



Patient/Caregiver Discussion Guide

When talking to families, start with the reason a fluoroquinolone is being recommended.

“We recommend [drug] for [infection] because [culture finding or clinical reason]. We considered [alternative], but [why it is less suitable]. We use this medicine selectively in children. Here is what to watch for and how to reach us.”

Confirm before counseling	Patient specific detail
Infection and evidence	Infection site, organism (if known), and susceptibility results or clinical rationale
Why this oral drug	Resistance, lack of a suitable oral alternative, allergy assessment, or site of infection
Plan	Drug, formulation, weight-based dose, duration, culture review, follow up

Questions Families May Ask

Family asks	Suggested response
Why are fluoroquinolones rarely prescribed for children?	“Another antibiotic is usually preferred. However, for your child, [specific reason] makes this antibiotic a better choice. We will review culture results and change treatment if a better option becomes available.”
Will fluoroquinolones hurt growing joints or tendons?	“Animal studies initially raised concerns about joint damage. Some studies in children have reported more joint or muscle symptoms with fluoroquinolones than with other antibiotics, but lasting joint damage has not been established. Tendon injuries, including tendon rupture, are rare but can occur during or after treatment. Call us for new pain, swelling, or a limp.”
Are fluoroquinolones safe? What does the black box warning mean?	“Most children tolerate treatment, but serious side effects involving tendons, nerves, or the brain and nervous system can occur and may persist. Stop the medicine and contact us right away if a warning symptom appears. We will reassess and arrange another treatment if needed.”
Are there children who should avoid fluoroquinolones?	“Yes. We check for allergies to fluoroquinolone antibiotics, any history of a past serious reaction to these medications, and medical conditions such as myasthenia gravis, Ehlers-Danlos syndrome, or Marfan syndrome. We also review other medications or health conditions that may affect treatment choice. We reviewed these risks for your child and feel the benefit outweighs the risks at this time.”
Could we use another antibiotic?	“We would if it treated this infection well. [Alternative] is [resistant on testing / not an appropriate oral option / unsuitable after allergy review]. We plan to use the shortest effective course.”
How often do serious side effects happen?	“There is no single reliable percentage that describes the risk of all serious side effects in children. We have study numbers for certain symptoms, but postmarketing reports do not tell us how often an individual child will have them.”
What should we do at home?	“Give the prescribed dose on schedule. Check with your pharmacist about medication interactions and timing with food, supplements, or antacids. Instructions may vary by formulation. Call us before changing the course; use the warning symptom plan below.”

End With a Home Plan

“Stop the medicine and call [daytime number / after hours number] immediately for tendon pain, a new limp, tingling or numbness, weakness in the arms, legs, hands or feet, marked confusion, unusual behavior, a new rash, severe diarrhea, persistent vomiting, or yellow eyes or skin. Seek emergency care for breathing trouble, facial swelling, seizure, fainting, or a blistering rash.”



High-yield Information for Clinicians

Fluoroquinolone Patient Screening and Selection

When to choose	Reserve for bacterial infections when culture/susceptibility, resistance, allergy, or lack of an equally safe and effective alternative makes benefit compelling; an oral agent may avoid IV therapy. Reassess culture results and use the narrowest effective regimen. AAP recommends limiting pediatric use when safe, effective alternatives exist.
Before prescribing	Ask about a prior serious quinolone reaction, tendon disease, neuropathy, seizure/CNS vulnerability, myasthenia gravis, Ehlers-Danlos syndrome, Marfan syndrome, kidney disease, diabetes, and interacting medicines. Review QT-prolonging drugs and patient-specific risks.

Oral Administration

Ciprofloxacin	- May administer with food to minimize GI upset. Ensure adequate hydration. Avoid concurrent administration: - Give at least 2 hours before or 6 hours after the following products: antacids or other products containing magnesium, aluminum, calcium, iron, or zinc, sucralfate, and certain binders like Kayexalate. - Do not give with milk, yogurt, or calcium-fortified juice alone, but can be taken with a meal containing these products. Administration with enteral feeding tubes: Do not administer oral suspension through feeding tube – use immediate release tablets. Consider holding enteral nutrition 1–2 hours before and 1–2 hours following ciprofloxacin administration. - Caffeine levels may rise; restrict caffeine if excessive cardiac or CNS stimulation occurs.
Levofloxacin	- Tablets may be administered without regard to meals. Oral solution should be administered at least 1 hour before or 2 hours after meals. Ensure adequate hydration. Avoid concurrent administration: Give at least 2 hours before or 2 hours after the following products: antacids or other products containing magnesium, aluminum, calcium, iron, or zinc, sucralfate, and certain binders. Administration with enteral feeding tubes: Consider holding enteral nutrition 1 hour before and 2 hours following levofloxacin administration.

Adverse Effects: Counseling and Monitoring

Common Side Effects	Ciprofloxacin: Nausea (3–4%), diarrhea (2–5%), rash (1–2%), CNS symptoms: dizziness, drowsiness, headache (1–3%) Levofloxacin: Nausea (7%), diarrhea (5%), rash (2%), CNS symptoms [dizziness (3%), headache (6%), insomnia (4%)]
Musculoskeletal	Ciprofloxacin: 9–22% of children. In a randomized trial of ~700 children, musculoskeletal events were reported more often with ciprofloxacin than the comparator within 6 weeks and at 1 year. Levofloxacin: In a pooled analysis of ~2,500 children, events including arthralgia were more frequent after levofloxacin than in the comparator group at 2 and 12 months; no physical joint abnormalities were observed.
Joint	Arthropathy/arthralgia can occur; actual incidence is unknown. Typically present as transient arthralgia rather than true structural arthropathy. Symptoms generally resolve after stopping treatment without long-term sequelae. Follow-up of ~200 initial patients for up to 5 years found no difference in ongoing musculoskeletal adverse events between levofloxacin and comparator.
Tendon	Tendinopathy or rupture may involve Achilles, hand, rotator cuff, biceps, or thumb tendons. It may begin within hours or days, or months after treatment ends. One estimate suggests an Achilles tendinopathy incidence of approximately 0.2% in exposed children; however, the overall incidence in pediatric patients remains uncertain.
CNS & Nervous System	Associated with a range of neurologic and psychiatric effects including dizziness and restlessness to psychosis. Additional reactions include confusion, agitation, insomnia, drowsiness, and more severe reactions including hallucinations, and seizure. In children, adverse reactions including confusion, depression, and unusual behavior were reported in <1% of patients receiving ciprofloxacin or levofloxacin. Peripheral neuropathy was reported in < 1% but can sometimes be irreversible.
Other risks	QT prolongation risk is higher for levofloxacin than ciprofloxacin. Aortic aneurysm/dissection risk may be higher in children with certain conditions, including Marfan or Ehlers-Danlos syndrome. Avoid fluoroquinolones in these patients. Dysglycemia (hyper- and hypoglycemia) are associated with fluoroquinolone use, specifically in patients with diabetes, CKD, or concurrent use of hypoglycemic agents or steroids. Hepatotoxicity has been reported rarely.

***Explaining the Uncertainty in Musculoskeletal/Joint/Tendon Outcomes***

Cartilage toxicity has been reported in juvenile animal studies, including cartilage erosions and noninflammatory effusions in weight-bearing joints. Findings vary by species and dose, with dogs exhibiting the highest rate of arthralgias. This led to a relative contraindication of fluoroquinolones in pediatric patients. However, fluoroquinolones have continued to be prescribed for select children with difficult-to-treat infections when the benefits of treatment may outweigh the risk of cartilage toxicity. Retrospective and prospective safety studies have found that joint symptoms are uncommon and are generally reversible in children receiving ciprofloxacin for cystic fibrosis or receiving nalidixic acid or norfloxacin. Additionally, MRI studies of treated children have not identified subclinical cartilage damage.

Unlike the largely reversible joint symptoms observed in pediatric studies, fluoroquinolone-associated tendinopathy and tendon rupture represent distinct, potentially serious adverse effects. Tendon injuries appear uncommon in children, with one large retrospective cohort reporting Achilles tendinopathy in 0.2% (12/6,229) of fluoroquinolone-exposed children within 30 days of treatment initiation; this association was not statistically significant after adjustment for confounders. Tendon rupture appears even rarer, with few cases reported in children. When tendon injury occurs, it most commonly involves the Achilles tendon, although other tendons may be affected. Symptoms can develop during or after treatment has ended. Clinicians should counsel families to monitor for new tendon pain, swelling, or difficulty walking, particularly heel pain or pain along the back of the leg. If symptoms occur, patients should discontinue treatment and seek prompt evaluation.