



# **Inpatient Guide to Musculoskeletal Infections for Patients and Families**

**Children's Minnesota, Orthopedics Surgery Department**



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## **To Our Patients and Families**

Welcome to Children's Minnesota. While here, we want your stay to be as comfortable and convenient as possible. Musculoskeletal infections are a common reason that require hospital stay for children. We understand that this can be uncertain and scary. Our hope is that this guide will help your family understand the diagnosis, team roles, daily interactions, and follow up care during your child's treatment here at Children's Minnesota.

Our first partner in our care is you. You know your child better than anyone else. We look forward to working together to provide the best care possible for your child. Please do not hesitate to reach out to your care team with questions or concerns during your stay.

Sincerely,

Your Children's Minnesota Care Team

## **What is a musculoskeletal (MSK) infection and How Do We Treat it?**

A musculoskeletal infection is an infection involving one or more systems including muscles, bones, or joints. The types of infections your child may have include:

- Osteomyelitis (infection in the bone)
- Myositis (infection in the muscle)
- Septic arthritis (infection in the joint)

Approximately 1 in 5,000 children will have a bone or joint infection in their lifetime. When diagnosed and treated at the right time, children have a good outcome to return to their daily life.

## **What causes MSK Infections?**

Typically, a musculoskeletal infection is caused by bacteria. These infections commonly enter the body through the bloodstream. Most of the time we do not know where or when this happened. Many of these bacteria are in our normal living environment. The infected area may be result of any of the following:

- Direct trauma or surgery
- Spread through the blood
- Spread from a nearby structure that already had an infection (such as a bone infection spreading to a joint)

The most common bacterial causes are:

- Methicillin-sensitive *Staphylococcus aureus* (MSSA)
- Methicillin-resistant *Staphylococcus aureus* (MRSA)

## **What are the signs and symptoms of a MSK infection?**

Signs and symptoms of musculoskeletal infections in children can often vary. The most common signs and symptoms are:

- Pain
- Fever (defined as more than 100.4 degrees F)
- Trouble moving a joint
- Change in skin color
- Swelling
- Warmth at site of infection
- Trouble walking or refusal to bear weight
- Fatigue and generally not feeling well

## **How is a MSK infection diagnosed?**

Several tests may be used to help diagnose a musculoskeletal infection. Some may be blood tests and some may be different types of imaging. Your provider may want the following tests:

- MRI
- Ultrasound
- X-rays
- Lab tests:
  - Complete Blood Counts
  - Erythrocyte Sedimentation Rate (ESR)
  - C-Reactive Protein (CRP)
  - Blood cultures
  - Fluid cultures
  - Wound cultures
  - Lyme serology
  - Cell Count

For definitions of these tests, please see frequently used terms and definitions.

### **How is a MSK infection treated?**

Most infections are treated with antibiotics used for the most common types of bacteria. The antibiotics may be changed during your child's stay if the bacteria can be identified through testing blood, joint fluid, or an abscess (pus). Antibiotics are started through an IV. In some cases, an antibiotic may need to be given through the blood for the entirety of treatment.

If there is a collection of fluid, such as an abscess or infected fluid in the joint, sometimes surgery may be recommended as antibiotic medicines may not be able to get to the area well enough on their own. If your child has surgery, there may be a drain to allow fluid to escape after surgery. A drain is removed at bedside usually within a week after surgery. Sometimes, more than one surgery is needed if the infection does not get better.

## Meet the Teams

During your stay, you may meet many different people and teams. Each of these team members are here to care for your child.

- **Primary Team (Pediatrics Team):** The primary team will manage your child's overall care and is the touchpoint for all teams involved. They will order your child's labs, tests, discuss with other teams involved, and provide their expertise as a trained pediatrics team.
- **Infectious Disease Team:** The infectious disease team includes board-certified pediatric infectious disease specialists and nurse practitioners with experience in infectious disease. The infectious disease team will work with the primary and orthopedics teams to help find causes of infection, antibiotic treatment, and guide care. This is also the team that will likely manage your child's antibiotic course once they go home.
- **Orthopedics Team:** The orthopedics team specializes in bones, joints, and muscles. The orthopedics team specializes in surgery and will help determine if surgery is needed. The orthopedics team is also usually involved in your child's follow up care.
- **Physical Therapy (PT) Team:** The physical therapy team may help your child's mobility and daily activities. A MSK infection can harm, for a short time, the ability to move and do the activities to care for themselves with their body. Physical therapists will help provide resources to improve your child's quality of daily activities such as walking or bathing.
- **Occupational Therapy (OT) Team:** The occupational therapy team may help your child with daily tasks that may have become difficult due to their infection. Occupational therapists will provide resources to improve your child's ability to perform these daily tasks such as bathing, dressing, or toileting.
- **Radiology Team:** The radiology team will perform and interpret imaging tests such as ultrasounds, MRIs, CT scans, and x-rays.
- **Interventional Radiology Team:** The interventional radiology team is a special team of radiologists trained in procedures that do not require open treatment (making an incision). They may be involved if there is a hard to reach area of fluid in the body that can be drained using a special drain.
- **Case Management Team:** The case management team of registered nurses will assist with the overall goal of discharge, or going home. The case manager confirms your child has what they need in place before going home. This may include equipment for home, home nursing, or arrangement for follow up appointments.
- **Social Work Team:** Clinical social work services focus on the psychological and social impact of the health care needs of the family system. Social workers assist patients and families with the physical, emotional, and social issues and concerns that exist during a hospitalization.

## **What to Expect While in the Hospital**

Each day, the different teams involved in your care will perform “rounds” – this is the time of day they will review labs, examine your child, and discuss with other teams the best plan of care. Different teams may round at different times of day. This is the time to update your care team on your child’s progress. You are the best observer and know your child best. Your input is always important! The primary team will then share an update to the family on the plan of care.

Your child may have labs (a blood draw) every other day to check their progress. Labs may be drawn more often if your child has a fever to check for bacteria in the blood.

Your child may have different medicines prescribed during their stay. Each day, orders are reviewed by the nursing staff and medicines given as ordered. These medicines may include antibiotics and pain medicines.

Vital signs, such as temperature, blood pressure, breathing rate, and heart rate will be taken many times a day to check how the treatment is working on your child.

## What to Expect After You Go Home

After discharge you will continue to follow up with (see) many care teams, including:

- Infectious disease:
  - You will have appointments with the infectious disease team to manage antibiotic medicine
  - Follow up happens approximately one week after discharge
  - Labs may be taken during these appointments to monitor your child's progress
  
- Orthopedics:
  - If a surgery was performed, an appointment to check the wound where the cut was made in surgery may be requested
  - You will have wound care instructions to follow when you leave the hospital
  - The orthopedics team will see your child after the antibiotic medicine is completed. If your child's bone was part of the infection or treatment, the orthopedics team may want to follow your child longer term.



## **When Should I Call**

Reasons to call your infectious disease team:

- Fever of 100.4 F or more
  - If you do not have a thermometer at home, please contact your team and they will be able to help arrange for one
- Questions about the antibiotic medicine
- Questions about labs after discharge

Reasons to call your orthopedics team:

- Pain that is getting worse and medicine is not helping
- Unable to walk or put weight on the injured or infected area
- More pus, draining, or redness coming from the bandage or wound site
  - Take photos to show your care team

### Children's Infectious Disease Clinic

Children's Specialty Center  
2530 Chicago Avenue South  
Suite 410  
Minneapolis, MN 55404

Children's Specialty Clinic  
347 North Smith Avenue  
Garden View Medical Building, 3<sup>rd</sup> Floor  
St. Paul, MN 55102

Main: 612-813-6777

Infectious Disease Nurse Triage: 651-220-7148 (M-F 8a-4p)

### Children's Orthopedic Clinic

Children's Specialty Center  
Orthopedic Clinic  
2530 Chicago Avenue South  
Suite G070, Basement  
Minneapolis, MN 55404

Main: 651-220-5700

## **Frequently Asked Questions**

### **What caused my child's infection?**

Most often, it is unknown exactly how your child got an infection. Children are more likely to have a bone and joint infection because they are growing and have more blood flow to their bones and other growing structures. Sometimes local trauma, such as a bruise, can lead to bacteria finding its way into an injured area.

### **How long will my child be in the hospital?**

The length of hospital stay will depend on how bad the infection is. Most children with a musculoskeletal infection typically stay in the hospital 1-2 weeks.

### **Will my child be more likely to get future infections?**

Once an infection is gone, your child is not likely to get a future bone or joint infection. If your child is immunocompromised (cannot fight diseases as easily), there may be exceptions. Please talk to your treating team about this.

### **Why is my child not allowed to eat or drink overnight?**

MSK infections are hard to predict. By keeping your child's stomach empty, it allows the team to perform surgery, if needed. This does not automatically mean surgery will be done. Your medical team will let you know when, or if, it is okay for your child to eat that day.

### **Why can't my child participate in all of their activities?**

When a bone or joint infection occurs, it can cause weakness in the area of infection. For example, if the infection was in the bone, that area of the bone is weaker. This puts your child at greater risk for a fracture, or broken bone. Limiting activities lowers risk for more harm. Your team will provide guidance on when it is safe to return to activities.

### **How long will my child need to take antibiotic medicine?**

Typically, antibiotic medicines are recommended for 4-6 weeks. The length of time will depend on how severe the infection is.

### **If my child feels better, can they stop taking the antibiotic medicine?**

Your child should continue to take all the medicine prescribed by your team. If an antibiotic is stopped too early, the infection may come back or cause antibiotics to not work in the future.

### **How do we know that my child is on the correct antibiotic medicine?**

Your child's care team may look at the bacteria in the blood through blood draws or the infection itself. If the type of bacteria your child has is known, the care team knows what antibiotic medicine to give. In cases where the specific bacteria is not known, it is treated based on the most common causes. Your child will be monitored if the antibiotic is working based on if there is improvement in the lab tests.

### **Is my child contagious?**

Bone and joint infections are not typically contagious as they are within the body. If there is a wound involved or a surgical site, avoid direct contact with the wound and always wash hands before and after any dressing changes or contact with the area. This can help prevent the spreads of bacteria from direct contact.

**What is MRSA?**

MRSA (Methicillin-resistant *Staphylococcus aureus*) is a specific type of bacteria that causes a staph infection that can be more difficult to treat because it is resistant to certain antibiotics. MRSA infections are becoming increasingly common in the community. If your child has a MRSA infection, they may be on “contact precautions”, meaning that staff may wear more protective equipment to help prevent the spread of MRSA.

**What is Lyme disease?**

Lyme disease, also known as *Borellia burgdorferi*, is caused by deer ticks. Most often we do not know when a tick bite occurred. Lyme disease can cause swelling in a joint, most commonly the knee. Lyme disease is treated with antibiotics.

**How do I care for my child’s wound at home?**

You will receive detailed instructions for wound care in your discharge paperwork. Please contact your nursing staff if you have any questions or concerns before going home.

**What are some of the complications of MSK infections?**

Most MSK infections do not have long term complications. Some of the complications could include arthritis, growth disturbance, fractures, or joint dysfunction. Discuss details with your care team about your child’s specific infection.

## **Resources and Contact Information**

- **Interpreter Services:** Interpreter services are available 24 hours a day, 7 days a week for patients at Children’s Minnesota. Children’s Minnesota offers interpreter services for many languages to assist patients and families free of charge. Please contact us at 612-813-7600 to request an interpreter.
- **Social Work:** During normal business hours (Monday-Friday, 8:00am to 4:30pm), you can call the Social Work department directly at 612-813-6138 (Minneapolis) or ask your child’s nurse, physician, or other care provider to request a social worker.
- **Billing**
  - For hospital payments: 952-992-5650
  - For clinic payments: 952-992-5640

### Children’s Minnesota Main Hospital

2525 Chicago Avenue South  
Minneapolis, MN 55404  
Main: 612-813-6000, Children’s Operator

### Children’s Infectious Disease Clinic

Children’s Specialty Center  
2530 Chicago Avenue South  
Suite 410  
Minneapolis, MN 55404

Children’s Specialty Clinic  
347 North Smith Avenue  
Garden View Medical Building, 3<sup>rd</sup> Floor  
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Minneapolis, MN 55404

Main: 651-220-5700

## Frequently Used Terms and Definitions

- **Abscess:** caused by an infection, a pocket of pus.
- **Acute:** an illness or symptom that begins suddenly or lasts a short time.
- **Antibiotics:** a medicine that stops the growth of or kills very small germs such as bacteria.
- **Arthrocentesis:** a procedure where joint fluid is removed from a joint using a needle.
- **Bacteremia:** bacteria in the blood.
- **Bursa:** a tiny, slippery sac of fluid that provides a cushion and reduces friction between the surfaces of a bone and soft tissue.
- **Bursitis:** inflammation of a bursa.
- **Cellulitis:** an infection of the skin and the soft tissues underneath.
- **Chronic:** something, like a disease or symptom, that lasts for a long time.
- **Computerized Tomography Scan (CT or CAT Scan):** a type of imaging that uses computers and rotating x-ray machines to create cross-sectional images of the body.
- **Cultures:** to take cells or tissues from your body and watch them grow.
- **Hematogenous:** refers to in the blood.
- **Intravenous (IV):** taking place within or given into a vein or veins.
- **Magnetic Resonance Imaging (MRI):** an imaging test that creates three-dimensional images of body tissues using a large magnet and radio waves.
- **Myositis:** an infection of muscle.
- **Nothing per oral (NPO):** nothing to eat or drink to keep the stomach empty.
- **Osteomyelitis:** an infection of bone.
- **Peripherally Inserted Central Catheter (PICC line):** a type of central line similar to an intravenous (IV) line, but it is much longer than a regular IV and goes all the way up to a vein near the heart. Part of the PICC stays outside of the body, usually where the arm bends.
- **Physis:** a rubbery disc separating the end of the bone from the shaft of the bone and helps the growth of long bones, also known as the growth plate.
- **Septic Arthritis:** an infection in a joint.
- **Subperiosteal abscess:** a collection of pus in the space between the outer layer of the bone and the inner layer.
- **Ultrasound:** a diagnostic technique that uses high-frequency sound waves to create images of organs and tissues.
- **X-ray:** a quick and painless test that makes an image to create pictures of the inside of the body, most often used to see bones.

