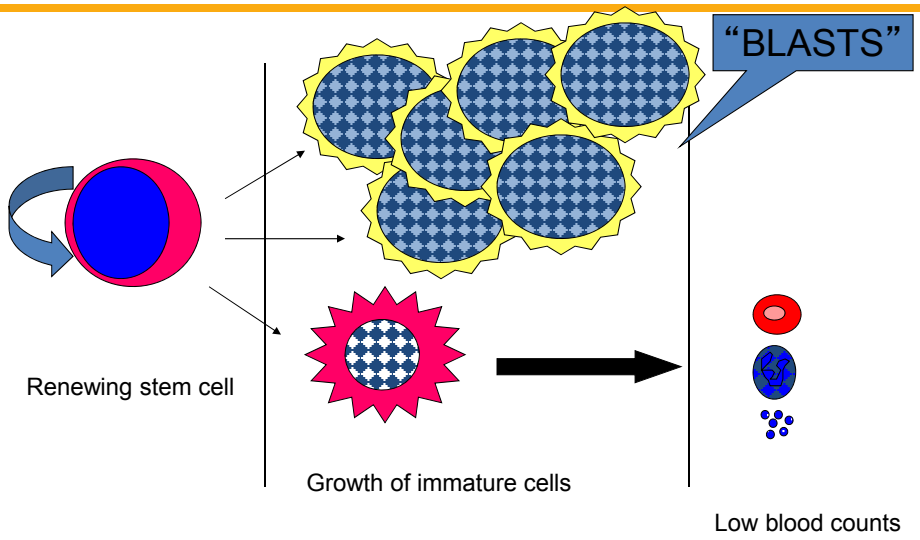
Growth *WITHOUT* Maturing Leads to AML



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How to Classify Complex Systems?

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Major Subtypes of AML
World Health Organization

- Acute myeloid leukemia with specific genetic abnormalities
  - AML with t(8;21)
  - AML with inv(16)
  - APL with t(15;17)
- AML associated with myelodysplastic syndrome
- AML associated with previous chemo or radiotherapy
- AML (not otherwise specified)
  - Subtypes based on appearance under the microscope

Vardiman, et. al. Blood. 2009;114:937-951

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Risk Stratification

Risk Status	Cytogenetics	Molecular Abnormalities
Favorable Risk	Inv(16) or t(16;16) or t(8;21)	Normal cytogenetics: NPM1 mutation (without FLT3-ITD) or CEBPA mutation
Intermediate Risk	Normal Cytogenetics	
	Inv(16) or t(16;16) or t(8;21)	C-kit mutation
	+8 or t(9;11)	
Poor Risk	3 or more abnormalities	Normal cytogenetics: FLT3-ITD mutation
	Monosomal karyotype	
	Abnormal 5 or 7	
	11q23 or inv(3) or t(3;3) or t(6;9) or t(9;22)	

NCCN Guidelines Version 1.2015

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"Practical" Subtypes of AML

- Acute Promyelocytic Leukemia t(15;17)
  - *Very different than other types of AML*
  - Excellent prognosis with unique treatment
- AML that is reliably cured with chemotherapy (*"core binding factor AML"*)
  - t(8;21), inv(16), t(16;16), NPM1 mutation
- AML ***not*** reliably cured with chemotherapy
  - Most of the other forms of AML

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Important Testing at Diagnosis

- Bone marrow sample
- Cytogenetics
- Testing for genes:
  - KIT, FLT3, NPM1, CEBPA
- Flow cytometry (defines what the cells look like to other cells)
- Lumbar puncture
- Test of the strength of the heart
- HLA typing of the patient and family

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Everyone Starts With Chemotherapy

- Starts with “Induction” aka “3+7”
  - Goal: to achieve a complete remission
  - 3 days of idarubicin/daunorubicin
  - 7 days of cytarabine
- Check the bone marrow around 10 -14 days later
- Then wait for blood count recovery

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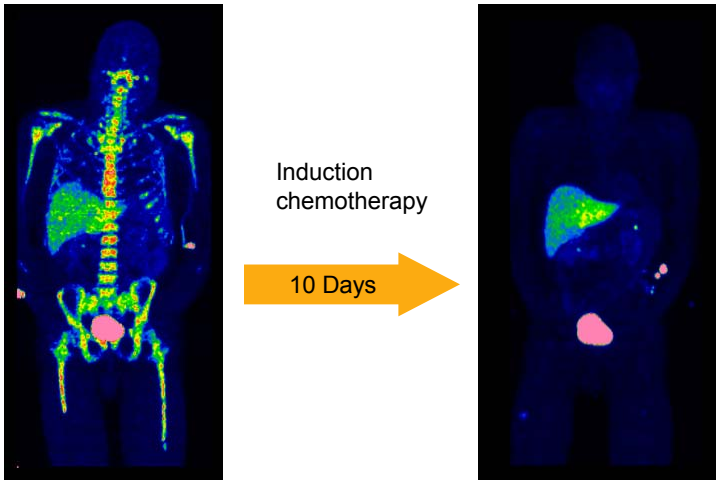
Responsive AML



Before Chemotherapy

After Chemotherapy

Vanderhoek Leuk Res. 2011 Mar;35(3):310-6

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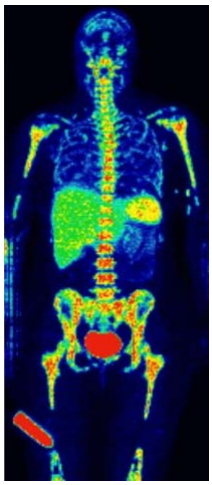
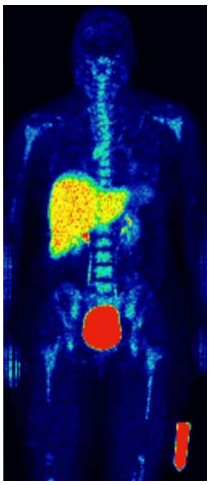
Refractory AML



Induction chemotherapy

10 Days



Before Chemotherapy

After Chemotherapy

Vanderhoek Leuk Res. 2011 Mar;35(3):310-6

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What to do after remission?

Goal: to make the remission "stick" = CURE

Favorable-risk AML → *"Consolidation" chemotherapy*

Intermediate-risk AML → *"Consolidation" chemotherapy* or *Blood/Marrow stem cell transplantation*

Poor-risk AML → *Blood/Marrow stem cell transplantation*

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"Consolidation" Chemotherapy

- Usually, high doses of cytarabine
- Can often be given in the clinic
- Patients must pay careful attention to their health during treatment
- Close monitoring
- Usually for 3 to 4 "cycles" of treatment

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Blood or Marrow Stem Cell Transplantation

- Many donor options
  - Matched siblings, volunteers
  - Mismatched family members
  - Cord blood
- Upper age limit "fuzzy"
  - Depends on the patient's overall health
- Transplant best option when patient is healthy with low chance of cure with chemotherapy

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Why Not Do Transplant for Everybody?

- Chemotherapy has fewer side-effects
- Recovery is faster, and more predictable with chemotherapy
- Transplant has more likelihood of curing, but is far more dangerous

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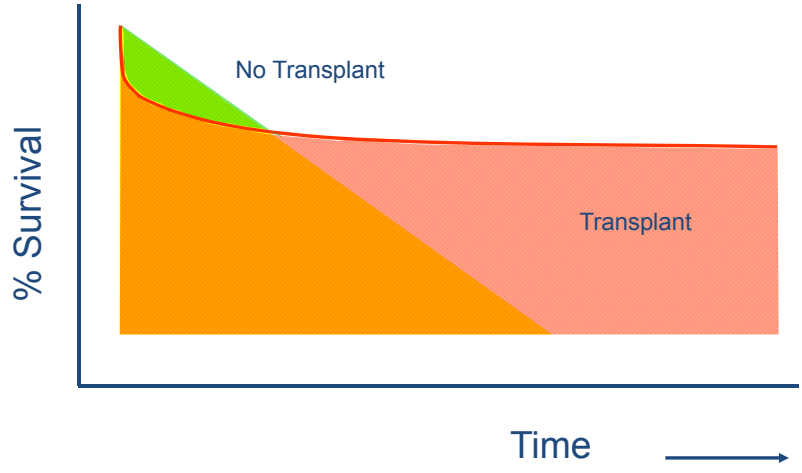
The Decision



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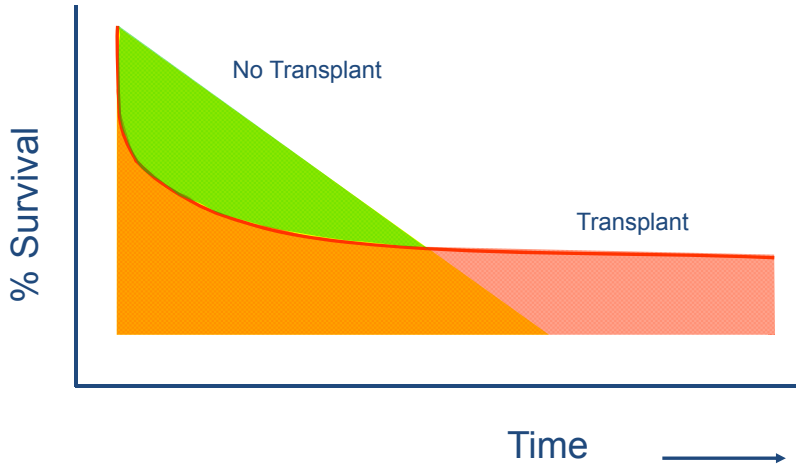
The Decision



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What Kind of Treatments Are Coming?

- Special labs can “sequence” all the genes in the leukemia cell
- Some of the genes control how the leukemia cells grow

Human Genome Project

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Mixtures of Mutated Genes Predict Behavior

- Proliferation Genes
  - FLT3
  - WT1
  - KIT
- Differentiation Genes
  - CEBPA
  - RUNX1
  - WT1

- Epigenetic Genes
  - TET1/2/3
  - IDH1/2
  - DNMT3A
  - ASXL1

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How Does Knowing How Leukemia "Works" Help Take Care of Patients?

- Helps predict behavior
- Helps to plan treatment

In the future, treatment will be increasingly based on mutated genes in the AML cells

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Symptoms of Acute Leukemia

- Bone marrow failure
  - Anemia (pale, fatigue, problems breathing)
  - Fever, infections
  - Bruises, bleeding
- Organ Impairment
  - Bone pain, swollen glands, headache, skin rash, pulmonary infiltrates

These symptoms are usually emergencies!

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Supporting Patients Through Treatment

- Maintain blood counts
  - Red cell and platelet transfusions
    - We can't give white cells reliably
- Treat/Prevent infections
  - Antibacterial, antiviral, antifungal agents important
- Control bleeding problems
- Control nausea, diarrhea

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What Can Patients Do To Stay Healthy?

- Stay in the loop!
  - Ask questions, know the plan, keep your family around for important conversations.
- Wash your hands!
  - Soap and water the best in the hospital, the gel is second best.
  - Always wash after the bathroom, before eating and after walking out of the room.

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What Can Patients Do To stay Healthy?

- Keep moving!
  - Walking and moving can be hard but *SO* important to help maintain strength.
  - Ask to speak to a physical therapist.
  - Wear a mask in the hospital.
- Keep eating!
  - If eating is tough, ask to speak to a nutrition specialist.
  - Eat safe food: fresh, washed, or cooked. Plant-based diets are generally healthy diets.

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What Can Patients Do To Stay Healthy?

- Keep your social contacts!
  - But avoid crowds in small spaces
  - Let friends/family help
- Discuss your mood!
  - It is normal to be depressed at times *BUT*
  - Depression can be an impediment to healing
- Protect your time and space!
  - Getting better is a full time job
  - Keep a perspective on work

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What is a Clinical Trial?

- Doctors are always trying to find better treatments.
- A clinical trial is the method to find new medical knowledge about AML that may improve patient's lives.
- Ask your doctor whether there is a clinical trial for you.
- Ask about the benefits and the risks.

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Conclusions

- Many patients with AML will be cured
- The road to cure is difficult and requires support from your family, friends and medical team.
- Good communication with your medical team is *essential* every step of the way
- Use resources such as LLS.org.

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Question & Answer Session

The speaker's slides are available for download at www.LLS.org/programs

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The Leukemia & Lymphoma Society (LLS) offers:

• Live, weekly Online Chats are moderated by an oncology social worker and provide a friendly forum to share experiences. Living with Acute Leukemia chat held on Thursday from 8:00pm-10:00pm ET.

- **WEBSITE: www.LLS.org/chat**

• What to ask: For a list of suggested questions to ask about certain topics, download and print any of the following guides.

- **WEBSITE: www.LLS.org/whattoask**

• Free publications are available ranging from disease specific information to health insurance options and resources to help patients and their families cope with the financial aspects of cancer.

- **WEBSITE: www.LLS.org/publications**

• For more information about blood cancers and other LLS programs, please contact an LLS Information Specialist.

- **TOLL-FREE PHONE: (800) 955-4572**
- **EMAIL: infocenter@LLS.org**