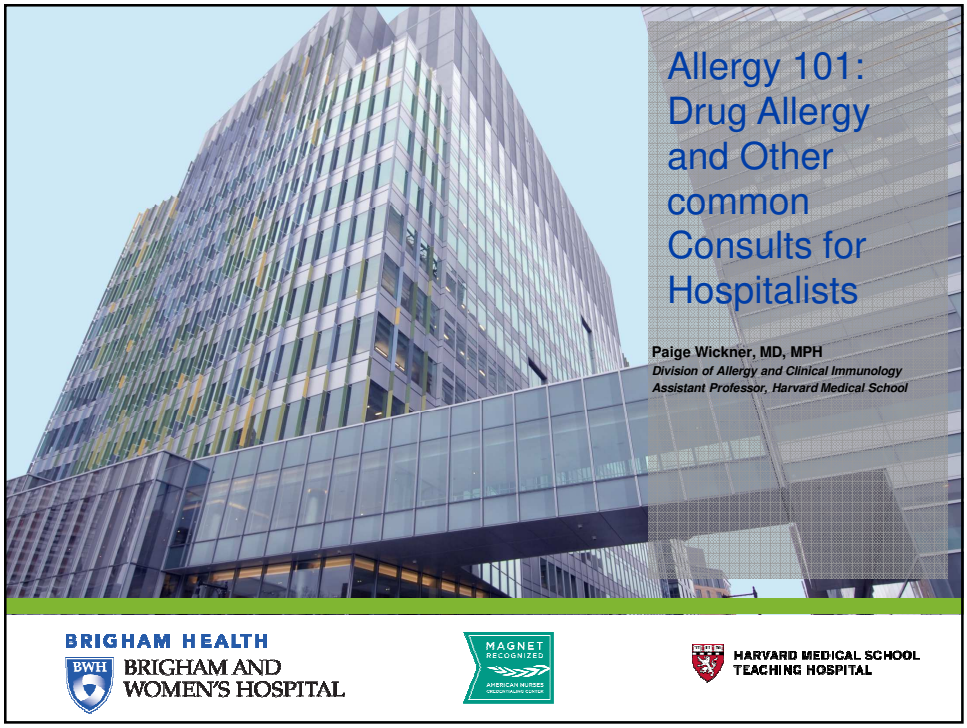

Allergy 101: Drug Allergy and Other common Consults for Hospitalists

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BRIGHAM HEALTH
BRIGHAM AND WOMEN'S HOSPITAL

MAGNET RECOGNIZED

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Disclosures

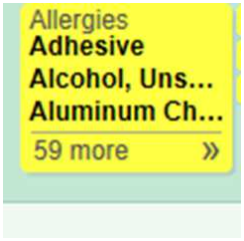
BRIGHAM AND WOMEN'S Health Care

- Dual employment, VP of Enterprise Patient Safety at CVS Health. Nothing discussed today relevant to role at CVS Health

Outline

BRIGHAM AND WOMEN'S Health Care

I. Drug allergies
   I. Basics
   II. Beta lactam
   III. Sulfa
   IV. Fluoroquinolones
   V. Contrast allergy
II. Immunodeficiency
III. Anaphylaxis



Hypothetical Case Example #1

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- D.L. is a 61 yo female with multiple drug allergies.
- This is her allergy list:

Allergen	Reaction	Severity	Free text
Codeine	Mental status change	Medium	
Penicillins			Hives
Bactrim	Rash	Medium	
Zolpidem			She felt really odd

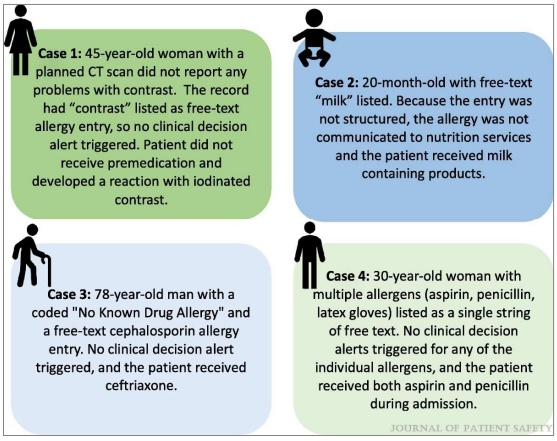
Hypothetical Case Example #1

BRIGHAM AND WOMEN'S Health Care

- She unfortunately gets a post viral pneumonia requiring antibiotics and a brief hospital stay for hypoxia and confusion.
- During her stay allergy is consulted for clarification of her drug allergies
- She undergoes a graded dose challenge to penicillin
- Unfortunately, despite a successful challenge, the team forgets to de-label the penicillin allergy in the EMR

FIGURE 1

BRIGHAM AND WOMEN'S Health Care



Representative cases of allergy documentation-related adverse events likely preventable by allergen-coded entry.

Li et al, J of Patient Safety, Jan 2022

BRIGHAM AND WOMEN'S Health Care

The Case for Clarifying Drug Allergies

- Benefits
  - First line therapy
  - Potentially lower cost
  - Patient safety
  - Drug drug interactions
- Timing
- Deletion vs. clean up of duplicates
- Labels with all parts
  - Specificity
  - Reaction vs. Unknown
  - Free text vs. codified

Question set 1: Drug allergy basics

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- What questions should I ask to clarify a listed allergy that says 'reaction-unknown'?
- Is there a role for skin testing in the inpatient setting?
- How do you choose the patients to skin test?

Drug allergy: History in 3 minutes

BRIGHAM AND WOMEN'S Health Care

- Best time to clarify drug allergies…
- Name of medication
- Indication
- Timing of reaction in relation to taking med
- Nature of reaction
  - ?Blistering
  - ?Mucosal involvement
  - End organ damage
- Similar agents tried
- Alternative options

Individual approach

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- Talk to the patient
  - Ask about time frame, reaction details
- Remove duplicates
- Remove erroneous entries
- Address acute medication needs
- Tackle known entities: e.g. Penicillin
- Start with medications that have immune mediated reactions
- Help patient understand their list: smart phone, provider communication, safe lists

De-labelling success

BRIGHAM AND WOMEN'S Health Care

TABLE II. Drug allergy labels tested versus labels removed from EHR

Drug allergy labels tested	Attempted delabeling strategy	No. of labels tested	No. of labels removed from EHR
Penicillin	Skin testing* and oral challenge	393	390
Cephalosporins	Skin testing and oral challenge	209	201
Trimethoprim-sulfamethoxazole or sulfonamide	Single or graded oral challenge	177	167
Fluoroquinolones	Skin testing and oral challenge	97	93
NSAIDs	Graded oral challenge	27	25
Vancomycin	Historical	12	12
Radiocontrast	Skin testing	18	18
Azithromycin	Single or graded oral challenge	10	10

NSAID, Nonsteroidal anti-inflammatory drug.
*Penicillin reagents used were penicillin G 1000 U/mL, penicillin G 10,000 U/mL, Pre pen (major determinant), minor determinant mixture, and amplicillin 25 mg/mL.

Vethody et al. Safety, Efficacy, and Effectiveness of Delabeling in Patients with Multiple Drug Allergy Labels. JACIP. Feb2021.

Interoperability

BRIGHAM AND WOMEN'S Health Care

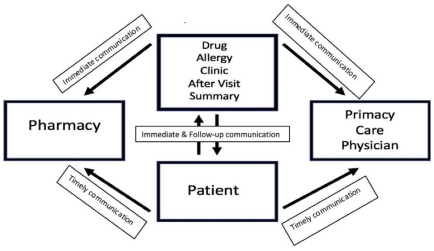


FIGURE 2. Future interventions to improve effectiveness of care in patients with MDALs.

Vethody et al. Safety, Efficacy, and Effectiveness of Delabeling in Patients with Multiple Drug Allergy Labels. JACIP. Feb2021.

Challenge vs. Desensitization

BRIGHAM AND WOMEN'S Health Care

Challenge/Test dose

- Confirms low suspicion cases
- After negative skin tests when possible
- Often involves 1/10 dose→ observation→ remainder of dose
- If passed, patient is considered not allergic
- Performed in allergists office or on floor of hospital

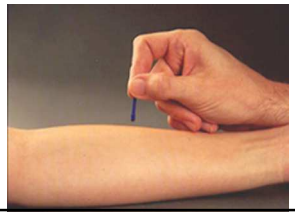
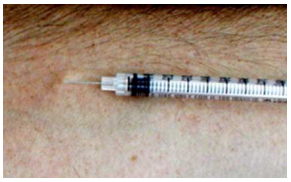
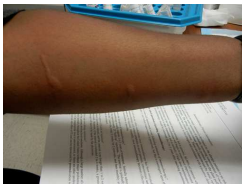
Desensitization

- Used to allow the patient to TEMPORARILY take the drug in question
- Used for immediate type reactions and when have no acceptable alternative agent
- Compliance important
- MICU
- Higher risk of anaphylaxis

Who should have a skin test?

BRIGHAM AND WOMEN'S Health Care

- Penicillin allergy with type I characteristics, delayed rash, distant allergy, prior to BMT or organ transplant
- Skin testing NOT recommended for SJS, TEN, serum sickness, cytotoxic reaction, non immunologic adverse drug effects
- Can NOT test patients on antihistamines (H1 or H2)
- Do not skin test hemodynamically unstable patients
- Not all medications have skin testing
- State by state rules vary on requirement to oversee testing: allergists, pharmacists, RN, NP, trained MDs

SKIN TEST ORDER

MRN/PATIENT NAME/DOB/DOS

□ To be seen by MD prior to start of test

Antibiotic	SPT	ID	ID
□ Azithromycin	100 mg/ml	0.001 mg/ml	0.01 mg/ml
□ Aztreonam	3 mg/ml	0.3 mg/ml	3 mg/ml
□ Cefazolin	330 mg/ml	3 mg/ml	33 mg/ml
□ Cefotaxime	100 mg/ml	1 mg/ml	10 mg/ml
□ Ceftazidime	100 mg/ml	1 mg/ml	10 mg/ml
□ Cetriaxone	100 mg/ml	1 mg/ml	10 mg/ml
□ Cefuroxime	100 mg/ml	1 mg/ml	10 mg/ml
□ Ciprofloxacin	2 mg/ml	0.002 mg/ml	0.02 mg/ml
□ Clindamycin	150 mg/ml	1.5 mg/ml	15 mg/ml
□ Cotrimoxazole	80 mg/ml	0.08 mg/ml	0.8 mg/ml
□ Erythromycin*	50 mg/ml	0.005 mg/ml	0.05 mg/ml
□ Gentamicin	40 mg/ml	0.4 mg/ml	4 mg/ml
□ Imipenem	1 mg/ml	0.1 mg/ml	1 mg/ml
□ Levofloxacin	25 mg/ml	0.0025 mg/ml	0.025 mg/ml
□ Moxifloxacin	1.6 mg/ml	0.002 mg/ml	0.02 mg/ml
□ Tobramycin	40 mg/ml	0.4 mg/ml	4 mg/ml
□ Vancomycin	50 mg/ml	0.0005 mg/ml	0.005 mg/ml
□ Ampicillin*	10 mg/ml	1 mg/ml	10 mg/ml
□ Naficillin	250 mg/ml	0.0025 mg/ml	0.025 mg/ml
□ Penicillin G	10,000 u/ml	10,000 u/ml	
□ Pre Pen	undiluted	undiluted	
□ Ticarcillin	200 mg/ml	2 mg/ml	20 mg/ml

Chemotherapy	SPT	ID	ID
□ Avastin*	25mg/ml	0.25mg/ml	2.5mg/ml
□ Carboplatin	10mg/ml	1mg/ml	10mg/ml
□ Cisplatin	1mg/ml	0.1mg/ml	1mg/ml
□ Cytoxan	10mg/ml	1mg/ml	10mg/ml
□ Oxaliplatin*	5mg/ml	0.5mg/ml	5mg/ml
□ Taxol*	1mg/ml	0.001mg/ml	0.01mg/ml

Biologics	SPT	ID	ID	ID
□ Abatacept*	25 mg/ml	0.025 mg/ml	0.25 mg/ml	2.5 mg/ml
□ Copaxone	20 mg/ml	0.02 mg/ml	0.2 mg/ml	2mg/ml
□ Etanecept	50 mg/ml	0.05 mg/ml	0.5 mg/ml	5mg/ml
□ Infliximab*	10 mg/ml	0.1 mg/ml	1 mg/ml	--
□ Methotrexate	25 mg/ml	0.25 mg/ml	2.5 mg/ml	--
□ Rebif	22mcg/ml	0.022mcg/ml	0.22 mcg/ml	2.2 mcg/ml
□ Rituximab*	10 mg/ml	0.01 mg/ml	0.1 mg/ml	1 mg/ml
□ Trastuzumab*	21 mg/ml	0.21 mg/ml	2.1 mg/ml	--

Venom : □ Entire Panel □ Honey Bee □ Wasp
□ White Faced Hornet □ Yellow Hornet □ Yellow Jacket

Environmental: □ Entire SPT Panel, ID TBD after SPT
□ Dust □ Cat □ Alternaria □ Penicillium □ Dog □ Cockroach □ Oak □ Grass □ Hormodendrum
□ Ragweed □ Grass □ Feather □ Brich □ Plantain □ □ BWH Weed □ BWH Tree □ Mugwort
□ Aspergillus □ Other:_____ □ Mouse □ Rat □

Food: □ Entire Panel **Legumes:** □ peanut □ soybean **Tree nuts:** □ brazil nut □ almond □ pecan
□ cashew □ english/black walnut □ hazelnut □ pistachio □ green pea **Crustacean shellfish:** □ shrimp □ lobster □ crab
Molluscks (shellfish): □ clam □ oyster □ scallop **Fish:** □ codfish □ tuna □ salmon **Dairy:** □ milk
□ casein □ lactalbumin **Grains:** □ wheat □ rice □ oat □ barley □ rye **Fruits:** □ strawberry □ apple □ orange
Vegetables: □ corn □ tomato □ white potato □ carrot □ celery □ garlic □ onion □ ginger
Meats: □ beef □ chicken □ pork □ **egg** white □ **egg** yolk □ **baker's/brewer's yeast** □ **sesame**

Fresh Food::

Corticosteroid	SPT	ID	ID	ID
□ Prednisone	1mg/ml			
□ Prednisolone	4mg/ml			
□ Depo-Medrol	40mg/ml	0.4mg/ml	4mg/ml	
□ Solumedrol	40mg/ml	0.4mg/ml	4mg/ml	
□ Decadron	4mg/ml	0.04 mg/ml	0.4mg/ml	
□ Solue-Cortef	100mg/ml	1mg/ml	10mg/ml	
□ Celestone	6mg/ml	0.6mg/ml	6mg/ml	
□ Kenalog	10mg/ml	0.1 mg/ml	1 mg/ml	10mg/ml

Local Anesthetic: Prick FS, ID 1/100, 1/10, FS
Benzoic acid esters: □ Benzocaine □ Butacine □ Chlorprocaine 2%/3% □ Cyclomethycaine
□ Hexylcaine □ Procaine 10% □ Proparacaine Ophthalmic 0.5% □ Propoxycaine □ Tetracaine Ophthalmic 0.5%
Other (Amides): □ Bupivacain 0.25%, 0.5%, 0.75% □ Dibucaine □ Dyclonine □ Etidocaine
□ Lidocaine 0.5%, 1%, 2% □ Mepivacaine 1%, 2%, Praxomine, Prilocaine
Challenge: _____ if ST negative, 0.3 ml FS SC, if negative 15 min. 1ml FS SC

General Anesthetic:	Prick	ID	ID	ID
□ Etomidate	2mg/ml	0.002 mg/ml	0.02 mg/ml	0.2 mg/ml
□ Fentanyl	50 ug/ml	0.05 ug/ml	0.5 ug/ml	5ug/ml
□ Midazolam	5 mg/ml	0.005 mg/ml	0.05 mg/ml	0.5 mg/ml
□ Pancuronium	2 mg/ml	0.002 mg/ml	0.02 mg/ml	0.2 mg/ml
□ Propofol	10 mg/ml	0.01 mg/ml	0.1 mg/ml	1 mg/ml
□ Succinylcholine	20 mg/ml	0.001 mg/ml	0.01 mg/ml	0.1 mg/ml
□ Thiopental	25 mg/ml	0.025 mg/ml	0.25 mg/ml	2.5 mg/ml
□ Vecuronium*	4 mg/ml	0.004 mg/ml	0.04 mg/ml	0.4 mg/ml

□ **Progesterone:** SP: Progesterone 50mg/ml in Benzyl Alcohol and Benzyl Alcohol; ID 1/1000, 1/100, 1/10
□ **Ferrlecit*:** SP: 12.5 mg/ml; ID: 0.0125 mg/ml, 0.125 mg/ml, 1.25 mg/ml(DO NOT TEST TO VENOFER)
Insulin: SP undiluted, ID: 1:1000, 1:100 and 1:10 □ Apidra □ Humalog □ Humulin R □ Humulin N
□ Lantus □ Levemir □ Novolin R □ Novolin N □ sterile diluent

□ **Other:**

Ordering MD: _____ **MD Initials:** _____
Date: _____ Time: _____

* PM testing only due to stability of medication

Question set 2:
Beta lactam allergy

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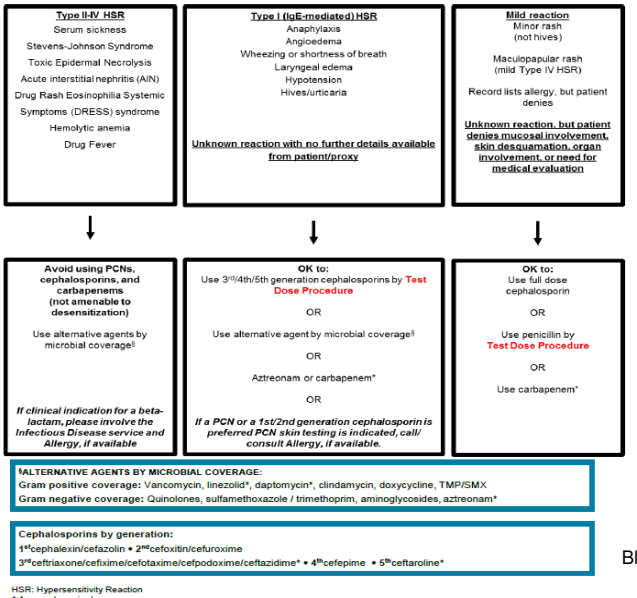
- If no skin testing is available…what can I do?
- Can I give a cephalosporin in a patient with a penicillin allergy?
- What about patients with a listed allergy to a cephalosporin? Can I give a different generation cephalosporin?
- When do I need to call allergy?

PCN Hypersensitivity Pathway 2019

BRIGHAM AND WOMEN'S Health Care

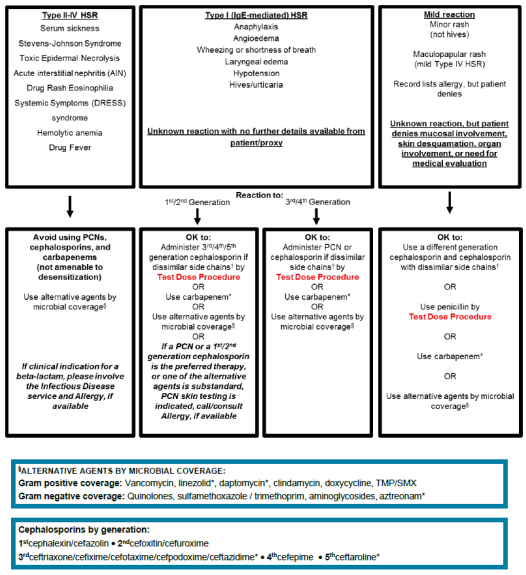


Blumenthal, et al Ann Allergy Clin Immunol 2015

Blumenthal…Wickner. ICHE 2019.

Cephalosporin Hypersensitivity Pathway 2019

BRIGHAM AND WOMEN'S Health Care



Cephalosporins in patients w/ PCN allergy

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- Not straightforward- if you have an allergy consult service, utilize it
- Macy et al April 2021 JAMA Network- removed cross reactivity warning in PCN allergic patients >4million studied, no safety issues identified, increased cephalosporin use
- For patients with mild cutaneous reactions without features of an IgE reaction UpToDate recommends:
  - Usually ok to give 3rd/4th/5th generation cephalosporin
  - Ok to give a carbapenem
  - Ok to give aztreonam
  - Give 1st/2nd generation cephalosporins or penicillins via test dose

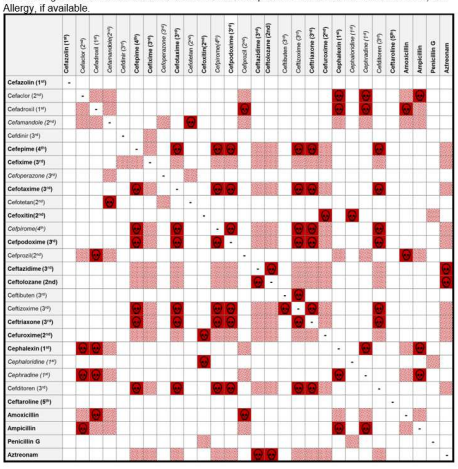
Blumenthal K & Solensky R. Choice of antibiotics in penicillin-allergic hospitalized patients.UpToDate. Accessed on Sept 2022

Cephalosporin cross reactivity

BRIGHAM AND WOMEN'S Health Care

Cross-Reactivity Among Cephalosporins

This matrix is intended for use with the penicillin and cephalosporin allergy pathways. This matrix describes cross-reactivity risk for patients considering side chain structure. Cross-reactivity is also possible through the beta-lactam ring. Cross-reactivity between cephalosporins is determined by R1 or R2 side chains considering identical (red) or similar (dotted red) structures. Boxes with a ⊖ symbol indicate a higher risk for allergic reaction. Empty boxes indicate a lack of side chain structural similarity and decreased risk of allergic reaction. For example, patients with an allergy to cefepime should avoid cefotaxime, but can receive ceftazidime. **Bolded agents** are on-formulary. *Italicized agents* are not available in the US. If there are questions about how to use this matrix, call Allergy, if available.



Aztreonam

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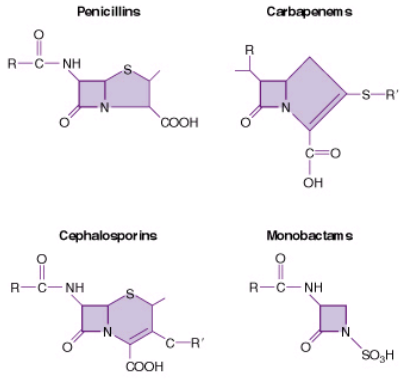
- Very little cross-reactivity due to its low immunogenic potential
- A safe alternative for PCN allergic patients
- Cross-reactivity exists with Ceftazidime
  - Identical side chain to Aztreonam



When to call allergy (if available):

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- Skin testing needed
- Multiple beta lactam allergy
- The patient has a proven allergy to the medication and for antibiotics infectious disease agrees that it is the best and only first line therapy
- You want to give a medication that the patient has had a severe delayed reaction to:
  - SJS
  - TEN
  - DRESS
  - Drug induced organ damage
  - Serum sickness

What if there is no allergy to call!

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- Avoidance if possible
- Consult literature/resources
- Develop standard hospital approaches for common allergens that don't rely on specialist
  - Beta lactams
  - Contrast allergy
  - NSAIDs
- Refer to allergy as an outpatient

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BRIGHAM AND WOMEN'S Health Care

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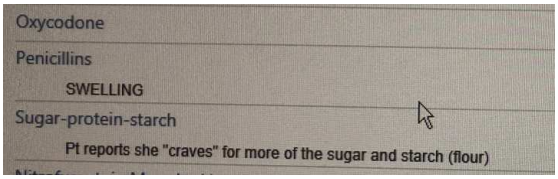
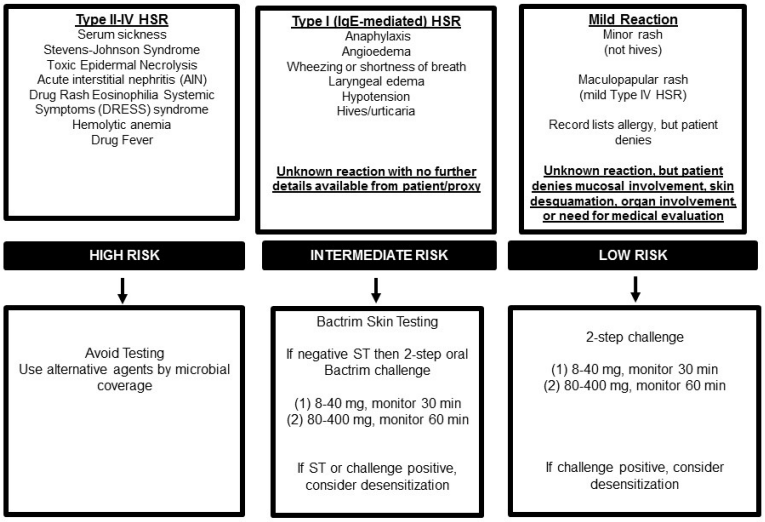


Bactrim Hypersensitivity Pathway

BRIGHAM AND WOMEN'S Health Care



Krantz, Matthew S., et al. "Oral Challenge with Trimethoprim-Sulfamethoxazole in Patients with 'Sulfa' Antibiotic Allergy." *The Journal of Allergy and Clinical Immunology: In Practice*, 2019, doi:10.1016/j.jaip.2019.07.003.

HSR: Hypersensitivity Reaction

Sulfa allergy

BRIGHAM AND WOMEN'S Health Care

For patients with morbilliform rash without fever or other severe cutaneous symptoms (SJS etc) can be done as outpatient or inpatient and does not require ICU

Bactrim (Sulfamethoxazole 200mg-Trimethoprim 40 mg/5mL)				
Day	Time	Trimethoprim Dose (mg)	Sulfamethoxazole Dose (mg)	Volume and formulation
1	9am	0.8mg	4mg	0.1 mL oral suspension
	11am	1.6mg	8mg	0.2mL oral suspension
	1pm	4mg	20mg	0.5mL oral suspension
	5pm	8mg	40mg	1mL oral suspension
2	9am	16mg	80mg	2mL oral suspension
	3pm	32mg	160mg	4mL oral suspension
	9pm	40mg	200mg	5mL oral suspension
3	9am	80mg	400mg	1 single strength tablet
4 onward	9am	80mg	400mg	1 single strength tablet

Fluoroquinolones

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- Most frequently reported non beta lactam antibiotic allergy
- Cross reactivity not complete between fluoroquionolones, allergists can often challenge to clarify safety of alternative FQ use
- Skin testing of questionable utility

Fluorquionolone allergy

BRIGHAM AND WOMEN'S Health Care

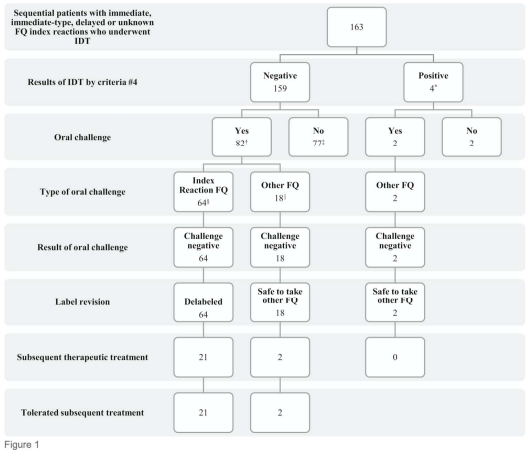

Figure 1

Krantz et al JACIP 2020

Contrast allergy: myth and pearls

BRIGHAM AND WOMEN'S Health Care

- Primary prevention usually not necessary
- NO CORRELATION WITH SHELLFISH, IODIDE
- Testing not widely used in US
- Premedication works well.

- Greenberger protocol:
  - 50mg prednisone 13,7, 1 hour prior
  - 10mg cetirizine (or 50mg benadryl IV) 1 hour before

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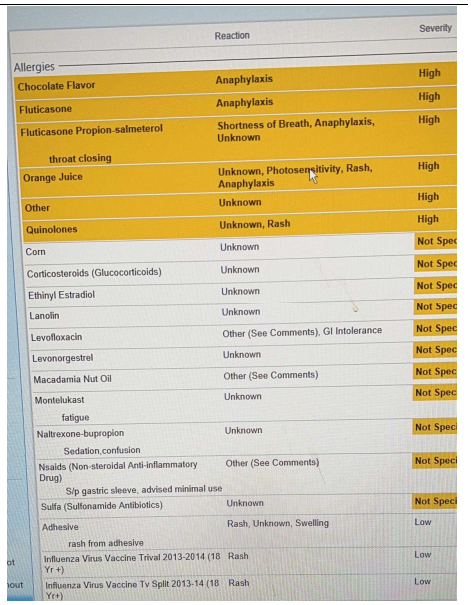
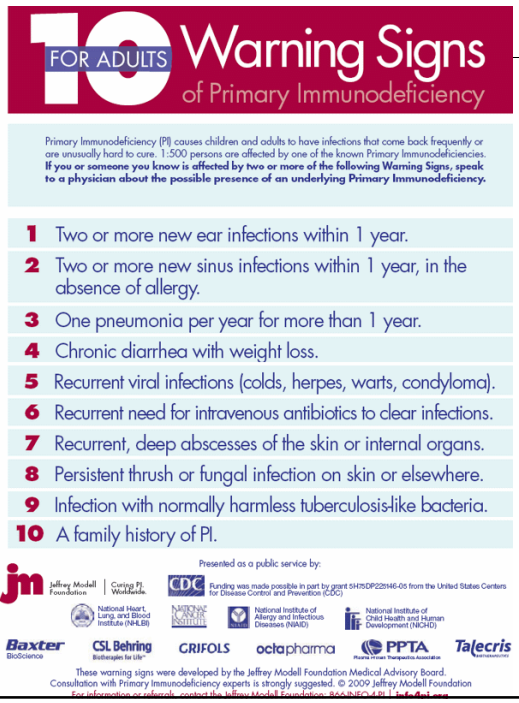


Allergies	Reaction	Severity
Chocolate Flavor	Anaphylaxis	High
Fluticasone	Anaphylaxis	High
Fluticasone Propion-salmeterol throat closing	Shortness of Breath, Anaphylaxis, Unknown	High
Orange Juice	Unknown, Photosensitivity, Rash, Anaphylaxis	High
Other	Unknown	High
Quinolones	Unknown, Rash	High
Corn	Unknown	Not Spec
Corticosteroids (Glucocorticoids)	Unknown	Not Spec
Ethinyl Estradiol	Unknown	Not Spec
Lanolin	Unknown	Not Spec
Levofloxacin	Other (See Comments), GI Intolerance	Not Spec
Levonorgestrel	Unknown	Not Spec
Macadamia Nut Oil	Other (See Comments)	Not Spec
Montelukast fatigue	Unknown	Not Spec
Naltrexone-bupropion Sedation,confusion	Unknown	Not Spec
Nsaids (Non-steroidal Anti-inflammatory Drug) S/p gastric sleeve, advised minimal use	Other (See Comments)	Not Spec
Sulfa (Sulfonamide Antibiotics)	Unknown	Not Spec
Adhesive rash from adhesive	Rash, Unknown, Swelling	Low
Influenza Virus Vaccine Trival 2013-2014 (18 Yr +)	Rash	Low
Influenza Virus Vaccine Tv Split 2013-14 (18 Yr+)	Rash	Low



BRIGHAM AND WOMEN'S Health Care

Immunodeficiency: CVID

BRIGHAM AND WOMEN'S Health Care

Diagnosis: at least two of immunoglobulin isotypes 2 SD below the mean for age values (usually IgG and IgA+/-M) AND all of the following:

a. >2years of age

b. poor response to vaccination (protein and polysaccharide)

c. other defined causes of hypogammaglobulinemia have been excluded

Immunodeficiency: CVID

BRIGHAM AND WOMEN'S Health Care

Immunodeficiency doesn't always present with recurrent infections

- Autoimmune disease (ex. autoimmune hemolytic anemia or thrombocytopenia in CVID, SLE-like syndrome in complement def.)
- Unusual lymphoid and granulomatous diseases (ex. Sarcoid-like lung disease in patients with CVID)
- Malignancies

Vaccine responses: pre and post vaccination

BRIGHAM AND WOMEN'S Health Care

Streptococcus pneumoniae Antibodies, IgG (14 serotypes)		
PNEUMOCOCCAL SEROTYPE 1, IgG	0.03 ug/mL	0.05 ug/mL
PNEUMOCOCCAL SEROTYPE 3, IgG	0.01 ug/mL	0.11 ug/mL
PNEUMOCOCCAL SEROTYPE 4*, IgG	0.01 ug/mL	0.01 ug/mL
PNEUMOCOCCAL SEROTYPE 5, IgG	0.03 ug/mL	0.03 ug/mL
PNEUMOCOCCAL SEROTYPE 6B*, IgG	0.08 ug/mL	0.05 ug/mL
PNEUMOCCOCAL SEROTYPE 7F, IgG	0.04 ug/mL	0.27 ug/mL
PNEUMOCOCCAL SEROTYPE 8, IgG	0.10 ug/mL	0.06 ug/mL
PNEUMOCOCCAL SEROTYPE 9N, IgG	0.01 ug/mL	0.02 ug/mL
PNEUMOCOCCAL SEROTYPE 9V*, IgG	0.04 ug/mL	0.07 ug/mL
PNEUMOCOCCAL SEROTYPE 12F, IgG	0.03 ug/mL	0.03 ug/mL
PNEUMOCOCCAL SEROTYPE 14*, IgG	0.02 ug/mL	0.04 ug/mL
PNEUMOCOCCAL SEROTYPE 18C*,IgG	0.02 ug/mL	0.02 ug/mL
PNEUMOCOCCAL SEROTYPE 19F*,IgG	0.05 ug/mL	0.04 ug/mL
PNEUMOCOCCAL SEROTYPE 23F*,IgG	0.01 ug/mL	0.01 ug/mL
PNEUMO SEROTYPE INTERPRETATION	SEE NOTE	SEE NOTE

INTERPRETATION: Pneumococcal Antibodies, IgG
Includes serotypes 1, 3, 4*, 5, 6B*, 7F, 8, 9N, 9V*, 12F, 14*, 18C*, 19F*, 23F*

My unvaccinated titers: twins in daycare

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S. pneumoniae IgG Ab,23 serotypes,S

Serotype 1 (1)	31.5	mcg/mL
Serotype 2(2)	6.8	mcg/mL
Serotype 3 (3)	17.1	mcg/mL
Serotype 4 (4)	4.9	mcg/mL
Serotype 5 (5)	31.5	mcg/mL
Serotype 8 (8)	12.0	mcg/mL
Serotype 9N (9)	27.4	mcg/mL
Serotype 12F (12)	6.9	mcg/mL
Serotype 14 (14)	19.7	mcg/mL
Serotype 17F (17)	85.6	mcg/mL
Serotype 19F (19)	54.2	mcg/mL
Serotype 20 (20)	11.1	mcg/mL
Serotype 22F (22)	122.8	mcg/mL
Serotype 23F (23)	102.2	mcg/mL
Serotype 6B (26)	27.6	mcg/mL
Serotype 10A (34)	59.6	mcg/mL
Serotype 11A (43)	5.8	mcg/mL
Serotype 7F (51)	69.3	mcg/mL
Serotype 15B (54)	19.8	mcg/mL
Serotype 18C (56)	2.8	mcg/mL
Serotype 19A (57)	25.6	mcg/mL
Serotype 9V (68)	31.2	mcg/mL
Serotype 33F (70)	12.1	mcg/mL

CASE 2: Anaphylaxis

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- 20 yo male with peanut allergy admitted for nephrolithiasis
- Day 2 of his admission he takes a bite of a pad thai noodle dish brought in by a friend. Within minutes eating, he develops hives, sensation of throat closing, ocular swelling, and chest discomfort.

Question set 3: Anaphylaxis

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- How do I know if its really anaphylaxis?
- How do I treat anaphylaxis?
- What are the options to prescribe epinephrine for discharge to patients who need it?

Is it really anaphylaxis?

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Here's my advice…..

With rare exception, If you think its anaphylaxis, treat it as anaphylaxis, then analyze after the fact.

Anaphylaxis

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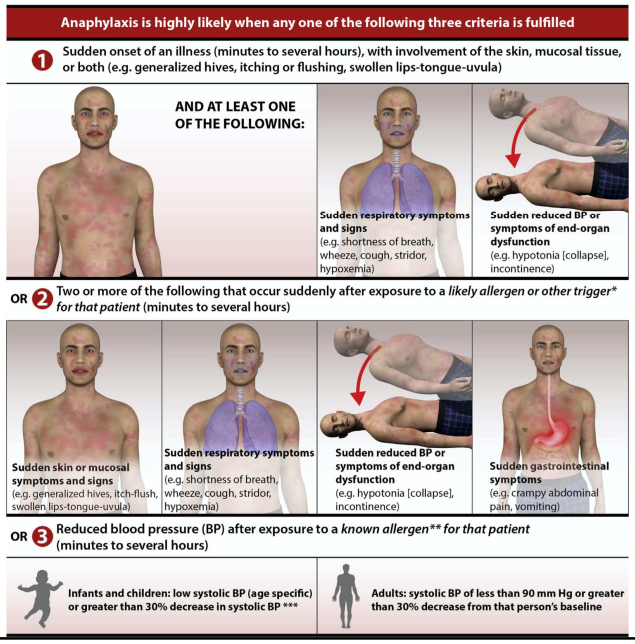

Strictest criteria

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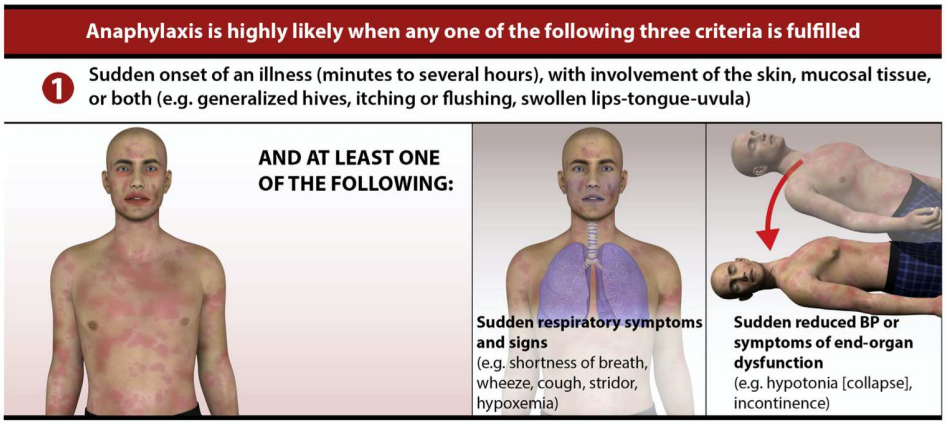

Likely exposure criteria

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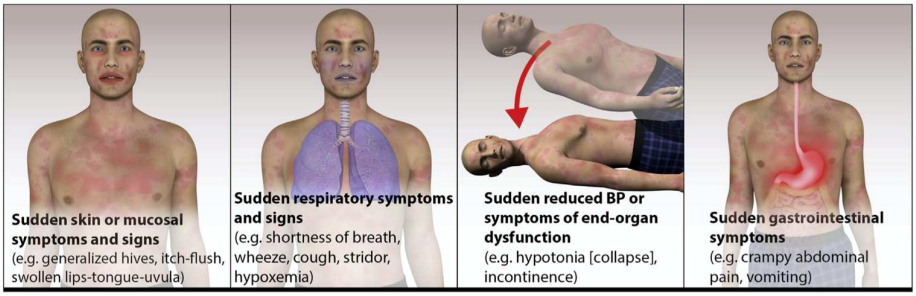
OR 2 Two or more of the following that occur suddenly after exposure to a *likely allergen or other trigger* for that patient* (minutes to several hours)



Sudden skin or mucosal symptoms and signs
(e.g. generalized hives, itch-flush, swollen lips-tongue-uvula)

Sudden respiratory symptoms and signs
(e.g. shortness of breath, wheeze, cough, stridor, hypoxemia)

Sudden reduced BP or symptoms of end-organ dysfunction
(e.g. hypotonia [collapse], incontinence)

Sudden gastrointestinal symptoms
(e.g. crampy abdominal pain, vomiting)

Exposure to patient known allergen

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OR 3 Reduced blood pressure (BP) after exposure to a *known allergen** for that patient* (minutes to several hours)

Infants and children: low systolic BP (age specific) or greater than 30% decrease in systolic BP ***

Adults: systolic BP of less than 90 mm Hg or greater than 30% decrease from that person's baseline

Anaphylaxis: Treatment

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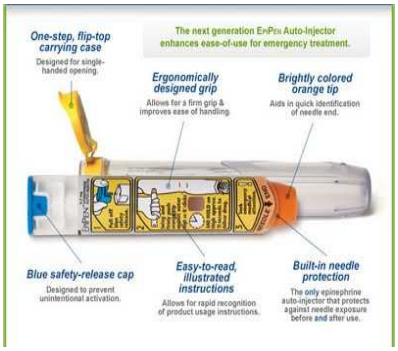
- Epi, Epi, Epi
  1:1000=1mg/ml
  - dose 0.3-0.5mg in adults
  - route of administration
    IM in anterolateral thigh
- Code cart differences:
  1:10,000=0.1mg/ml
- Second dose: 16-36%
- Biphasic reaction:
  3-20%



Anaphylaxis: Treatment cont

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- O2 for hypoxemia
- Inhaled beta 2 agonists for refractory bronchospasm (nebulizer)
- IVF for refractory hypotension
- H1/H2 antagonists
- Corticosteroids- poor data this helps acutely
- **Stop offending agent** (if its during ingestion, infusion etc)

The epinephrine IM delivery options

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Case 2: follow up

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- Given Epi IM x1, cetirzine, and solumedrol.
- Monitored vital signs and symptoms x 2 hours
- Reviewed epinephrine use and carrying portable epinephrine, asking and reading labels
- Reviewed ingredients of noodle dish, contained peanut

Case 2: follow up

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- Seek emergency care
- Follow up for testing
- List allergy in allergy section of medical record and communicate to patient (smart phone etc)
- Does not need epipen prescription

Case 4: High risk

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- A patient in your practice has repeated urinary tract infections requiring IV antibiotics.
- You sent them to allergy 5 years ago, where her TMP/SMX and PCN allergies were cleared
- She is on a repeat course of antibiotics and develops hives

Conclusions

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- Know what questions to ask to clarify drug allergies
- Understand complexities of penicillin and cephalosporin allergies
- Review sulfa and other antibiotic allergies
- When to call/refer to an allergist
- Partnership in cleaning up the EMR allergy section
- Anaphylaxis 101
- The porpoise….