

## Severe Chronic Neutropenia International Registry

Neutropenia is a condition that happens when the level of neutrophils in the blood drop below  $1.000 \times 10^9/L$  or below 1000/cmm (per cubic millimeter). Neutrophils are blood cells that are produced in the marrow, or core of the bones. The blood neutrophils are normally  $2.500$  to  $9.900 \times 10^9/L$ .

Neutrophils are very important because they fight infection. When bacteria invade the body a chemical signal is sent out and the neutrophils, like fire fighters responding to a blaze, rush to the site of infection. The bone marrow also responds by speeding up its production of neutrophils to replace those involved in fighting the infection. If, however, production of new neutrophils is suppressed or slowed down, a shortage may develop, and any infection can overwhelm the few neutrophils available. Therefore, a person with only a few neutrophils is at particular risk for developing a serious bacterial infection.

Severe chronic neutropenia is the condition where the bone marrow doesn't produce neutrophils in the blood above the  $0.500 \times 10^9/L$  level (on a continuing or recurrent basis, or in cycles, lasting for months or years), resulting in not enough neutrophils to fight infection. We believe there are three main groups; congenital (from birth the bone marrow produces almost no neutrophils), idiopathic (occurring some time in life but why is not known, autoimmune neutropenia is in this group), and cyclic (from birth or occurring very early in life the bone marrow starts and stops producing neutrophils in a 21 day cycle; infections, mouth ulcers, and or skin infections occur when a person is at the low point in their cycle). Infections are a serious problem for all patients with neutropenia. Neupogen is a medication that helps the bone marrow to work better, helping the marrow to produce neutrophils. Once on Neupogen congenital patients and idiopathic patients neutrophil counts generally rise into the normal range. On Neupogen cyclic patients neutrophil counts still cycle, however, the goal of treatment is to raise the lowest absolute neutrophil count (ANC) in the cycle so that the person does not develop an infection. The most common side effect with Neupogen is bone pain when the person starts Neupogen. The bone pain generally resolves within the first two months.

There is no special diet or regime that will help neutropenia. After starting Neupogen, generally neutropenic people who have been very ill or limited in their activities find they can return to activities or do things they have not done before. If someone is always tired generally that improves also because the person is not always fighting infection.

Cyclic neutropenia is one of the rarest forms of neutropenia. Very few people or doctors have much experience with it. People with cyclic neutropenia mostly have mouth sores. They might look like canker sores, but if you were to compare them to people who do not have neutropenia the mouth sores look different. Generally the mouth sores come routinely with low cycles, they tend to get big ( $\frac{1}{2}$  inch), are deep, and have a crust that falls off. Most cases of cyclic neutropenia, especially the most severe cases, can be helped with Neupogen by raising the ANC thus reducing the illnesses that occur during the low point of the cycle.

### Mission of the Registry

This international disease registry was established in March, 1994, and is directed by an advisory board of physicians who treat SCN patients and is supported by Amgen, Inc. The mission of this registry is to establish a worldwide database of treatment and disease related outcomes for persons diagnosed with SCN. The information collected will lead to improved medical care and became a focus for future research.

### To Register

Preliminary telephone screening will indicate if the patient meets the eligibility criteria; however, a final determination will be made only after an Advisory Board physician has reviewed the completed registration packet.

## **Steps to Take to Reduce Bacteria Exposure General Information for Families**

### **Diet**

- ◆ Wash all fruits and vegetables with a fruit and vegetable soap to remove bacteria. A good fruit and vegetable wash will remove fungicides, herbicides, pesticides, chemicals, waxes, dirt and oil.
- ◆ All processed foods, such as hot dogs, need to be boiled per the package directions or for at least 5 minutes to eliminate bacteria.
- ◆ All poultry needs to be cooked to appropriate temperature to eliminate bacteria.
- ◆ All non-cooked foods, such as sushi, needs to be handled in a very clean environment. Make sure everyone handling food is wearing plastic gloves.
- ◆ All purchased juices need to be pasteurized - check the label.
- ◆ Ground meat, turkey, chicken, and beef need to be cooked to the appropriate temperature to eliminate bacteria.
- ◆ Utensils, straws, and cups should not be used by more than one person. Sharing will increase the likelihood of bacteria or viruses being transferred.

### **Hand Washing Technique**

- ◆ Lather the soap up between your fingers as well as the palms and backs of your hands.
- ◆ Wash hands for 20 seconds or more, until they are well covered with lather. Rinse.
- ◆ Dry your hands before turning off the water then use paper towel to turn off water.
- ◆ In public bathrooms door handles may have bacteria, so use the paper towel to open the door.

### **Travel**

- ◆ Be prepared with a mask in case someone around you is coughing. N95 mask is rated to filter very small particles.
- ◆ Carry a small bottle of anti-bacterial hand cleaner, such as Purell.
- ◆ Carry or buy bottled water. Use bottle water to brush teeth.
- ◆ Eat cooked food, and avoid fresh food in exotic places.

### **Traveling with Medication That Must be Kept Cold**

- ◆ Carry medication with you in small cooler bag (do not check your medicine as luggage).
- ◆ Insulate the medication from the ice.
- ◆ Carry the prescription label from the pharmacy for customs.
- ◆ Carry twice as many vials, syringes and/or supplies needed for the number of days traveling.
- ◆ Carry all the supplies with the medication and prescription label.
- ◆ Carry a small needle disposal unit.
- ◆ Check with customs on current rules and regulations regarding taking medication in or out of the country.

### **Injecting Subcutaneous Medication**

- ◆ Check with your doctor regarding the best method to inject (administer) the medication.
- ◆ Some subcutaneous medications can be given into the fat of the abdomen, the leg, or the arm.
- ◆ When injecting, gently squeeze the skin together, touch the needle to the skin and then gently insert the needle. You/your child are not a dartboard.
- ◆ When starting daily injections keep a record of where you have injected; the record can be discontinued after you and your physician are comfortable with your routine.
- ◆ To administer into the abdomen use the clock method. Visualize a clock around your navel. Day one, give at 12 o'clock; day two, give at 1 o'clock, etc. If injecting into the leg vary the sites in a routine manner.

## Infants

- ◆ Receiving blankets are excellent for creating a barrier between a young infant and the airborne bacteria and viruses.
  - The baby should be wrapped in two blankets; the inner blanket is considered the clean blanket, the outer blanket is the barrier.
  - The outer blanket can be changed easily if there is an exposure.
  - Carry several clean blankets; this will allow you to change the outer blanket anytime you feel it is no longer clean. The outer blankets are then cleaned normally in the laundry and are ready to be reused.
- ◆ Bath time is an excellent time for a skin and nail check. Look for nails that need to be trimmed to prevent infection from scratches. Check for scratches, cuts, inflammation or infection. Check under arms, on hands, face, knees. Boys: check penis, scrotum, and rectal area. Girls: check labia and rectal area.
- ◆ In the case of persistent diaper rash it may be necessary to see your doctor who may refer you to a dermatologist to determine if the rash is caused by bacteria or may be fungal or both.

## Young Children

- ◆ Teach children good hand washing habits early.
- ◆ Keep toys and play areas clean. Toys and hands are always going into a young child's mouth.
- ◆ When out of the house keep wipes available for quick clean up of your child or the environment, such as grocery store carts.
- ◆ Strangers love to touch and admire children, but limiting this contact reduces exposure to bacteria or viruses.
- ◆ Vaccinations are important. The most common childhood vaccines are live attenuated vaccine and inactivated vaccine.
  - The live attenuated vaccines are produced with a small amount of the living virus or bacteria that is weak, allowing the body to react to the bacteria or virus but not become ill. Rarely someone with a compromised immune system will become ill. The majority of patients with neutropenia have an intact immune system and the attenuated vaccine is safe.
  - The inactivated vaccine stimulates a weaker response because the bacteria or virus has been killed. These vaccines may require boosters to maintain immunity.

## Dental Care

- ◆ See a dentist 2-4 times a year for teeth cleaning. This reduces the plaque build up on teeth.
- ◆ An electric toothbrush and a Sonicare will reduce plaque on teeth.
- ◆ Brush after each meal. When unable to brush, rinse particulate matter from mouth after eating.
- ◆ Mouthwash will reduce particulate matter and bacteria in the mouth. Commercial mouth washes work well. Use non-irritating neutral washes.
- ◆ Fluoride rinse will help prevent tooth decay. It is also has an anti-bacterial action and will reduce the bacteria count in the mouth.
- ◆ Flossing daily will reduce the plaque build up on teeth. The "glide" or "slide" type floss - Johnson and Johnson, Reach Easy Slide, Ultra Shred-Resistant Floss - will be easier to use. They slide more easily across the tooth surface, and are less damaging to gums because less effort is needed to floss, hopefully reducing gum damage.
- ◆ Gum Soft-Picks allow spaces between teeth to be cleaned gently. Using a back and forth cleaning motion at the gum line between teeth will reduce plaque at difficult to reach spaces and will not damage gums that are inflamed from gingivitis or periodontal disease.
- ◆ Orthodontic Care.
  - Children are starting at a younger age with orthodontic care; many orthodontists are using palate expanders, i.e. Hyrax, rapid palatal, or maxillary expanders; and mandible expanders, i.e. Schwarz.
  - All appliances should have every edge checked for roughness, and be double-checked for exposed wires to make sure that no wires are sticking out at the time of adjustment.
  - Expanders are a good place for bacteria and thrush to live, so they need good cleaning at

- least twice a day.
- The mandible expander is made to conform to the tissue of the mouth at the beginning of the process. As it is expanded, edges may become exposed that need to be smoothed or rounded. Mouth sores will develop quickly when edges become rough. Talk with your orthodontist about the best method to prevent and reduce the rough edges. This will prevent or reduce mouth sores.
- Appointments should be scheduled in the first few days of the week, avoiding Friday or pre-holiday appointments, so that if a problem occurs after the appointment you will be able to see the orthodontist the next day to repair or smooth the appliance. If you have to wait over a weekend or holiday with mouth sores because of a rough wire, the orthodontic experience will be more uncomfortable.

### **Skin Care**

- ◆ Develop frequent and good hand washing habits early.
- ◆ Practice good nail care to prevent infections around the nail bed.
- ◆ Clean and treat cuts and scrapes with an antibacterial agent, such as betadine then apply an antibacterial ointment, such as Neosporin, and cover with a Band-Aid promptly.
- ◆ Latex or Nitrile gloves will protect skin, preventing or limiting scrapes or cuts. Use Gloves when handling dirty items, such as when gardening, when working on the car, or cleaning bathrooms.

### **Complete Blood Counts (CBCs or FBCs)**

- ◆ CBCs should be drawn just prior to the next shot or at least 16 hours from the last injection of Neupogen®. Using this method the CBC will show the lowest absolute neutrophil count the patient is experiencing.

Daily Injections	Every Other Day Injections	Three Times a Week Injections	Twice a Week Injections
Just prior to next injection or 16 hours after last injection	Just prior to next injection or more than 36 hours after last injection	Just prior to next injection or more than 2 days since last injection	Just prior to next injection or more than three days since last injection

## Sports and School Kits

### Sports Kit

Item	Purpose
Bottled water	Clean cut or scrape
Betadine or anti-bacterial hand cleaner	Clean cut or scrape
Band-Aids (different sizes)	Cover cut or scrape
Cold pack (that you can activate)	Reduce swelling
Emergency numbers	To contact parents in case of serious injury
Sun screen	Prevent sunburn
Blister pads	Protect skin
Neosporin	Antibacterial ointment for cut or scrape
Consent for emergency treatment	Allows for immediate emergency treatment
Insurance information	May be required for treatment

### School Kit

#### School

Emergency numbers to contact parents  
 Allergy list (if any)  
 Physician and telephone number  
 Current medication list  
 Consent for emergency treatment  
 Insurance information

#### Classroom

Item	Purpose
Tooth brush / floss	Remove food from under gums (popcorn)
Betadine or anti-bacterial hand cleaner	Clean cut or scrape
Band-Aids (different sizes)	Cover cut or scrape
Cold pack (that you can activate)	Reduce swelling
Sun screen	Prevent sunburn
Blister pads	Protect skin
Neosporin	Antibacterial ointment for cut or scrape

## Effective Communication Between Parents and Professionals Managing the Medical Maze

Individuals, families and parents know themselves or their children better than anyone. Trust your feelings, enlist the help of the medical community and look for the medical health professionals who are interested in Neutropenia.

Health care is two-way communication between the patient/parent and the health care provider.

- ◆ Keep records
- ◆ Ask questions
- ◆ Be a broken record (if you do not understand or not understood, keep trying)
- ◆ Be the squeaky wheel
- ◆ Be self-reliant (take charge of your health care)
- ◆ Be your child's / your advocate
- ◆ Enlist your health care provider's help
- ◆ Be your doctor's partner in your health care (be knowledgeable, work together)
- ◆ Be motivated, the process may be a long one
- ◆ Trust your feelings

## **First Doctor Visit**

### Checklist

A 3-ring binder works well to hold and organize information

- ◆ Referral letter from general practitioner or prior health care professional
- ◆ Medical history of patient and family
- ◆ Past medication history
- ◆ Reports from past bone marrow and cytogenetic evaluations
- ◆ CBC reports
- ◆ Other significant evaluations: e.g. MRIs, CT Scans, Bone Density Evaluations
- ◆ Current medication
- ◆ Allergies (medication, food, tape, other)
- ◆ Question list
- ◆ Insurance information

## Patient Information

Name		Birthdate	
Existing Medical Conditions			
Previous Physicians			
Name		Telephone #	
Allergies or Sensitivities			
Medication, Food, Other		Specific Reaction	
Current Medications			
Name		Start Date	Dose
History			
Date	Major Infections – Where – What type	Antibiotics taken - Specify	Hospitalized?
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No
			Yes No

## Doctor Visit

Suggestions for questions

- ◆ Labs – obtain results and ask about implications
- ◆ Medications – should there be any changes
- ◆ Precautions to take
- ◆ Medical status – any changes
- ◆ Treatments – anything new

Questions for the Health Care Professional	Doctors Response / Parents Notes
1.	
2.	
3.	
4.	



To Whom It May Concern:

I am writing in order to clarify any confusion about the health of one of your students, \_\_\_\_\_  
\_\_\_\_\_. This child has severe chronic neutropenia. This is a non-contagious blood disorder. There are three types of neutropenia, congenital, cyclic, and idiopathic. Congenital and cyclic neutropenia can only be passed from the parent's DNA to the child's DNA at conception (people inherit congenital and cyclic neutropenia the same way that they inherit red hair or blue eyes, it is part of their genetic make-up). Idiopathic neutropenia is not inherited and develops in children in a variety of ways, but it is still not contagious. There is no risk of any teachers or classmates contracting this disease. Neutropenia is treated through regular injections of Neupogen (in the same way that diabetes is treated by regular injections of insulin). Although regular treatment with Neupogen allows the neutropenic individual to live a relatively normal life, it is important that adults working with neutropenic children are aware of these children's special needs.

These children are at a higher risk of infections; therefore adults need to watch for cuts and scrapes. It is important that all cuts and scrapes be cleaned and treated with an antibacterial agent such as betadine or anti-bacterial hand cleaner, antibacterial ointment applied (Neosporin) and covered with a Band-Aid promptly. In case of high fevers or sudden fatigue, parents should be notified immediately.

Neutropenic children treated with Neupogen may experience bone pain. The bone pain the child experiences is normal. The pain is generally located in the long bones, pelvis and / or forehead. Once Neupogen is injected and starts working the marrow expands causing pressure within the bone, creating bone pain. Children are not good at describing the pain, and behavioral difficulties that result are best dealt with kind and firm behavior management. These children truly hurt. It is our hope that the pain will diminish as the child becomes more stable on Neupogen. The most severe bone pain has been described by adults as "having my leg broken over and over". Adults take Ibuprofen or narcotics for the pain. It is our hope that children will experience mild bone pain and will only need Ibuprofen or Acetaminophen to receive relief.

If you have any questions about this disorder, please feel free to contact the Severe Chronic Neutropenia International Registry at 1-800-726-4463.

Sincerely,

Audrey Anna Bolyard, R.N., B.S.  
Clinical Manager

To Whom It May Concern:

I am writing to ask for your help with \_\_\_\_\_ who has severe chronic neutropenia, which is a non-contagious genetic blood disorder. There are three types of neutropenia, congenital, cyclic, and idiopathic. In congenital and cyclic patients it can only be passed from the parent's DNA to the child's DNA at conception (it is inherited in the same way that they inherit red hair or blue eyes - it is part of their genetic make-up). Idiopathic neutropenia is not inherited and develops in children in a variety of ways, but it is still not contagious. There is no risk of any coaches or teammates contracting this disease. Neutropenia is treated through regular injections of Neupogen (in the same way that diabetes is treated by regular injections of insulin). Regular treatment with Neupogen allows the neutropenic individual to live a relatively normal life. It is important that adults working with neutropenic children are aware of these children's special needs.

These children are at a higher risk of infections, therefore adults need to watch for cuts and scrapes. It is important that all cuts and scrapes be cleaned and treated with an antibacterial agent such as betadine or anti-bacterial hand cleaner, antibacterial ointment applied (Neosporin) and covered with a Band-Aid promptly. As the child's coach, if you would clean scrapes and cuts at the time of the injury this would prevent infection and allow the child to get right back into the game. In case of high fevers or sudden fatigue, parents should be notified immediately.

Thank you for your help. If you have any questions about this disorder, please feel free to contact the Severe Chronic Neutropenia International Registry at 1-800-726-4463.

Sincerely,

Audrey Anna Bolyard, R.N., B.S.  
Clinical Manager