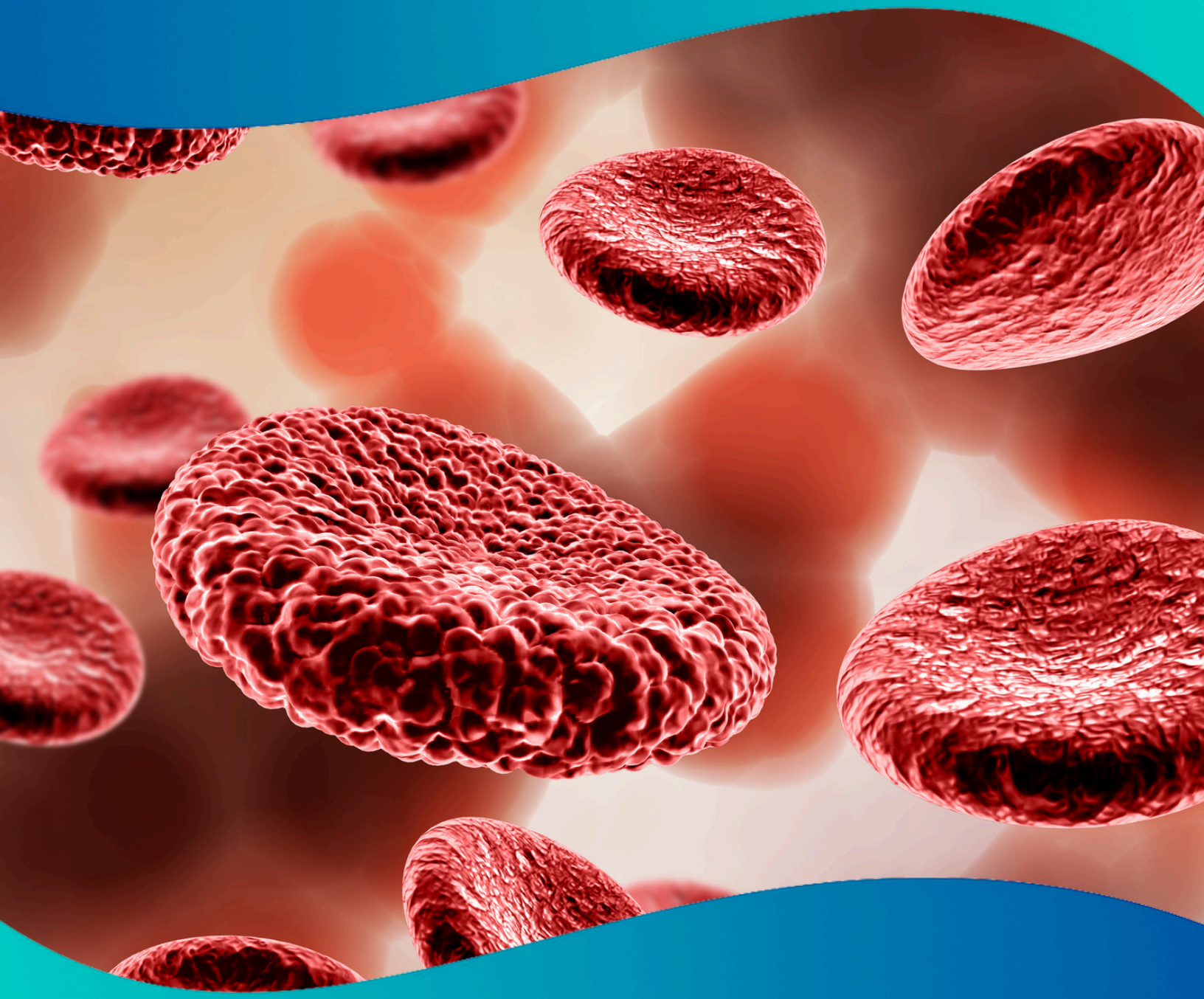
UNDERSTANDING NEUTROPENIA



A Patient Guide

QuickRX

UNDERSTANDING NEUTROPENIA

A Patient Guide

This booklet will help you learn about neutropenia, a condition where you have low levels of certain white blood cells. You will find out what causes it, why it matters, and how to protect yourself from infection while your counts are low.

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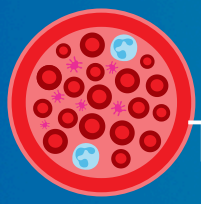

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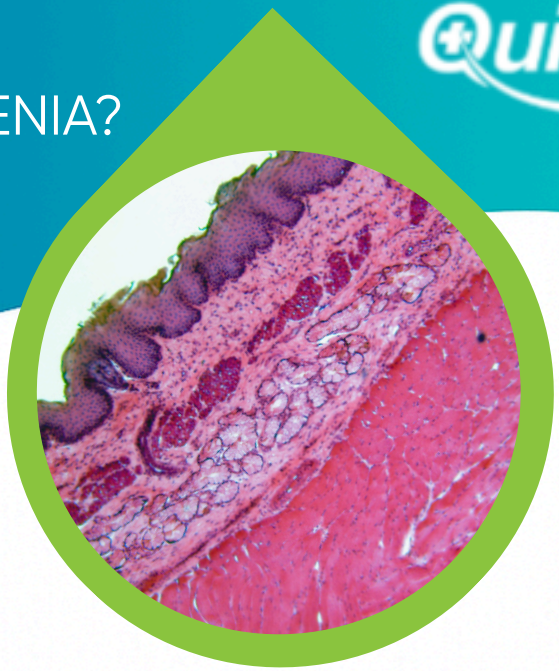
WHAT IS NEUTROPENIA?



Neutropenia is a condition where you have too few neutrophils, a type of white blood cell that fights infection. When your neutrophil count is low, your body has a harder time fighting off bacteria and other germs.

Think of it this way: Neutrophils are like soldiers in your immune system's army. They're usually the first responders when germs invade your body. When you don't have enough of these soldiers, infections that your body would normally fight off easily can become serious.

Key Terms to Know

Neutropenia: Low levels of neutrophils in the blood.

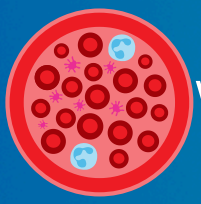
Neutrophils: A type of white blood cell that fights bacterial infections.

ANC (Absolute Neutrophil Count): The number of neutrophils in your blood. Normal is 1,500-8,000 cells per microliter.

White Blood Cells (WBCs): Cells that help your body fight infection. Neutrophils are one type of WBC.

Febrile Neutropenia: Having a fever while your neutrophil count is low - a medical emergency.

References:
1. National Cancer Institute. "Neutropenia." cancer.gov.
2. American Cancer Society. "Low White Blood Cell Counts." cancer.org.
3. National Neutropenia Network. "About Neutropenia." neutropenianet.org.



WHY NEUTROPHILS MATTER

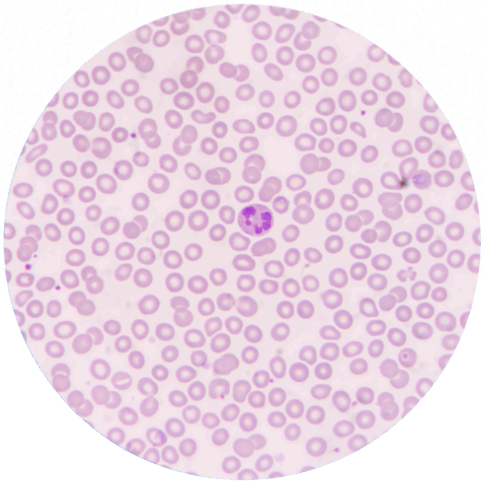
Neutrophils are the most common type of white blood cell, making up about 50-70% of all white blood cells. They play a crucial role in fighting infection.

What Neutrophils Do

- First responders to infection
- Travel quickly to sites of infection
- Surround and destroy bacteria
- Release chemicals that kill germs
- Signal other immune cells to help

Where Neutrophils Come From

- Made in the bone marrow
- Released into the bloodstream
- Live only about 1-2 days
- Body constantly makes new ones



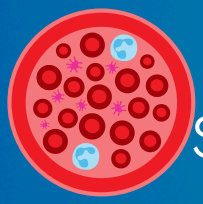
What Happens Without Enough Neutrophils

- Bacteria can multiply unchecked
- Minor infections can become serious quickly
- Infections may not show typical signs (like pus)
- Fever may be the only sign of serious infection

Types of Infections to Watch For

- Skin infections
- Mouth sores and gum infections
- Lung infections (pneumonia)
- Bloodstream infections (sepsis)
- Urinary tract infections

References:
1. American Society of Hematology. "Blood Basics." hematology.org.



SIGNS & SYMPTOMS

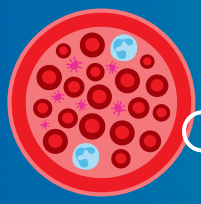
Neutropenia itself often has no symptoms. The danger is that infections can develop quickly and become serious.

WARNING: FEVER IS AN EMERGENCY

If you have neutropenia and develop a fever of 100.4°F (38°C) or higher, this is a medical emergency. Call your doctor immediately or go to the emergency room.

Signs of Infection to Watch For	• Fever (100.4°F/38°C or higher) - most important sign • Chills or shaking • Sore throat or mouth sores • Cough or shortness of breath • Redness, swelling, or pain anywhere • Burning with urination • Diarrhea • Redness or pus around wounds, IV sites, or catheters • Unusual fatigue
Important Notes	• With neutropenia, you may NOT have typical signs of infection • There may be no pus, swelling, or redness • Fever may be the ONLY sign of serious infection • Even a "low-grade" fever is concerning
Check Your Temperature	• Check daily or as directed by your doctor • Check whenever you feel unwell • Know what number to call if you have a fever

References:
1. National Comprehensive Cancer Network. "Febrile Neutropenia Guidelines." nccn.org.



CAUSES OF NEUTROPENIA

Neutropenia can be caused by many different conditions:

CHEMOTHERAPY-INDUCED NEUTROPENIA

The most common cause

- Chemotherapy kills fast-growing cells, including bone marrow cells
- Usually occurs 7-14 days after chemotherapy
- Counts typically recover before next treatment cycle

OTHER CANCER TREATMENTS

- Radiation therapy (especially to large areas)
- Some targeted therapies
- Bone marrow transplant

BLOOD DISORDERS

- Leukemia
- Myelodysplastic syndromes (MDS)
- Aplastic anemia
- Bone marrow failure syndromes

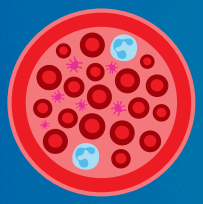
CONGENITAL (BORN WITH IT)

- Severe congenital neutropenia (Kostmann syndrome)
- Cyclic neutropenia
- Other inherited bone marrow failure syndromes

OTHER CAUSES

- Certain medications
- Autoimmune diseases
- Viral infections (HIV, hepatitis)
- Vitamin deficiencies (B12, folate)
- Overwhelming infections

References:
1. American Cancer Society. "Causes of Neutropenia." cancer.org.



How is Neutropenia Diagnosed?

Neutropenia is diagnosed with a simple blood test:

Complete Blood Count (CBC)

A blood test that measures:

- White blood cells (total and types)
- Red blood cells
- Platelets

Absolute Neutrophil Count (ANC)

The key number for diagnosing neutropenia.

Normal ANC: 1,500 - 8,000 cells/microliter

Neutropenia: ANC below 1,500 cells/microliter

How ANC is Calculated

ANC = WBC × (% neutrophils + % bands) ÷ 100
(Your lab will calculate this for you)

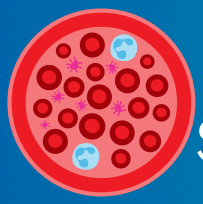
Additional Tests May Include

- Bone marrow biopsy (to check marrow function)
- Blood cultures (if infection suspected)
- Tests for underlying causes
- Genetic testing (for congenital neutropenia)

Monitoring

If you're receiving chemotherapy, your blood counts will be checked regularly - often before each treatment cycle.

References:
1. American Society of Clinical Oncology. "Understanding Blood Counts." cancer.net.



SEVERITY LEVELS

The lower your ANC, the higher your risk of infection:

MILD NEUTROPENIA

ANC: 1,000 - 1,500 cells/microliter

- Slightly increased infection risk
- Usually no special precautions needed
- Continue normal activities

MODERATE NEUTROPENIA

ANC: 500 - 1,000 cells/microliter

- Increased infection risk
- Take extra precautions
- Avoid sick people and crowds

SEVERE NEUTROPENIA

ANC: Below 500 cells/microliter

- High risk of serious infection
- Strict precautions needed
- May need to avoid public places
- Any fever is a medical emergency

PROFOUND NEUTROPENIA

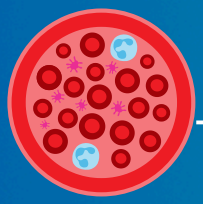
ANC: Below 100 cells/microliter

- Very high risk of life-threatening infection
- Maximum precautions required
- May require hospitalization

Duration Matters

The longer neutropenia lasts, the higher the infection risk. Neutropenia lasting more than 7 days increases risk significantly.

References:
1. NCCN Guidelines. "Prevention and Treatment of Cancer-Related Infections." nccn.org.

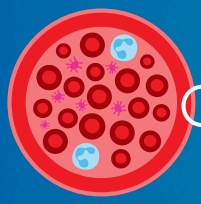


TREATMENT OPTIONS

Treatment depends on the cause and severity of neutropenia:

GROWTH FACTORS (G-CSF)	Medications that help your bone marrow make more neutrophils: • Filgrastim (Neupogen, Zarxio, Nivestym) • Pegfilgrastim (Neulasta, Fylnetra, Udenyca, Ziextenzo) • Eflapegrastim (Rolvedon) Used to: • Prevent neutropenia after chemotherapy • Shorten duration of neutropenia • Treat chronic neutropenia
ANTIBIOTICS	Preventive (Prophylactic): • May be given during high-risk periods • Helps prevent bacterial and fungal infections Treatment: • Started immediately if fever develops • Usually IV antibiotics in the hospital • Broad-spectrum to cover many bacteria
OTHER TREATMENTS	• Treating underlying cause • Adjusting medications that cause neutropenia • Delaying or reducing chemotherapy dose • Treating vitamin deficiencies

References:
1. American Society of Clinical Oncology. "Managing Neutropenia." cancer.net.



GROWTH FACTOR THERAPY

G-CSF (granulocyte colony-stimulating factor) medications help your body make more neutrophils.

How It Works

- Stimulates bone marrow to produce neutrophils faster
- Helps neutrophils mature and work better
- Releases neutrophils from bone marrow into blood

Types of G-CSF

Short-Acting (Filgrastim):

- Neupogen, Zarxio, Nivestym, Releuko, Granix
- Given daily by injection
- Usually started day after chemotherapy
- Continue until counts recover

Long-Acting (Pegfilgrastim):

- Neulasta, Udenyca, Ziextenzo, Fylnetra, Nyvepria
- One injection per chemotherapy cycle
- Given 24+ hours after chemotherapy
- Neulasta Onpro: on-body injector worn home

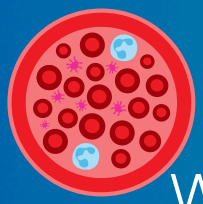
Common Side Effects

- Bone pain (most common) - usually in back, hips, legs
- Injection site reactions
- Headache
- Fatigue

Managing Bone Pain

- Over-the-counter pain relievers (ask your doctor which)
- Antihistamines (like Claritin) may help
- Pain usually improves as counts rise

References:
1. NCCN Guidelines. "Myeloid Growth Factors." nccn.org.

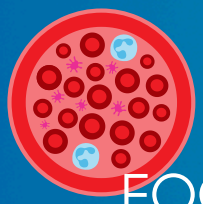


SIDE EFFECTS : WHAT TO EXPECT

COMMON SIDE EFFECTS	⚠ RARE BUT SERIOUS — Seek immediate medical attention:
Bone Pain (most common — up to 30% of patients): • Mild to moderate aching in back, hips, legs, or sternum • Usually starts 1-2 days after injection • Lasts 2-4 days, improves as counts rise • TIP: Loratadine (Claritin) taken 1 day before may help prevent it	Splenic Rupture (rare but serious): • Sudden pain in left upper abdomen or shoulder • Can occur in patients with or without enlarged spleen • Seek emergency care immediately
Injection Site Reactions: • Redness, swelling, or itching at injection site • Usually mild, resolves within days	Allergic Reactions: • Difficulty breathing, wheezing • Swelling of face, lips, or throat • Widespread rash or hives
Other Common Effects: • Headache • Fatigue • Nausea (mild)	Lung Problems (ARDS — rare): • Sudden shortness of breath • Fever with breathing difficulty • Rapid breathing
	Capillary Leak Syndrome (very rare): • Sudden swelling, especially in arms/legs • Low blood pressure, dizziness • Decreased urination

💡 Most patients tolerate G-CSF well. Report any unusual symptoms to your doctor.

References:
1. FDA. "G-CSF Prescribing Information." fda.gov.
2. NCCN Guidelines. "Myeloid Growth Factors." nccn.org.



DRUG & FOOD INTERACTIONS

G-CSF has few drug interactions, but timing with chemotherapy is critical.

⚠️ CRITICAL TIMING WITH CHEMOTHERAPY:

Do NOT give G-CSF within 24 hours BEFORE or AFTER chemotherapy.
- G-CSF stimulates cell growth — chemo kills growing cells
- Wrong timing can reduce effectiveness of both treatments
- Follow your oncologist's schedule exactly

SUPPLEMENTS:

- No known significant interactions with common supplements
- Always tell your doctor about all supplements you take
- Avoid immune-boosting supplements during chemotherapy (echinacea, etc.)

VACCINES:

- Discuss any vaccines with your oncologist before receiving
- Your immune response may be reduced during treatment
- Live vaccines may need to be avoided during certain periods

FOOD INTERACTIONS:

- No specific food restrictions with G-CSF
- Maintain good nutrition to support blood cell production
- Stay hydrated

MEDICATIONS TO DISCUSS WITH YOUR DOCTOR:

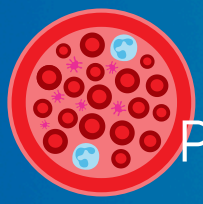
Lithium: May enhance G-CSF effect (can increase white cell counts more than expected). Your doctor may monitor counts more closely.

Topotecan: May prolong neutropenia if G-CSF timing isn't carefully managed.

Other Chemotherapy Drugs: Timing varies — always follow your specific schedule.

💡 The most important thing is following the timing schedule exactly as prescribed by your oncologist.

References:
1. Lexicomp. "Filgrastim Drug Interactions."
2. NCCN Guidelines. "Myeloid Growth Factors." nccn.org.

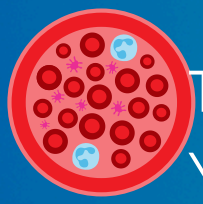


PREVENTING INFECTION

When your neutrophil count is low, taking precautions can help prevent infection:

Hand Hygiene - Most Important!	• Wash hands often with soap and water • Use hand sanitizer when soap isn't available • Ask visitors and caregivers to wash hands too
Avoid Germs	• Stay away from sick people • Avoid crowds during severe neutropenia • Don't share food, drinks, or utensils • Avoid changing diapers or cleaning litter boxes
Food Safety	• Avoid raw or undercooked meat, fish, eggs • Wash fruits and vegetables thoroughly • Avoid unpasteurized dairy and juices • Check expiration dates • Avoid salad bars and buffets
Skin and Mouth Care	• Use soft toothbrush • Avoid flossing if platelets are also low • Use electric razor instead of blade • Moisturize skin to prevent cracks • Clean cuts immediately
Other Precautions	• No gardening without gloves • Avoid standing water (flower vases, humidifiers) • No rectal thermometers or suppositories • Wear shoes at all times

References:
1. CDC. "Preventing Infections in Cancer Patients." cdc.gov/cancer.



TIPS FOR TAKING YOUR MEDICATION

DO:

- Store G-CSF in the refrigerator (do not freeze)
- Let medication warm to room temperature before injecting
- Rotate injection sites (thigh, abdomen, upper arm)
- Follow the injection schedule exactly
- Keep all monitoring appointments
- Report bone pain or side effects to your doctor
- Take preventive antibiotics if prescribed

DON'T:

- Give G-CSF within 24 hours before or after chemotherapy
- Shake the medication
- Use if cloudy, discolored, or has particles
- Skip doses
- Inject into red, bruised, or tender areas

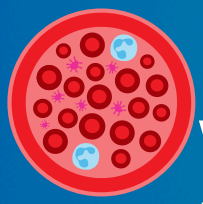
For Neulasta Onpro (On-Body Injector)

- Applied to skin at your appointment
- Delivers medication automatically ~27 hours later
- Keep it dry
- Don't remove it early
- Avoid sleeping on it

Self-Injection Tips

- Clean injection site with alcohol
- Pinch skin and insert needle at 45-90 degree angle
- Inject slowly
- Dispose of needles in sharps container

References:
1. Prescribing information for G-CSF products.



WHEN TO CALL YOUR DOCTOR

⚠ EMERGENCY - CALL IMMEDIATELY OR GO TO ER:

FEVER of 100.4°F (38°C) or higher
This is a medical emergency when you have neutropenia!

Also call immediately for:
- Chills or shaking (even without fever)
- Signs of infection that come on suddenly
- Difficulty breathing
- Confusion
- Severe diarrhea or vomiting
- Bleeding that won't stop

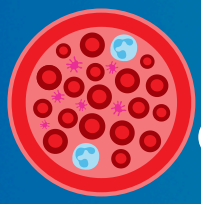
⚠ CALL YOUR DOCTOR'S OFFICE IF:

- Sore throat or mouth sores
- Cough or cold symptoms
- Burning with urination
- Redness, swelling, or pain anywhere
- Diarrhea
- Skin rash
- Unusual fatigue
- Severe bone pain from G-CSF
- Injection site reactions that don't improve
- Questions about your medications

Know Your Numbers
Keep your oncologist's after-hours phone number with you at all times.

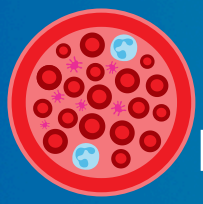
When in doubt, call!

References:
1. American Cancer Society. "When to Call the Doctor." cancer.org.



GLOSSARY

ANC	Absolute neutrophil count - the number of neutrophils in your blood
BONE MARROW	Spongy tissue inside bones where blood cells are made
CBC	Complete blood count - blood test measuring all blood cells
FEBRILE NEUTROPENIA	Fever plus low neutrophil count - a medical emergency
G-CSF	Granulocyte colony-stimulating factor - medication that boosts neutrophil production
IMMUNE SYSTEM	The body's defense system against infection
NADIR	The lowest point blood counts reach after chemotherapy
NEUTROPENIA	Low levels of neutrophils in the blood
NEUTROPHILS	White blood cells that fight bacterial infections
PROPHYLACTIC	Preventive treatment given before a problem occurs
SEPSIS	Life-threatening response to infection throughout the body
WHITE BLOOD CELLS (WBCs)	Cells that help fight infection



RESOURCES

Learn More:

- National Neutropenia Network: neutropenianet.org
- American Cancer Society: cancer.org
- National Cancer Institute: cancer.gov
- Leukemia & Lymphoma Society: lls.org
- American Society of Hematology: hematology.org
- Severe Chronic Neutropenia International Registry: depts.washington.edu/registry
- CDC - Preventing Infections in Cancer Patients: cdc.gov/cancer
- Mayo Clinic - Neutropenia: mayoclinic.org

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