AMPLIFY

You're Doing It Wrong: Debunking Myths in Pediatric Urgent Care Medicine

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Myth Busting in Pediatric Urgent Care

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Financial Disclosures

- None
  - Nada
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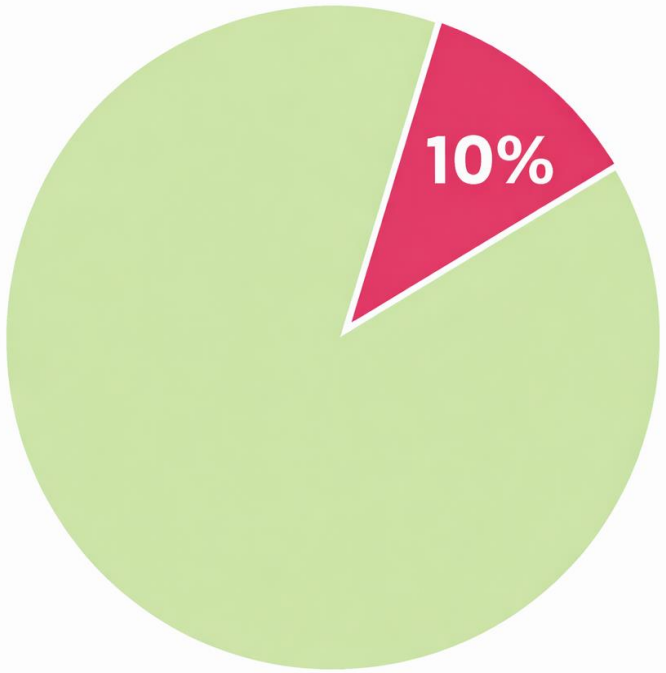
            - Nessuno

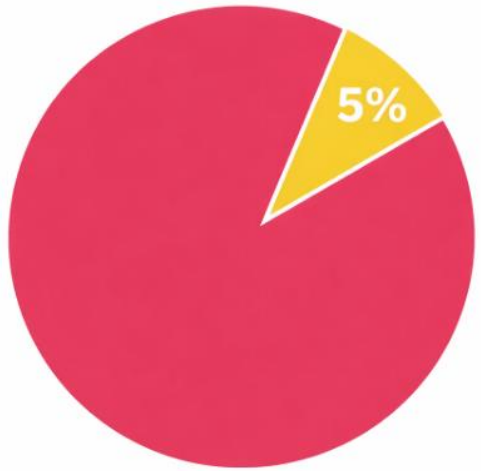
Myth 1

Lots of kids are allergic to amoxicillin

Penicillin/Amoxicillin Allergies



Reported allergy = 10%



Of this 10%, true allergy = 5%

2019 - Of those who report allergy (the 10%), those who demonstrate true allergy*

- 1.98% children
- 7.78% adults

< 1% population allergic to Penicillins

Consequences of Penicillin Allergy Label

- Suboptimal antibiotic therapy (second line agents)
- 50% higher rate of surgical site infections
- More adverse drug reactions
- Increased C difficile infections
- Longer hospital stays, increased readmission rates
- Increased mortality
- Increased cost

Why are so many kids diagnosed with an amoxicillin allergy?

- Misattribution mostly
- Lots of viral rashes
- Antibiotics can cause side effects (GI symptoms, candidal diaper rash, headache)
- Antibiotics can cause benign delayed hypersensitivity rashes
- Clear allergy evaluation is not done at time of reaction/rash/symptoms

Penicillin Adverse Reactions in Children

NON-IMMUNE REACTIONS ("Type A")

Predictable side effects

- Diarrhea
- GI upset
- Yeast diaper rash

IMMUNE-MEDIATED ("Type B")

Drug-specific immune Hypersensitivity Types

- Hypersensitivity Types (Gell-Coombs I-IV)

HYPERSENSITIVITY TYPES

(Gell-Coombs Classification)

Type I Immediate

Mechanism:

- IgE on mast cells > histamine release
- **Minutes – 1 hour**
- Most feared reaction
- Anaphylaxis <0.015%

Type II Cytotoxic

Mechanism:

- IgG antibodies against drug-coated cells
- Minutes – 1 hour

Rare

Type III Immune Complex Immune > Complex

Hours – Days

- Circulating immune complexes deposit in tissues
- **Hours – Days**
- Serum sickness-like syndrome
- Fever → Rash
- Lymphadenopathy

Type IV Delayed T Cell-mediated

Clinical Features:

- Maculopapular rash
- Delayed exanthem
- Drug fever
- Contact dermatitis
- **Hours – Days**

Most common rash reaction

Rapid Decision Algorithm

- **Step 1 – Timing**
  - < 2 hour = treat as antibiotic allergy
  - Day 5-10 = benign rash
  - Day 7-14 + systemic symptoms = possible serum-sickness-like reaction, ?SCARs
- **Step 2 – Morphology**
  - Hives – might be allergy
  - Maculopapular – benign/viral
- **Step 3 – Child Appearance**
  - Well appearing = reassuring
  - Systemic symptoms = investigate further

Pediatric Antibiotic Rash Comparison

Feature	Benign Amoxicillin Rash	Viral Exanthem	Serum Sickness–Like Reaction	IgE Allergy
Timing	Day 5–10 of therapy	With viral illness	Day 7–14	Minutes–hours after dose
Morphology	Maculopapular	Maculopapular	Urticarial / target-like	Hives (urticaria)
Itching	Mild	Mild	Variable	Severe
Systemic symptoms	None	Viral symptoms	Fever + arthralgia	Possible anaphylaxis
Allergy label?	No	No	Avoid drug	Yes

Urticaria

- Raised wheals
- Transient
- Itchy
- Blanching erythema
- Variable distribution
- Rapid onset

Viral Rashes – Don't call it an Amoxicillin Allergy

Human Herpesvirus 6
(Roseola)

Erythema
Infectiosum
(Fifth Disease)

Infectious
Mononucleosis

Coxsackievirus
(Hand Foot and Mouth)

Drug Rash – Don't call it an Amoxicillin Allergy

- Morbilliform Drug Eruption
  - Blanching
  - Maculopapular
  - No or mild pruritis
  - Well child

Urticaria Multiforme – Don't call it an Amoxicillin Allergy

- **Viral**, Vaccine, or Medication Trigger
- Benign cutaneous hypersensitivity reaction
- Annular/polycyclic wheals
- Acral edema
- Migratory

Timing is key!

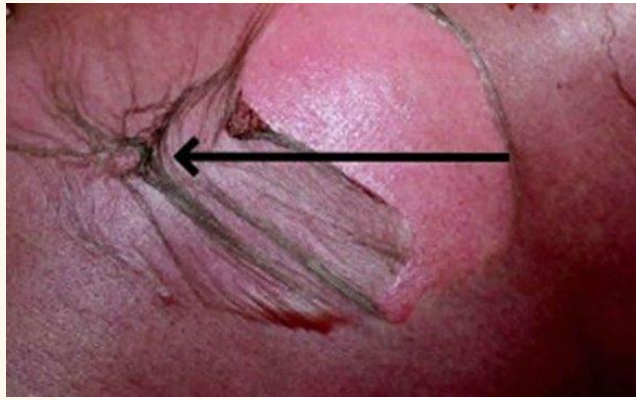
Serum Sickness-Like Reaction

- Urticarial, polycyclic wheals, target lesions
- Joint swelling
- Lymphadenopathy
- Fever

Avoid Medication

Severe Cutaneous Adverse Reactions (SCARs)

- Mucosal involvement, blistering
- Nikolsky sign
- Systemic symptoms
- Rapid evolution
- Multiorgan involvement



Avoid Medication

Severe Cutaneous Adverse Reactions (SCARs)

- Serum sickness like reaction
- Stevens Johnson syndrome/Toxic epidermal necrolysis
- DRESS syndrome (Drug Reaction with Eosinophilia and Systemic Symptoms)
- AGEP (Acute Generalized Exanthemous Pustulosis)

Avoid Medication

Pediatric Antibiotic Rash Clinic Management

Timing	Findings	Diagnosis	Treatment changes	Label as Allergy	Follow up
Minutes to hours	Hives, swelling Anaphylaxis	Acute urticaria Angioedema Anaphylaxis	Treat anaphylaxis Supportive care Stop the medication	Yes	Depends upon severity of reaction
1-14 days	Various – usually Maculopapular rash	Viral rash	None	No	As needed
5-14 days	Maculopapular rash	Benign Amoxicillin rash (delayed hypersensitivity)	None	No	1-2 days PCP
5-14 days	Annular/polycyclic wheals	Urticaria Multiforme	Antihistamines Ibuprofen	No	1-2 days PCP
7-14 days	Annular/polycyclic wheals Joint pain, swelling, Fever	Serum Sickness Like Reaction	Antihistamines Ibuprofen Avoid steroids if possible	Avoid medication	1-2 days PCP
4-28 days	Fever, lymphadenopathy, edema, mucous membrane lesions, subepidermal bullae	SJS/TEN spectrum DRESS syndrome AGEP	Depends upon findings	Yes	Depends upon severity of reaction

Careful Documentation

Don't call it a drug allergy unless it clearly meets criteria for an IgE mediated allergic reaction (or SCAR)

Reassure families that most rashes while taking Amoxicillin are non-allergic

Recommend a re-evaluation in 1-2 days

Myth 2

Benedryl is a safe medication in children

First Generation Antihistamines

- Current guidance strongly discourages the use of first-generation antihistamines like diphenhydramine in children.
  - Generic names: diphenhydramine, chlorpheniramine, promethazine, hydroxyzine, meclizine, dimenhydrinate, doxylamine, clemastine
  - Brand names: Benedryl, Chlor-Trimeton, Phenergan, Vicks NyQuil, Dramamine, Tavist, Unisom
- Competitive, reversible inhibitors of histamine H1 receptors – non-selective, cross the blood brain barrier

Safety Concerns in Children

- Paradoxical excitation
- Sedation and Performance Impairment in school/activities
- Anticholinergic effects (dry mouth, tachycardia, urinary retention)
- Hallucinations, seizures or death

Diphenhydramine Risks in Children

- 1,200-1,500 emergency department visits annually in children
- Rate of ED visits for liquid diphenhydramine ingestions was 8.1 per 100,000 bottles sold (comparable to clonidine and other high-risk Rx)
- Diphenhydramine-related seizures: 404 cases in 2023 (½ to PICU)
- Most ED visits and hospitalizations occur in children < 6 years
- Neurodevelopmental risks??

Second-Generation Antihistamines

Medication	Brand	Minimum Age	Pediatric Dose
Cetirizine	Zyrtec	≥ 6 months	6–23 mo: 2.5 mg daily 2–5 yr: 2.5–5 mg daily ≥ 6 yr: 5–10 mg daily
Loratadine	Claritin	≥ 2 years	2–5 yr: 5 mg daily ≥ 6 yr: 10 mg daily
Fexofenadine	Allegra	≥ 6 months	6–23 mo: 15 mg BID 2–11 yr: 30 mg BID ≥ 12 yr: 60 mg BID or 180 mg daily
Levocetirizine	Xyzal	≥ 6 months	6 mo–5 yr: 1.25 mg daily 6–11 yr: 2.5 mg daily ≥ 12 yr: 5 mg daily
Levocetirizine	Xyzal	≥ 6 months	6 months–5 yr: 1.25 mg bily 6–11 yr: 2.5 mg daily ≥ 12 yr: 5 mg daily
Desloratadine	Clarinex	≥ 6 months	6–11 months: 1.25 mg daily 1–5 yr: 1.25 mg daily 6–11 yr: 2.5 mg daily ≥ 12 yr: 5 mg daily

Cetirizine/Levocetirizine:

- Most potent
- Cetirizine fastest acting (20 mins)
- Can be mildly sedating
- Well-established long-term safety data

Amplify the News!

- Adjust your formulary
- Stop recommending first-generation antihistamines
- Many second-generation formulations: liquid, chewables, dissolvable tabs, pills

- Topical benedryl also not a great idea (some evidence it may sensitize further to allergen you are treating)

Myth 3

Stick with one dose of ondansetron

Ondansetron (Zofran)

History

- Developed by Glaxo in the 1980s
- First selective 5-HT3 receptor antagonist
- FDA approved in 1991
- Initially for chemo-induced nausea

Mechanism of Action

- Selective 5-HT3 receptor antagonist
- Blocks serotonin signaling
- Works at: GI vagal afferent nerves at chemoreceptor trigger zone

Common Clinical Uses

- Chemotherapy-induced nausea
- Post-operative nausea/vomiting
- Widely used in ED and urgent care

Key Safety Points

- Generally non-sedating
- Minimal extrapyramidal effects
- QT prolongation possible
- Rare: serotonin syndrome

One and Done

Single-dose ondansetron – Oral or IM

- Reduces vomiting
- Improves tolerance of oral rehydration solutions
- Decreases need for IV fluids
- Lowers hospitalization rates

Ondansetron Safety

Most safety concerns have not panned out:

- Diarrhea – not consistently found
- Prolonged QT – except with high dose IV administration (32 mg IV no longer recommended)
- Masking other diagnoses – no evidence of this in large review (appendicitis, CNS)
- Serotonin syndrome – caution with multiple SSRIs

A systematic review of 170 randomized trials (n=23,421) found no increased mortality risk associated with ondansetron compared to placebo

But Consider

- One and done in clinic is a safe and effective approach
- A recent study supports the safety of ondansetron for limited home use in children

Ondansetron for Home Use

- Multidose Ondansetron after ED Discharge – 2025
  - Double blind randomized trial
  - 1030 children, 6 EDs
  - 6 months- 18 years
  - Provided 6 doses of ondansetron or placebo for home use
  - Followed for 7 days

- Results
  - Reduced the risk of moderate-to-severe gastroenteritis by 50%
  - Decreased vomiting episodes
  - Did not decrease duration of illness
  - Did not decrease repeat healthcare visits (but number low, 9% vs 13%)
  - Did not decrease IV fluids (also small percentage, about 3%)
  - No increase in adverse events

Prescribing Home Ondansetron

- For treatment of acute gastroenteritis
- Data supports use from age 6 months and above, but use caution in those 6 months – 4 years
- If clinically dehydrated, should perform oral rehydration in clinic before prescribing for home
- Current AAP guidance recommends 2 home doses, can consider 6 doses
- As needed dosing, not scheduled dosing

Prescribing Home Ondansetron

Weight	Dose
8–15 kg	2 mg
15–30 kg	4 mg
>30 kg	8 mg

ODT or liquid formulations - 0.15 mg/kg/dose

Myth 4

Cast and refer those toddler fractures

Toddler Fractures

- Nondisplaced or Minimally displaced spiral tibia fracture
  - 9 months – 4 years
  - Frequent slide injury
  - Presents with limp or non-weight bearing

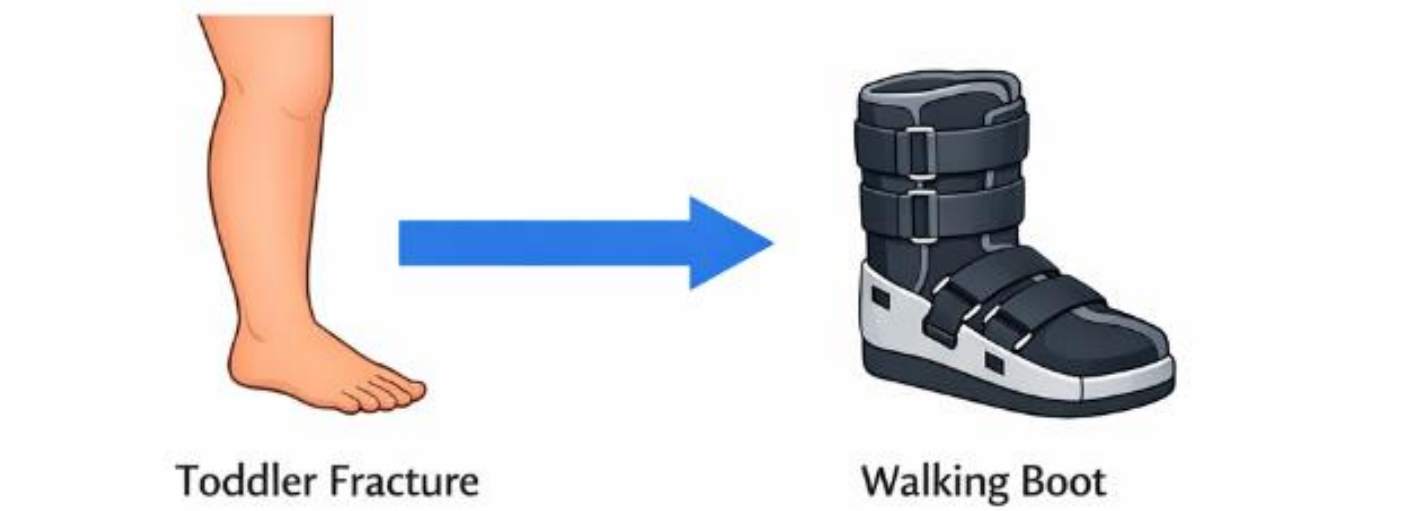
- Traditional treatment has been a posterior long leg splint and cast, with Orthopedics follow up

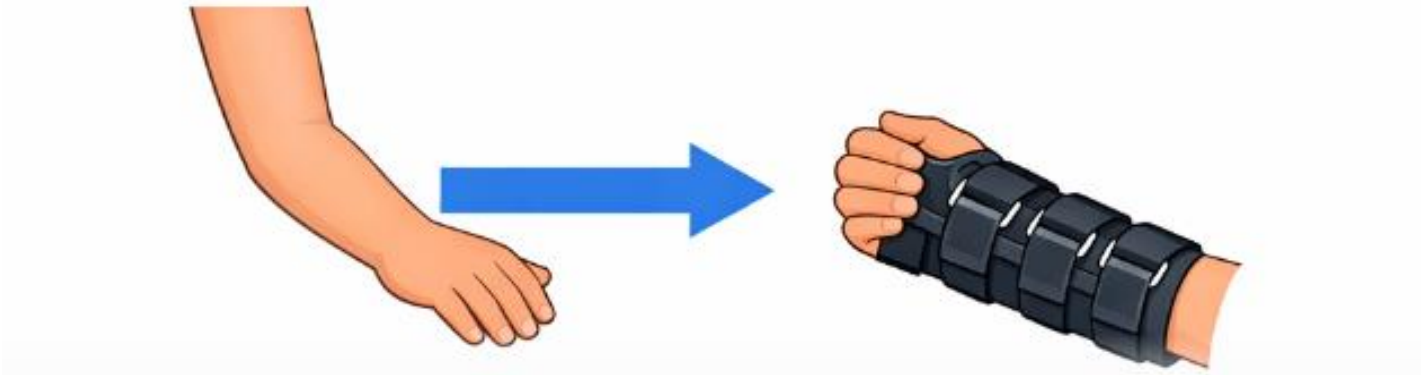
Removable Boot vs Casting

- Multicenter, assessor-blinded, noninferiority randomized trial, 2025
  - 9 months – 4 years
  - Prefabricated walking boot with NO Ortho follow up vs circumferential cast immobilization and Ortho follow up
  - Noninferior for pain control and functional recovery

- Retrospective chart review, 2019
  - Compared boot, short or long leg cast, or no immobilization
  - Boot may allow faster return to weight bearing
  - Fractures stable no matter the immobilization type
  - All regained weight bearing by 4 weeks

Velcro for the Win





Nondisplaced Spiral Fracture of the Tibia (Toddler's Fractures)

Distal Radius Buckle Fracture

Toddler Fracture

- Immobilization – you can't really go wrong here
  - Splint
  - Cast
  - Boot
  - No immobilization?
- Follow Up
  - Orthopedics
  - PCP
  - None
- Return Precautions

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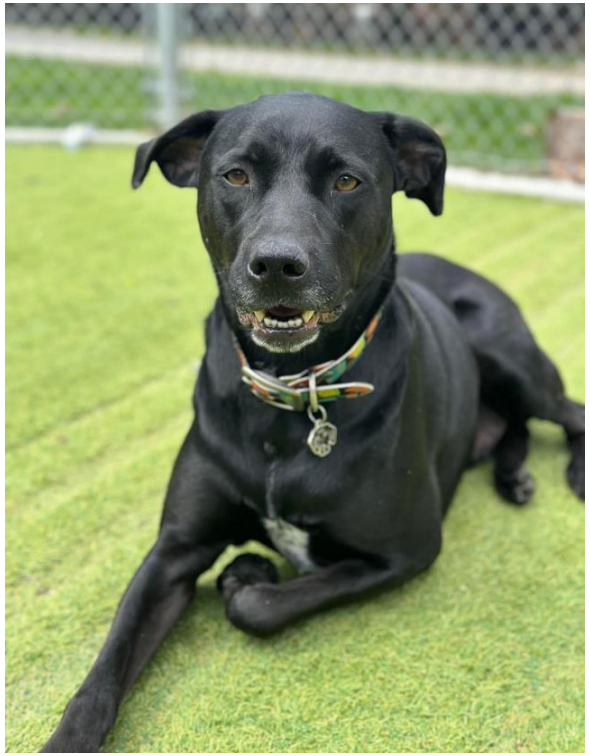

Thank you

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