

# Antibiotics Used in Pediatric Urology

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## What are antibiotics?

Antibiotics are drugs that kill bacteria or prevent their growth. These medicines have been available for little more than 40 years, but have revolutionized medical care.

## What are bacteria?

Bacteria are tiny single-cell organisms. They are so small that they can only be seen with a microscope. Because of this fact they are called micro-organisms. Another term for bacteria is **germ**. There is no universal antibiotic that is effective against all types of bacteria and different antibiotics are effective against different bacteria.

In order to select the proper antibiotic, we need to collect a urine sample or a sterile blood sample. We collect urine either with a clean sample (peeing into a sterile container) or through a urinary catheter. The material is then grown in a laboratory for several days to allow the laboratory experts to determine the type of bacteria and which antibiotic is likely to be effective against it. This form of evaluation is called a **culture and sensitivity test**. This is not always practical and certainly is not immediate. The results usually take about 48 hours. Therefore, we sometimes will make a calculated guess at what an effective antibiotic will be for a certain person or condition. This is called clinical judgment.

Sometimes microorganisms develop resistance to a particular drug and another agent must be substituted. Many families ask if a child might become “immune”

to an antibiotic, but this is not the case. The patient does not develop immunity to the medicine, but a particular germ can develop resistance to the drug.

### **Are antibiotics safe?**

Just as there is no perfectly effective antibiotic, there is no perfectly safe antibiotic. Every form of medicine has pros and cons. The major risks of most antibiotics are very minimal but can be serious. We recommend use of antibiotics only when clinical judgment suggests they are necessary. The symptoms of many of the diseases we treat in children are severe and the consequences of the diseases can be tragic. The antibiotics we use have excellent records in terms of efficacy and infrequent serious complications, but no antibiotic is completely effective or completely without risk.

### **How are antibiotics used?**

We generally use antibiotics in one of three ways:

- 1. Therapeutic use:** Here we are treating a specific proven or suspected infection. The dosage, delivery means (oral, intravesical, intramuscular, or intravenous), and duration depend on the severity of the infection. A bladder infection (in the absence of vesicoureteral reflux) may create severe symptoms but is unlikely to put the kidneys at risk from damage so oral antibiotics are usually sufficient. Kidney infections, especially in young children, can produce life-threatening sepsis (blood-borne infections) and can destroy kidneys. These infections require aggressive intravenous drug therapy based on specific culture and sensitivity data.
- 2. Long term preventative (prophylactic) use:** Here we use low doses of antibiotics over a long time period to try to prevent recurrent urinary infections that may be disabling to a youngster's childhood, or to prevent kidney infection and damage in children with vesicoureteral reflux while we are waiting for the reflux to resolve. Many children with neurogenic bladder

who intermittently catheterize end up needing prophylaxis because of recurrent infections that may not always have symptoms.

3. **Short term prophylaxis use:** Here we use a short course of antibiotics administered to try to prevent an infection when doing a specific intervention such as urodynamic testing, a radiological study involving a catheter, or a genitourinary tract operation.

### **What are the risks associated with antibiotics?**

There are many serious risks and complications from the antibiotics used in Pediatric Urology practice. Not every reaction reported in relation to an antibiotic is necessarily due to that drug. But some drugs have recognized complications.

**Ampicillin & Amoxicillin** are in the penicillin class of antibiotics and are often used to treat a specific infection. These should be avoided in people with penicillin allergy. We generally avoid these for long-term use because resistant germs develop easily and they tend to cause diarrhea.

**Furadantin/Macrodantin** have been used successfully for a long time in urology. This antibiotic primarily stays in the urinary tract and resistance to it is not easily developed. It is good for acute (short, sudden) lower tract infections or long-term prophylaxis. Some children experience gastrointestinal upset with the liquid Furadantin form. An exceedingly rare form of pulmonary fibrosis may occur with this.

**Sulfa drugs** were among the very first antibiotics available. They are used for bladder inflammation and long-term use. Resistance may develop rather easily. Some people experience skin rash with sulfa drugs. These are usually mild and self-limited once the drug has been stopped. A very rare and dangerous skin reaction can also occur.

**Bactrim/Septra** are different brand names for the same drug which combines two types of antibiotics: a sulfa component and trimethoprim. The result is a very effective antibiotic that interferes with common urinary tract bacteria. Resistance is not developed easily and this drug is easily tolerated over long periods. This is also effective for many ear, sinus, and lung infections. In addition to the possibility of sulfa reactions, the white blood cell count is also influenced by trimethoprim, having a tendency to fall a little more than usual in simultaneous viral infections. One very rare complication may be a severe form of anemia in which the blood cells do not replenish themselves.

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