Help, is this an allergic reaction?

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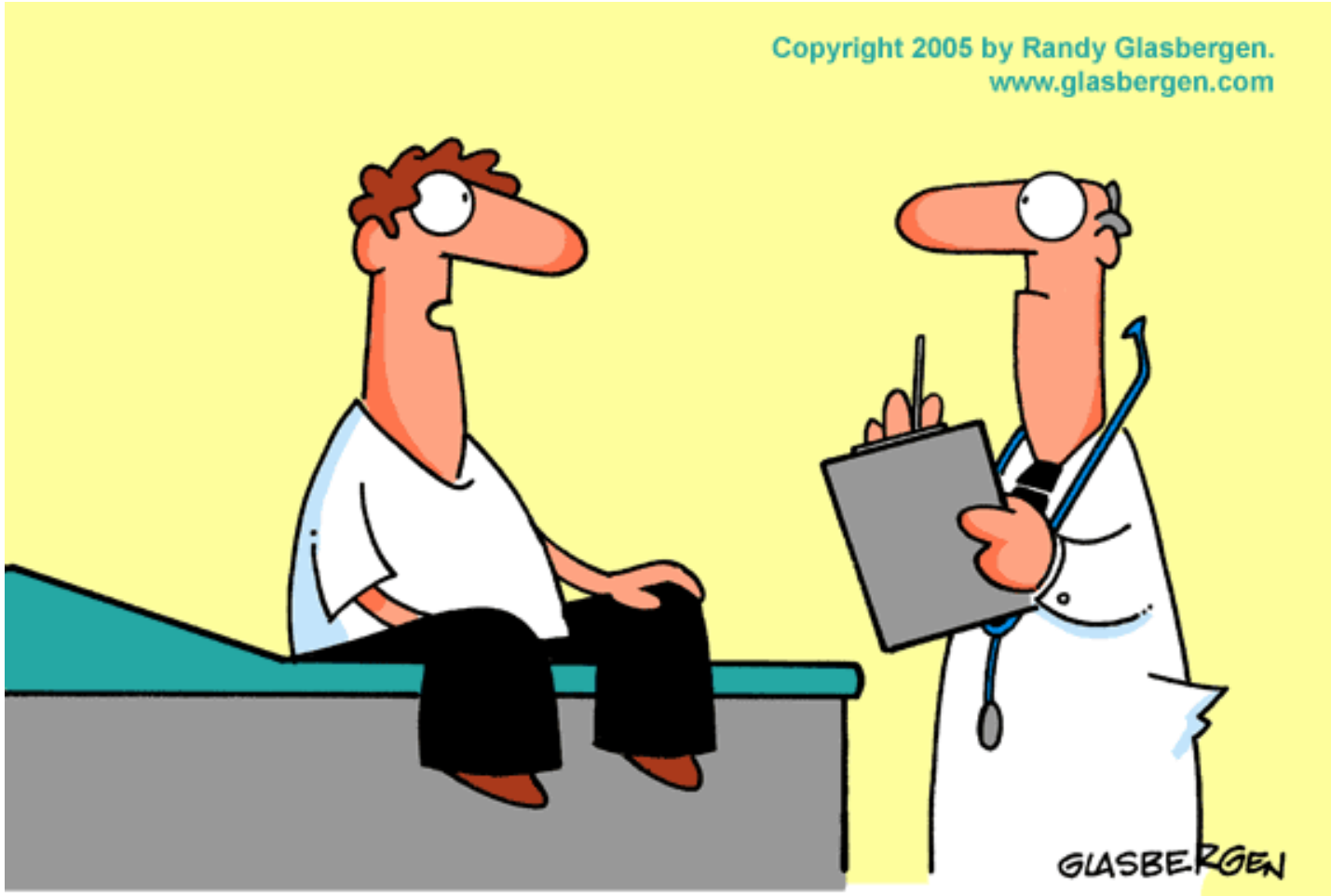
Objectives

- Explain how to describe rashes
- Discuss allergic drug reactions vs exanthems
- Describe common causes of urticaria (hives)

Get ready! This is a jammed pack session

Today's current healthcare



"I already diagnosed myself on the Internet.
I'm only here for a second opinion."

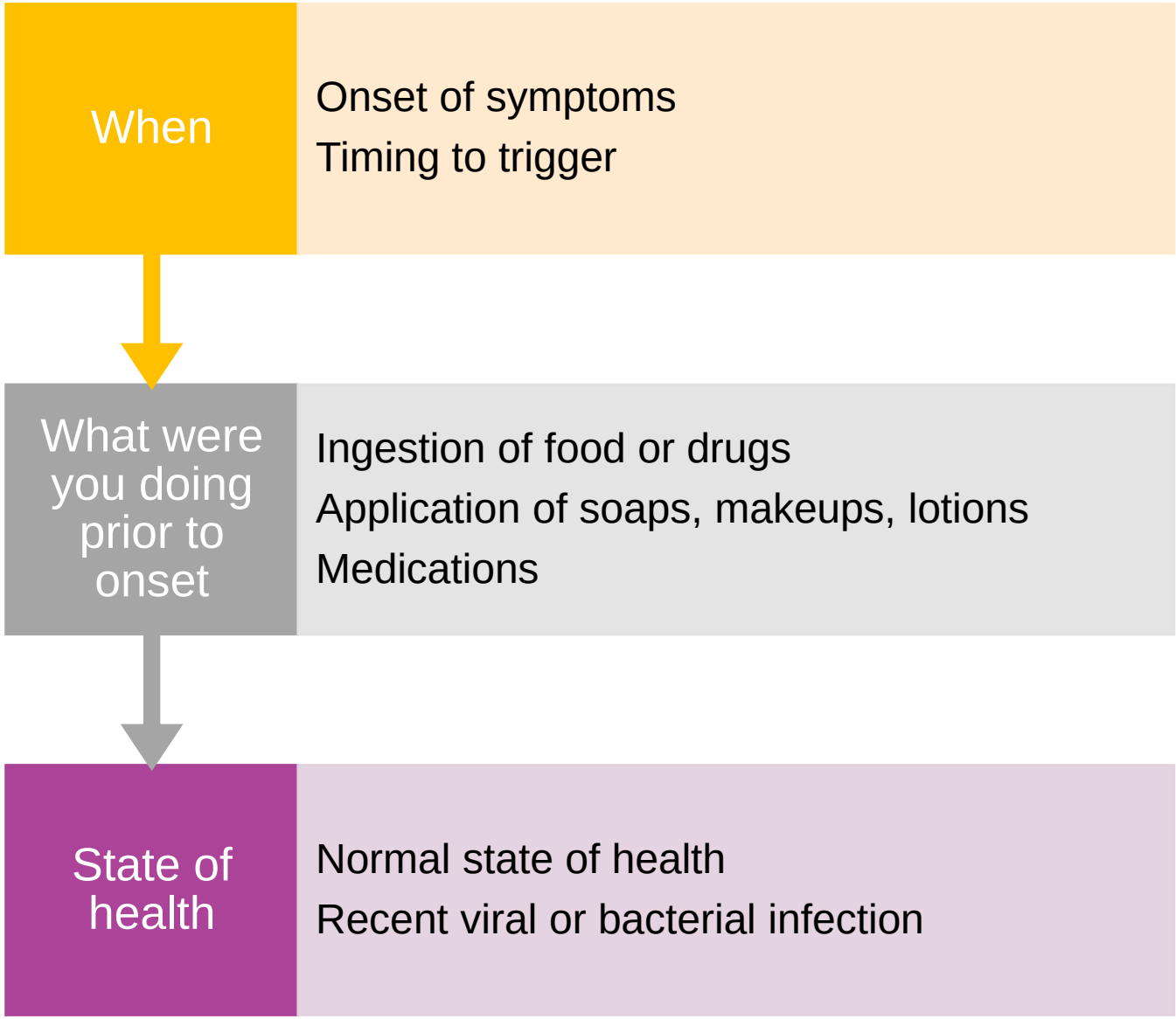
Intake

History is your best diagnostic tool

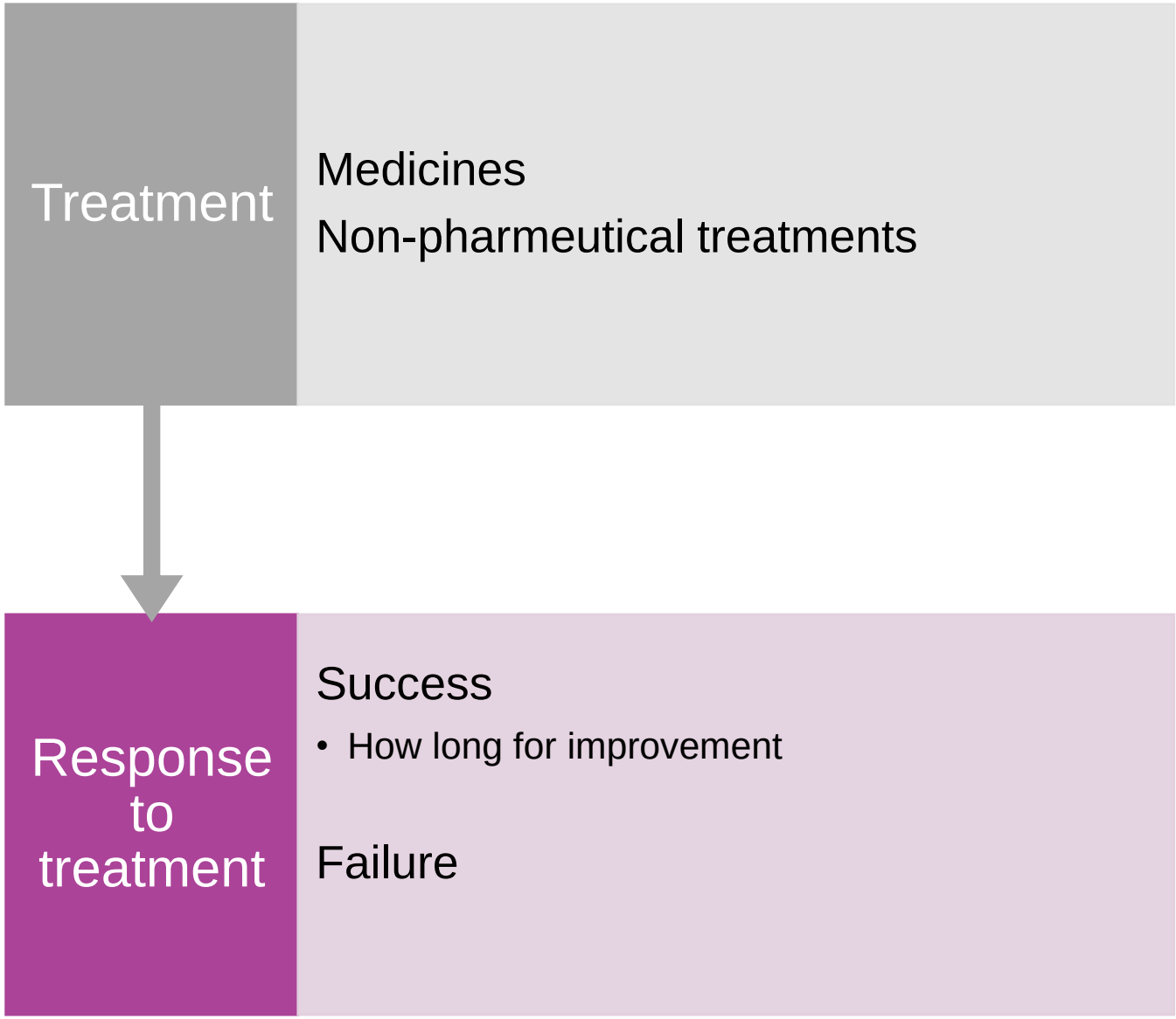
OLD CARTS

- Onset
- Location
- Duration
- Character
- Aggravating Factors
- Relieving Factors
- Timing
- Severity

What were you doing?



What did you do after onset?



What did the rash look like?

- Color
- Location
- Pattern
- Feel (Flat/Raised)
- Discharge

Patterns of distribution

Patterns of skin lesions is important.
Is the lesion solitary, satellite lesion or clustered

– Acral –
affecting distal areas, hands and feet.

– Extensor –
extensor surfaces, elbows, knees.

– Flexural –
flexural surfaces, axillae, genital areas, cubical fossa.

– Follicular –
arising from hair follicles.

– Dermatomal –
corresponding with nerve root distribution.

– Koebernised –
arising in wound or scar.

– Seborrhoeic –
associated with areas where there are sebaceous glands, face and scalp.

https://www.nursinginpractice.com/clinical/dermatology/skin-assessment-and-the-language-of-dermatology/

Morphology

Macule: lesion without elevation or depression, < 1 cm

Patch: lesion without elevation or depression, > 1 cm

Papule: any solid, elevated “bump” < 1 cm

Plaque: raised plateau-like lesion of variable size, often a confluence of papules

Nodule: solid lesion with palpable elevation, 1–5 cm

Tumor: solid growth, > 5 cm

Cyst: encapsulated lesion, filled with soft material

Vesicle: elevated, fluid-filled blister, < 1 cm

Bulla: elevated, fluid-filled blister, > 1 cm

Pustule: elevated, pus-filled blister, any size

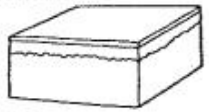
Wheal: inflamed papule or plaque formed by transient and superficial local edema

Comedone: a plug of keratinous material and skin oils retained in a follicle; open is black, closed is white

Morphology

SURFACE CHANGES

Normal/smooth

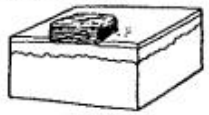


Surface not different from surrounding skin and feels smooth. Stratum corneum and epidermis normal; change in elevation and/or colour only.

Scaly

Dry/flaky surface due to abnormal stratum corneum with accumulation of, or increased shedding of, keratinocytes. *Scratch test*: scaly lesions MUST be scratched vigorously with a nail to see if scaling increases and separates easily. If it does the diagnosis is psoriasis.

Keratin/horn

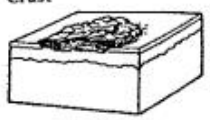


Rough, uneven surface due to accumulation of abnormal keratin. Unlike crust it is difficult to pick off. It is seen on solar keratoses, chronic eczema on the palms and soles, warts and corns.

Exudate

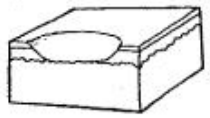
Serum, blood or pus that has accumulated on the surface either from an erosion or ruptured blister/pustule.

Crust



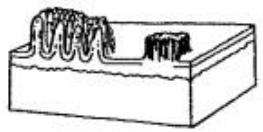
Dried serum, pus or blood. Clinically a crust may be confused with keratin but there should be a history of weeping, pus or bleeding. An attempt should be made to remove the crust to determine whether an ulcer or erosion is underneath.

Excoriation



Localized damage to the skin due to scratching. It consists of linear or pinpoint erosions or crusts.

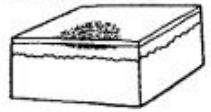
Warty/papillomatous



Surface consisting of minute finger-like or round projections.

TYPES OF LESION

Macule (size < 1 cm)
Patch (size > 1 cm)



Flat lesions due to localized colour change only – surface is always normal.

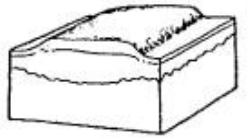
Papule (size < 1 cm)

Any lesion (< 1 cm) that is raised above the surface or has a scaly, crusted, keratinized or macerated surface.

Nodule (size > 1 cm)

Any elevated lesion (> 1 cm diameter) which has a rounded surface (i.e. the thickness is similar to the diameter): often due to dermal pathology.

Plaque (size > 1 cm)

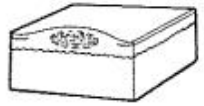


A raised lesion (> 1 cm) where the diameter >> thickness. Usually due to epidermal pathology with scale, crust, keratin or maceration on the surface.

Vesicle (size < 1 cm)
Bulla (size > 1 cm)

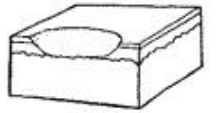
A fluid-filled lesion (blister).

Pustule (size < 1 cm)



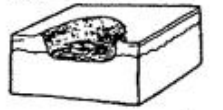
A pus-filled lesion (if in doubt prick lesion and pus comes out). Larger lesions are either abscesses or pseudocysts.

Erosion



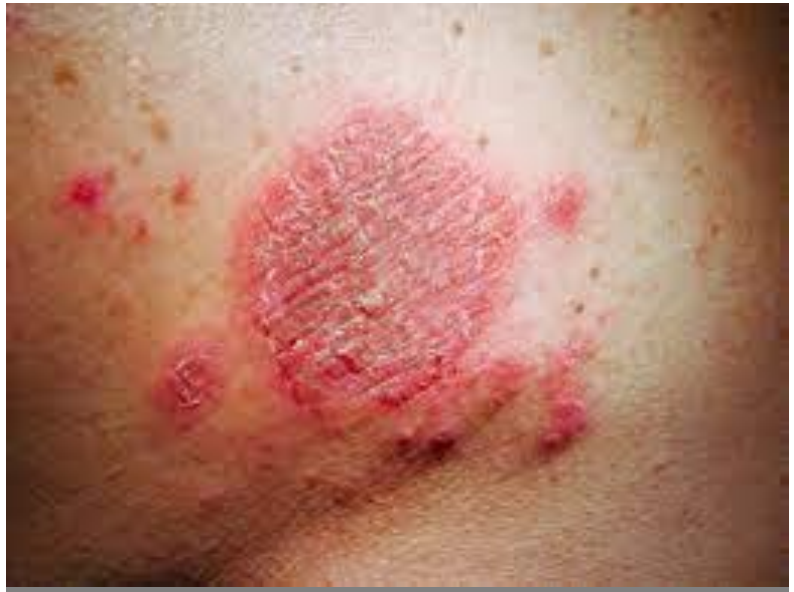
Partial loss of epidermis, which will heal without scarring. Usually secondary to an intraepidermal blister which has burst, and with exudate on the surface.

Ulcer

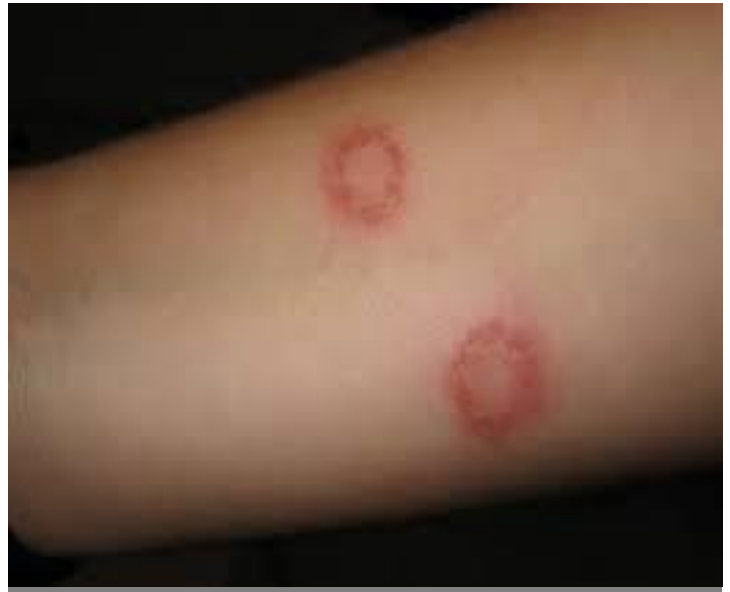


Full thickness loss of epidermis and some dermis, which will heal with scarring. There will be surface exudate (serum, pus or slough) or crust (which should be removed).

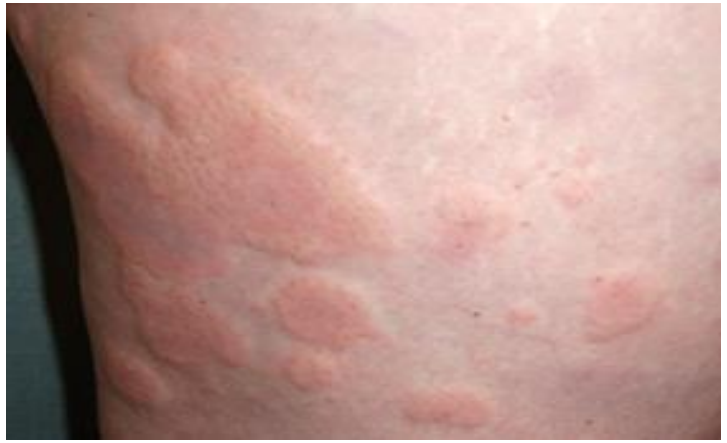
Similar but different



Nummular dermatitis



Annular lesion

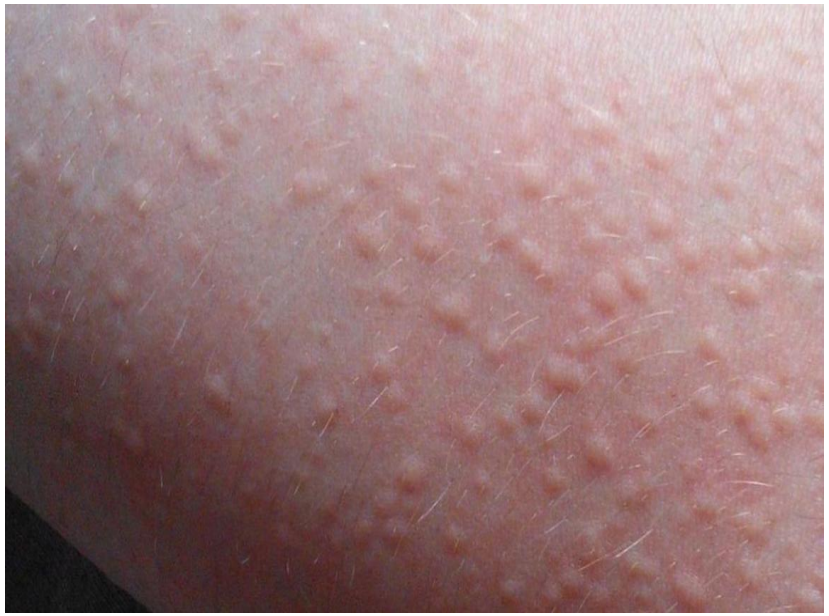


Urticarial lesions

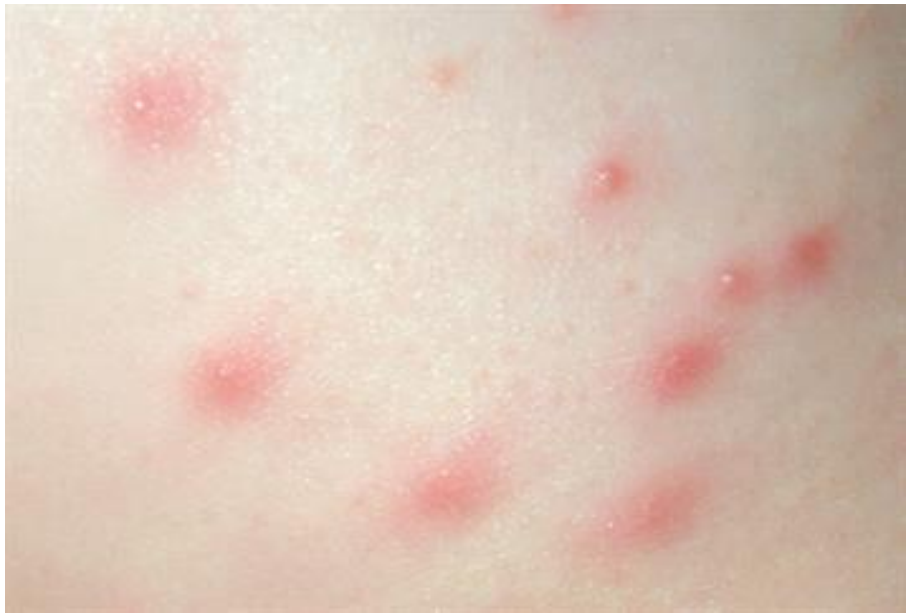
Images obtained from Google

“Bumps” can be very different

Cholinergic urticaria



Folliculitis



Allergy vs Sensitivity

Allergy

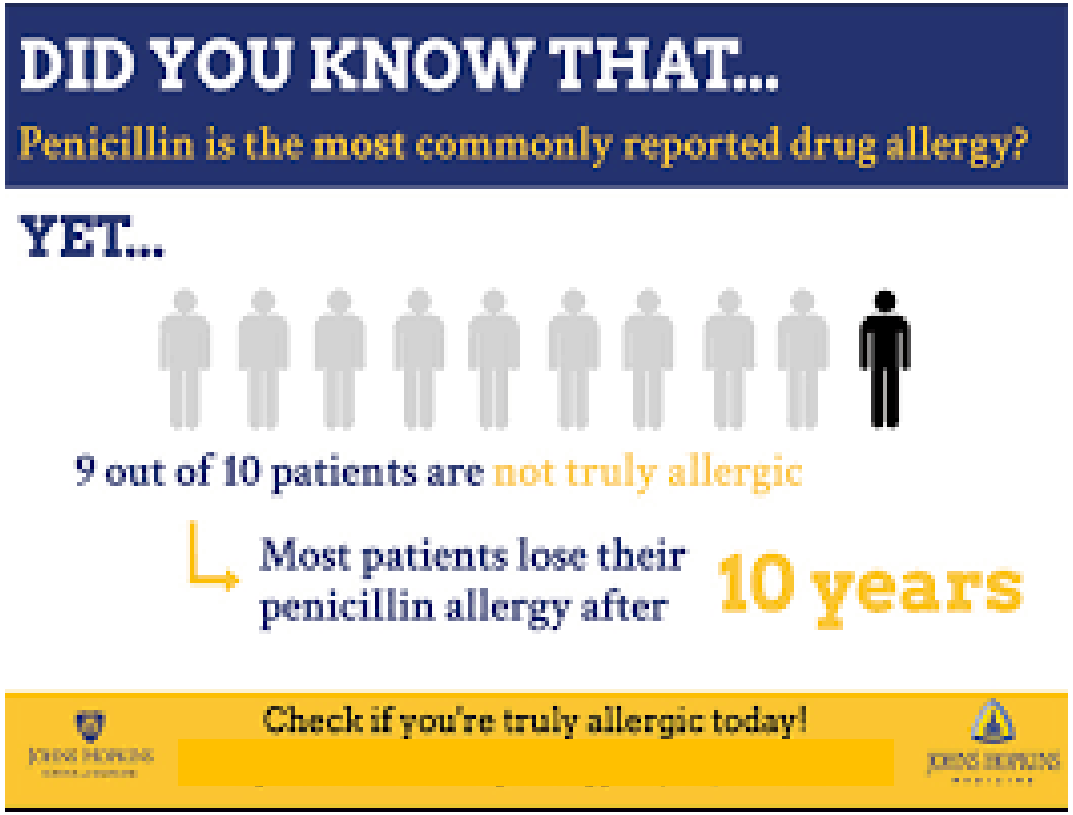
- Immune system gets activated to a normally harmless substance and causes a reaction

Sensitivity

- Can look like an allergic reaction
- Does not involve the immune system

Penicillin Allergy

- Commonly misdiagnosed
- It is not genetic



Making the Diagnosis

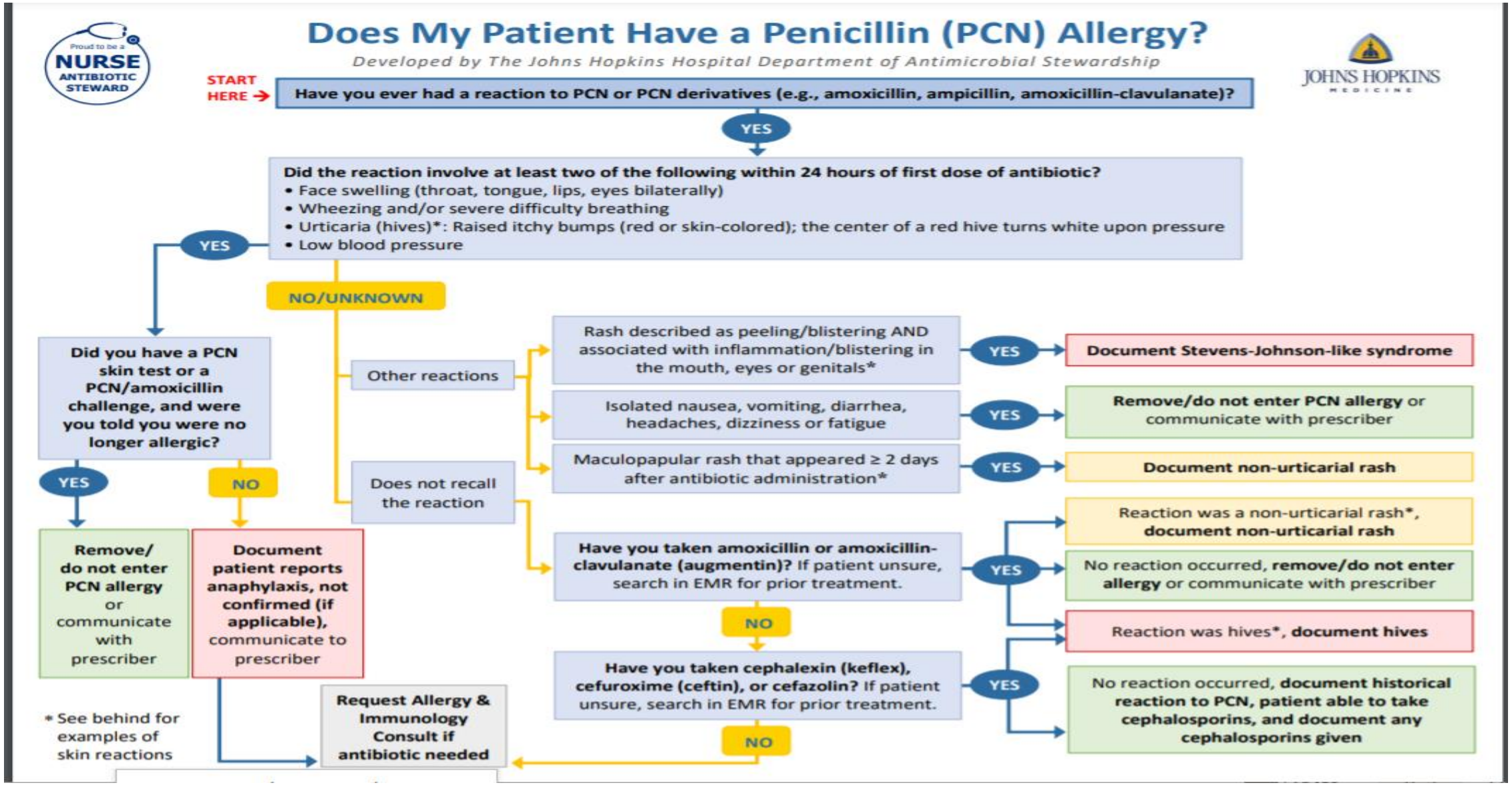
The diagnosis is based on:

- clinical and medication history
- timing of initial drug administration and onset of symptoms
- physical examination

Other considerations:

- Concurrent infections
- comorbidities
- immunosuppression

Establishing a temporal association between drug administration and onset of the eruption remains a key element for the identification of the causative drug.



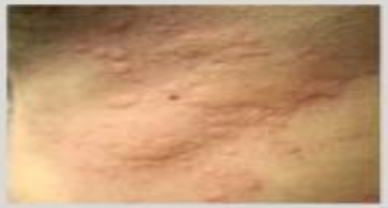
https://www.hopkinsmedicine.org/antimicrobial-stewardship/nursing-toolkit/_docs/penicillin-allergy-algorithm-with-pictures.pdf

MOST COMMON SEVERE REACTIONS INVOLVING THE SKIN*

Anaphylaxis

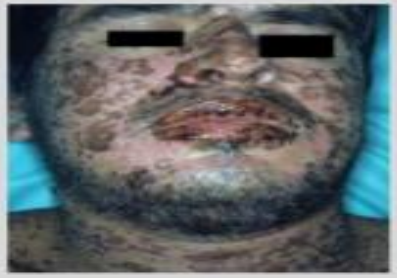
- Bilateral facial swelling
- Wheezing and/or severe difficulty breathing
- Hives
- Occurs within 6 hours of antibiotic administration

Urticaria (hives)



- Itchy, red bumps with white centers (look like new mosquito bites)
- Appears within 6 hours of antibiotic administration
- Bumps disappear after a few hours and new ones may appear

Exfoliative dermatitis



- Skin peeling or blistering with mucosal (eyes, mouth, genital) involvement
- Develops after several days of antibiotics
- Examples: Stevens-Johnson syndrome, TEN
- Requires hospitalization

Erythema multiforme

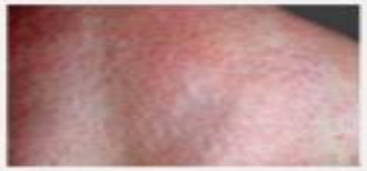
- Rings containing a "bull's-eye"
- Appears after 2—3 days of antibiotic administration

Drug rash eosinophilia and systemic symptoms (DRESS syndrome)

- Fever, rash
- Eosinophilia, liver or kidney involvement
- Occurs 2—6 weeks after exposure

NON-SEVERE SKIN REACTION

Non-urticarial maculopapular rash



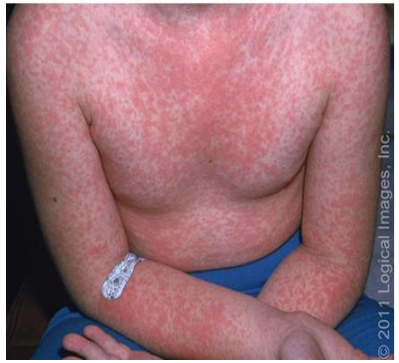
- Tiny red dots covering a large area of the body, may feel rough to the touch
- Appears after 2—3 days of antibiotic administration
- Can be treated through, does not contraindicate future antibiotic use
- May not recur with future drug administration

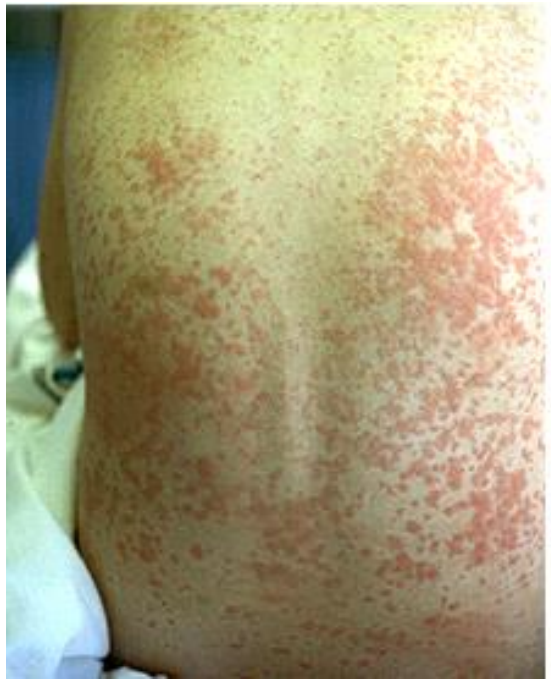
*The patient might report other less common skin reactions. Please document as much detail as possible.

https://www.hopkinsmedicine.org/antimicrobial-stewardship/nursing-toolkit/_docs/penicillin-allergy-algorithm-with-pictures.pdf

Drug-induced exanthems

- most common cutaneous reactions to drugs, responsible for approximately 90 percent of all drug rashes
- morbilliform eruption, often begin in dependent areas and generalize
- erythematous macules and papules
- delayed-type, T cell-mediated (type IV) immune reactions





https://www-uptodate-com.ezproxy.cmh.edu/contents/drug-eruptions?search=hives%20related%20to%20drug%20reaction&source=search_result&selectedTitle=3~150&usage_type=default&display_rank=3

Clinical Presentation of drug exanthem

The onset of the cutaneous eruption typically occurs within 7 to 10 days (range 5 to 21 days) after starting treatment

The eruption may appear two to four days after stopping treatment.

Drugs introduced one to three weeks before the reaction is much more likely to be responsible than a drug taken regularly for months or even years

In patients previously sensitized to the causative drug or a cross-reactive substance, the reaction may develop as early as 6 to 12 hours, or typically one to three days, after renewed treatment initiation.

https://www-uptodate-com.ezproxy.cmh.edu/contents/exanthematous-maculopapular-drug-eruption?search=hives%20related%20to%20drug%20reaction&topicRef=2089&source=see_link

Clinical Course

Most exanthematous drug eruptions are generally mild and may include pruritus and low-grade fever; slightly elevated, acute-phase proteins; and mild eosinophilia.

Do not cause major morbidity.

The peak of eruption is approximately 2-4 days after discontinuation of the causative drug and resolves in one to three weeks. A mild eruption may subside within a few (3-7) days.

Resolution often occurs with some desquamation. In patients with darkly pigmented skin, postinflammatory hyperpigmentation may occur.

https://www-uptodate-com.ezproxy.cmh.edu/contents/exanthematous-maculopapular-drug-eruption?search=hives%20related%20to%20drug%20reaction&topicRef=2089&source=see_link

Management

Drug withdrawal

- **Prompt withdrawal of the offending drug**
- However, in patients taking multiple drugs, every effort should be made to stop only the most suspicious drug(s) and not several or all drugs.
- If the drug is urgently needed and no suitable alternative is available, drug treatment may also remain unchanged under close medical supervision

Symptomatic treatment

- topical corticosteroid
- oral antihistamine

Systemic corticosteroids are generally not recommended. However, in widespread exanthems a short course of prednisone (0.5-1.0mg/kg) for 3-5 days

What to look for?

- If the following symptoms develop:
  - high fever
  - facial edema
  - Muscle or joint pain
  - skin tenderness
  - development of pustules or blisters
  - jaundice

- Seek immediate medical attention if any of these signs develop.

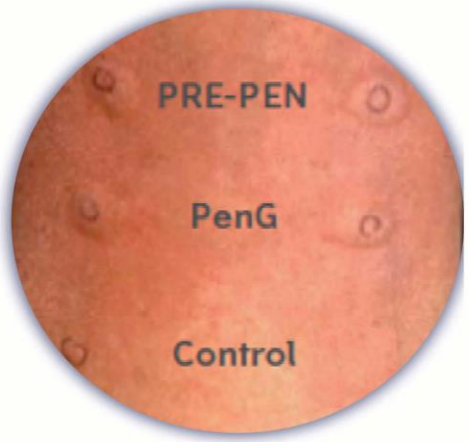
Allergy testing

Evaluation by Allergy is not considered emergent

If testing is warranted, assess 1-6 months after resolution

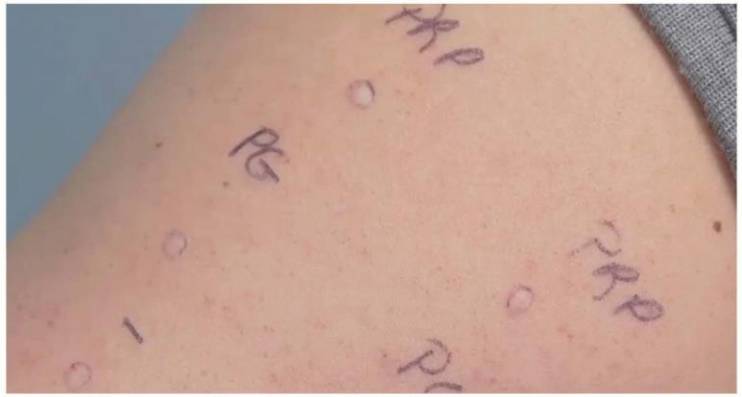
Positive Reaction

This picture shows a positive reaction, therefore the patient is labeled as penicillin allergic.



Negative Reaction

If negative, **optional oral challenge** may be given. Record the final skin test results on the recording form.



https://penallergytest.com/implementation-2/testing-procedure/

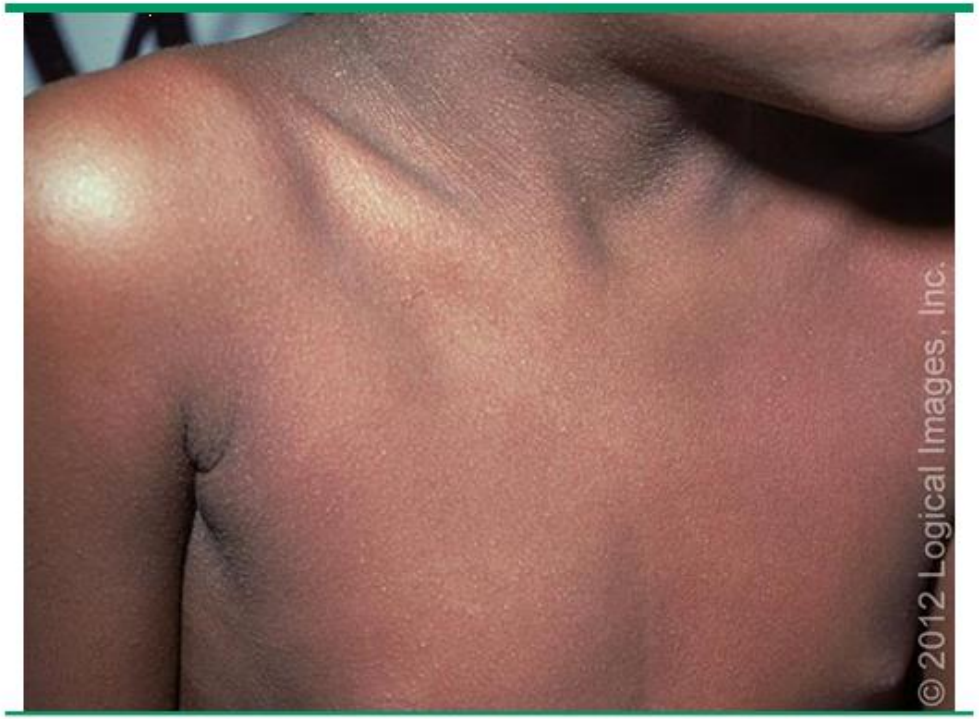
Rash after Group A streptococcal infection

The scarlet fever rash first appears as tiny red bumps on the chest and abdomen that may spread all over the body

Looking like a sunburn, it feels like a rough piece of sandpaper

Lasts about two to five days.

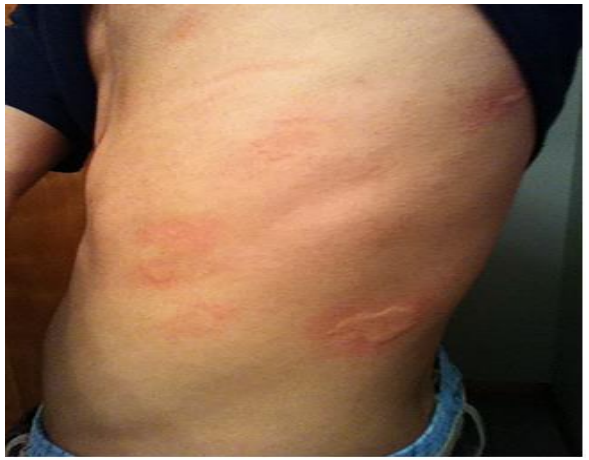
Scarlet fever rash - "Sandpaper" papules

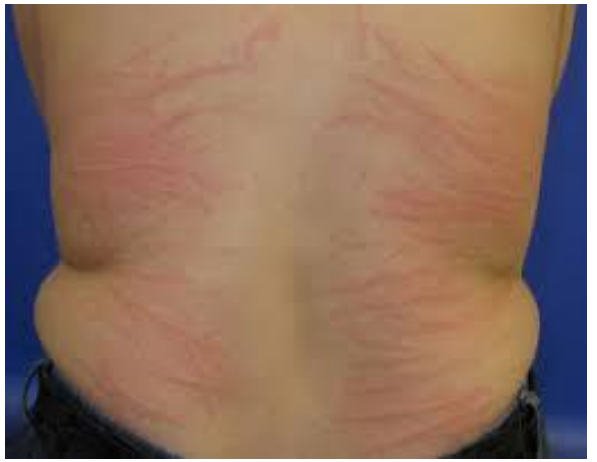


The rash of scarlet fever is a diffuse erythema that blanches with pressure, with numerous small (1 to 2 mm) papular elevations, giving a "sandpaper" quality to the skin.

Urticaria

- **Acute urticaria** — Urticaria is considered acute when it has been present for less than six weeks.
- **Chronic urticaria** — Urticaria is considered chronic when it is recurrent, with signs and symptoms recurring most days of the week, for six weeks or longer.





Images from Google

Clinical Manifestations of Urticaria

Lesions are circumscribed, raised, erythematous plaques, often with central pallor

may be round, oval, or serpiginous in shape and vary in size from less than 1 centimeter to several centimeters in diameter. May coalesce as they enlarge

intensely **itchy**

transient, usually appearing and enlarging over the course of minutes to hours and then disappearing within 24 hours.

Not painful and resolve without leaving residual ecchymotic marks on the skin, unless there is trauma from scratching.

Any area of the body may be affected, although areas in which clothing compresses the skin (eg, under waistbands) or skin rubs together (axillae) are sometimes affected more dramatically

https://www-uptodate-com.ezproxy.cmh.edu/contents/new-onset-urticaria?search=urticaria&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

Pathophysiology

Urticaria is mediated by cutaneous mast cells in the superficial dermis.

Basophils have also been identified

Mast cells and basophils release multiple mediators upon activation including histamine (which causes itching) and vasodilatory mediators (which cause localized swelling in the uppermost layers of the skin).

The same process gives rise to angioedema when mast cells deeper in the dermis and subcutaneous tissues are activated.

https://www-uptodate-com.ezproxy.cmh.edu/contents/new-onset-urticaria?search=urticaria&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

Causes of Urticaria

Infection

- Viral
- Bacterial
- Parasitic

IgE Mediated

- Medications
- Food
- Stinging insects
- Latex

Physical

- Cold
- Exercise
- Cholinergic
- Vibratory
- Aquagenic

Causes of Urticaria

Direct mast cell activation

- Narcotics
- Radiocontrast Agents
- Muscle relaxants
- Vancomycin

Miscellaneous

- NSAIDS
- Serum Sickness
- Hormones related (progesterone)
- Stinging nettle

Questions to ask

- Other signs and symptoms of a generalized allergic reaction or anaphylaxis? Patients may fail to report more subtle symptoms unless specifically asked.
- Previous history of hives. Some children develop acute urticaria repeatedly with infections.
- Symptoms or signs to suggest an underlying systemic disorder? Specifically, has the patient recently had unexplained fever, weight loss, arthralgias, or arthritis
- Usual state of health when the hives appeared or has the patient been ill recently with viral or bacterial infections?
- Any recent health events, such as musculoskeletal injuries for which he/she was taking NSAIDs or new diagnoses requiring unfamiliar medications or treatments?
- Review events in the hours before the urticaria appeared. What had the patient ingested (foods, beverages, candy)? Was the patient involved in exercise or physical exertion? Was the patient exposed to extremes of temperature or stung by an insect?
- Any new medications or supplements
- Recent travel

https://www-uptodate-com.ezproxy.cmh.edu/contents/new-onset-urticaria?search=urticaria&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

Treatment

- Antihistamines
- Diphenhydramine
- Cetirizine
- Levocetirizine
- Fexofenadine

Treatment may require 2-4x the normal amount to control urticaria

Testing for urticaria

- Testing is generally not part of first line treatment of hives
- Generalized food and aeroallergen panels are not recommended for chronic hives.
- Clear history of development of hives every time, they ingest a food, then IgE testing of the suspected food would be recommended.
  - Hives related to food ingestion only occur immediately after the food is ingested and typically are short lived.
  - Foods are not the cause of chronic hives.

- In select cases, additional blood testing to look for systemic causes may be offered by an allergist if hives are unresponsive to treatment.

Other diagnoses

- Angioedema **without** urticaria should prompt consideration of other angioedema disorders,
  - drug-induced angioedema (eg, angiotensin-converting enzyme [ACE] inhibitors)
  - idiopathic angioedema
  - hereditary and acquired C1 inhibitor deficiency (HAE)
- If urticarial lesions are long-lasting, painful, or leave residual bruising, the diagnosis of urticarial vasculitis should be considered.

https://www-uptodate-com.ezproxy.cmh.edu/contents/new-onset-urticaria?search=urticaria&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

Food Allergies

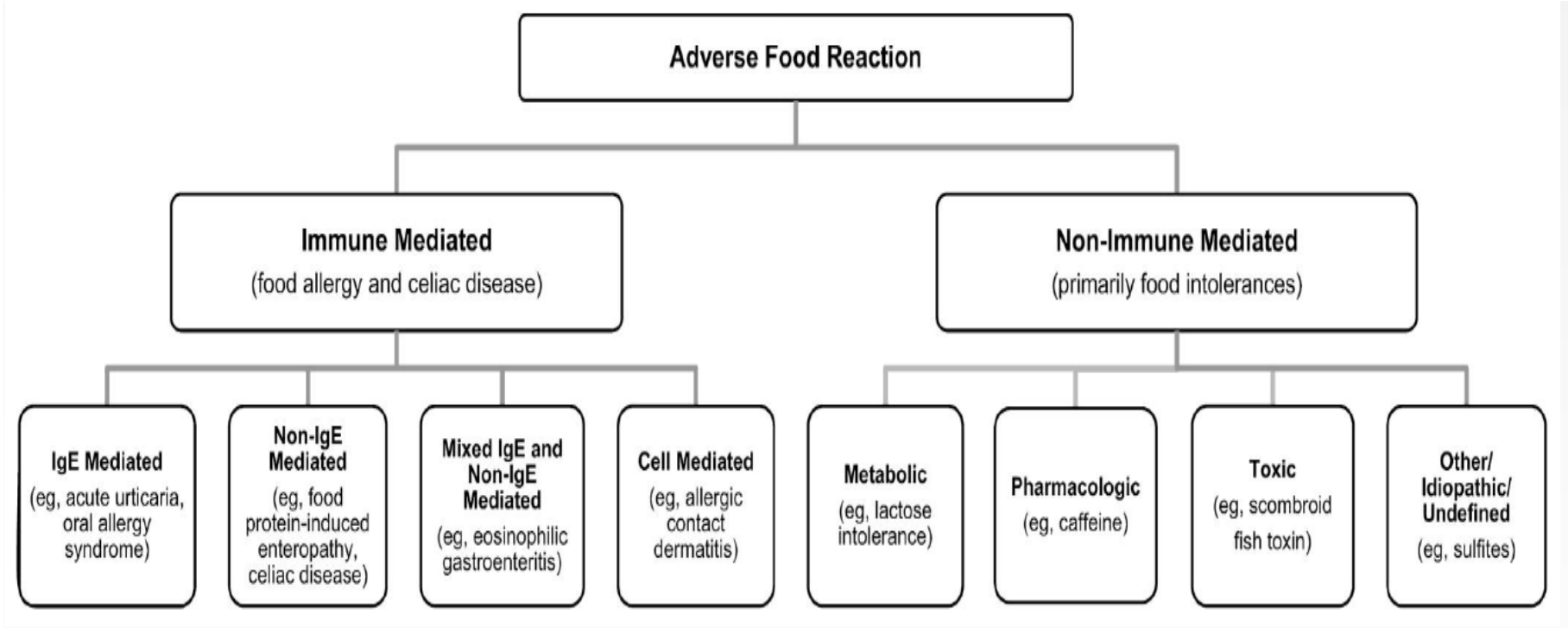
Allergic

Immunologic

Intolerance

Non-immunologic

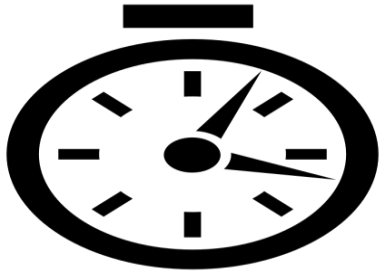
Immune vs. Non-Immune Mediated Reactions



Boyce, et al. Guidelines for the Diagnosis and Management of Food Allergy in the United States: Report of the NIAID-Sponsored Expert Panel. JACI 126.6 (2010): S10

Onset of Symptoms

- **Timing of onset after ingestion**
  - Allergic reactions will typically occur within the first 20 minutes, but can be as late as 2 hours of ingestion
  - Symptoms that occur after 12 hours are not typically related to an IgE mediated response



Symptoms of an allergic reaction

- **Skin**
  - Hives, itchy rash, swelling of the face and extremities
- **Mouth**
  - Itching, tingling or swelling of lips, tongue and/or mouth
- **Gut**
  - Nausea, abdominal cramps, vomiting, diarrhea
- **Throat**
  - Tightening of throat, hoarseness, hacking cough
- **Lung**
  - Shortness of breath, repetitive coughing and wheezing
- **Heart**
  - Thready pulse, low blood pressure, fainting, pallor, blue skin
- **Other**
  - Sense of impending doom
- Anaphylaxis occurs when two or more body systems are involved, or immediate respiratory symptoms develop

Frequency and Occurrence of Signs and Symptoms of Anaphylaxis

Signs and Symptoms	Percent
Cutaneous	
Urticaria and angioedema	85-90
Flushing	45-55
Pruritus without rash	2-5
Respiratory	
Dyspnea, wheeze	45-50
Upper airway angioedema	50-60
Rhinitis	15-20
Hypotension, dizziness, syncope, diaphoresis	30-35
Abdominal	
Nausea, vomiting, diarrhea, cramping pain	25-30
Miscellaneous	
Headache	5-8
Substernal pain	4-6
Seizure	1-2
Angor animi (sense of impending doom)	—

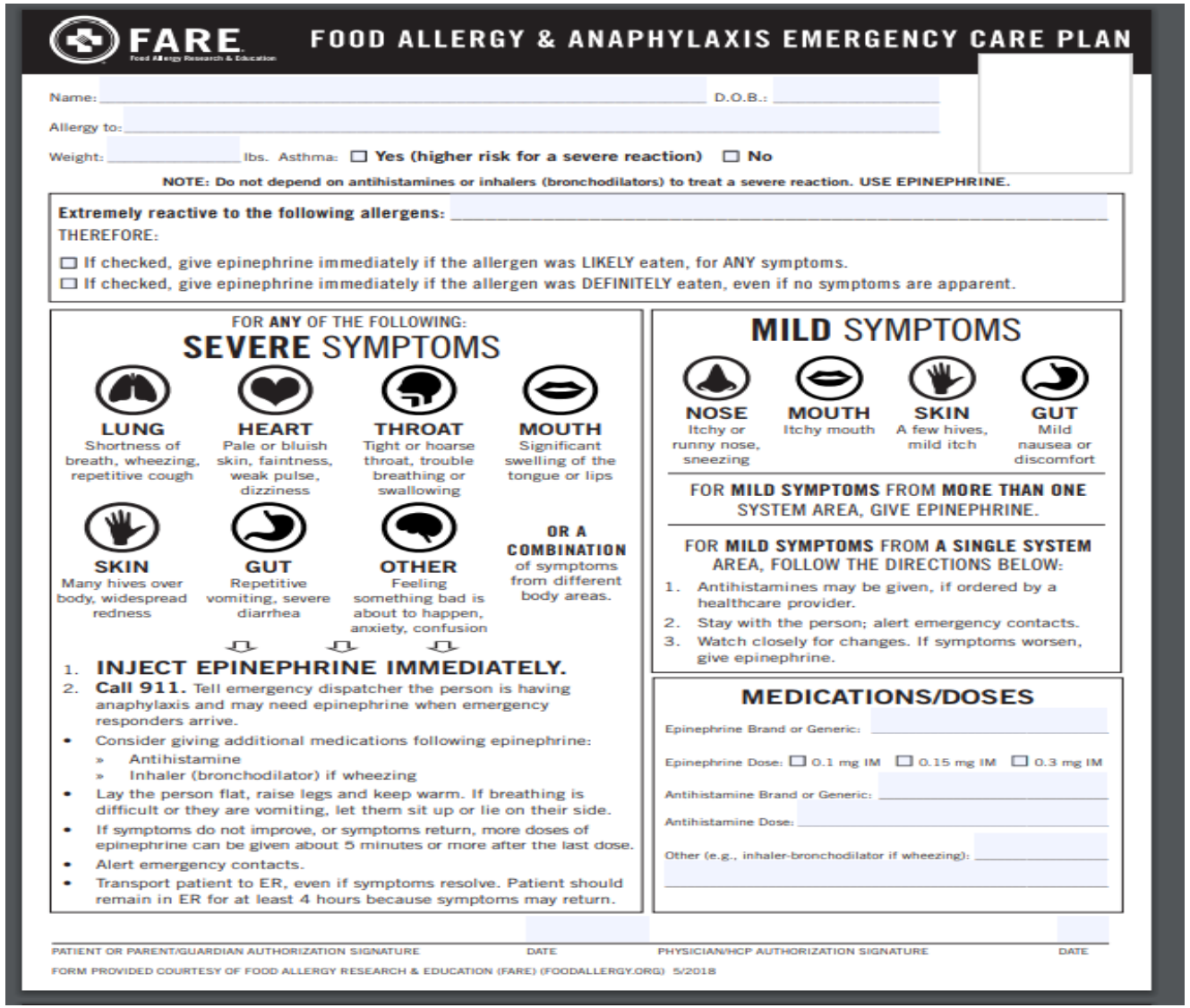
Lieberman P, et al. *J Allergy Clin Immunol*. 2010;126:477-480.

Emergency Plan from CMH

Reaction	Symptoms	Do the following
No Reaction	• Exposure to allergen but no symptoms	Observe
Mild Reaction	• Runny nose, sneezing, itchy nose • Itching, tingling or mild swelling of lips, tongue, or mouth • A few hives • Nausea, abdominal cramps/ discomfort	Give antihistamine and Observe Note: Severity of symptoms can change quickly. If symptoms worsen, give epinephrine
Moderate to Severe Reaction	• Tightening of throat, hoarseness, cough • Labored breathing, wheezing • Fast pulse, weak pulse, fainting, blue or pale skin, • Dizziness, feeling of doom, confusion, altered consciousness or agitation • Trouble swallowing • Swelling of lips/ tongue that bother breathing • Repetitive vomiting or severe diarrhea (if severe combined with other symptoms) • Hives all over the body or flushing/redness all over the body	Use Epinephrine* and then give antihistamine Call 911- tell dispatcher – may need epinephrine Lay the person flat, raise legs, keep warm. Let the person sit up or lie on side if vomiting Give a second dose of epinephrine, if symptoms get worse, continue, or do not get better in 10 minutes

Medications: *May repeat epinephrine dose in 10 minutes if symptoms have not resolved.

FARE Emergency Care Plan



FARE Food Allergy Research & Education

FOOD ALLERGY & ANAPHYLAXIS EMERGENCY CARE PLAN

Name: _____ D.O.B.: _____

Allergy to: _____

Weight: _____ lbs. Asthma: ☐ **Yes (higher risk for a severe reaction)** ☐ **No**

NOTE: Do not depend on antihistamines or inhalers (bronchodilators) to treat a severe reaction. USE EPINEPHRINE.

Extremely reactive to the following allergens: _____

THEREFORE:

☐ If checked, give epinephrine immediately if the allergen was LIKELY eaten, for ANY symptoms.

☐ If checked, give epinephrine immediately if the allergen was DEFINITELY eaten, even if no symptoms are apparent.

FOR **ANY** OF THE FOLLOWING:

SEVERE SYMPTOMS

LUNG — Shortness of breath, wheezing, repetitive cough

HEART — Pale or bluish skin, faintness, weak pulse, dizziness

THROAT — Tight or hoarse throat, trouble breathing or swallowing

MOUTH — Significant swelling of the tongue or lips

SKIN — Many hives over body, widespread redness

GUT — Repetitive vomiting, severe diarrhea

OTHER — Feeling something bad is about to happen, anxiety, confusion

OR A COMBINATION of symptoms from different body areas.

1. **INJECT EPINEPHRINE IMMEDIATELY.**
2. **Call 911.** Tell emergency dispatcher the person is having anaphylaxis and may need epinephrine when emergency responders arrive.

- Consider giving additional medications following epinephrine:
  - » Antihistamine
  - » Inhaler (bronchodilator) if wheezing
- Lay the person flat, raise legs and keep warm. If breathing is difficult or they are vomiting, let them sit up or lie on their side.
- If symptoms do not improve, or symptoms return, more doses of epinephrine can be given about 5 minutes or more after the last dose.
- Alert emergency contacts.
- Transport patient to ER, even if symptoms resolve. Patient should remain in ER for at least 4 hours because symptoms may return.

MILD SYMPTOMS

NOSE — Itchy or runny nose, sneezing

MOUTH — Itchy mouth

SKIN — A few hives, mild itch

GUT — Mild nausea or discomfort

FOR **MILD SYMPTOMS** FROM **MORE THAN ONE** SYSTEM AREA, GIVE EPINEPHRINE.

FOR **MILD SYMPTOMS** FROM **A SINGLE SYSTEM** AREA, FOLLOW THE DIRECTIONS BELOW:

1. Antihistamines may be given, if ordered by a healthcare provider.
2. Stay with the person; alert emergency contacts.
3. Watch closely for changes. If symptoms worsen, give epinephrine.

MEDICATIONS/DOSES

Epinephrine Brand or Generic: _____

Epinephrine Dose: ☐ 0.1 mg IM ☐ 0.15 mg IM ☐ 0.3 mg IM

Antihistamine Brand or Generic: _____

Antihistamine Dose: _____

Other (e.g., inhaler-bronchodilator if wheezing): _____

PATIENT OR PARENT/GUARDIAN AUTHORIZATION SIGNATURE _____ DATE _____

PHYSICIAN/HCP AUTHORIZATION SIGNATURE _____ DATE _____

FORM PROVIDED COURTESY OF FOOD ALLERGY RESEARCH & EDUCATION (FARE) (FOODALLERGY.ORG) 5/2018

Oral allergy syndrome

- Cross reactivity between pollens and fresh fruit and vegetables
- Symptoms are typically limited to mouth
- Treatment consists of antihistamine
- Foods usually tolerated if baked

Ragweed→ bananas, melons (watermelon, cantaloupe, honeydew), zucchini and cucumber
Birch→ apples, pears, peaches, apricots, cherries, plums, prunes, nectarines, kiwi, carrots, celery, potatoes and peppers
Grass→ peaches, celery, melons, tomatoes, oranges

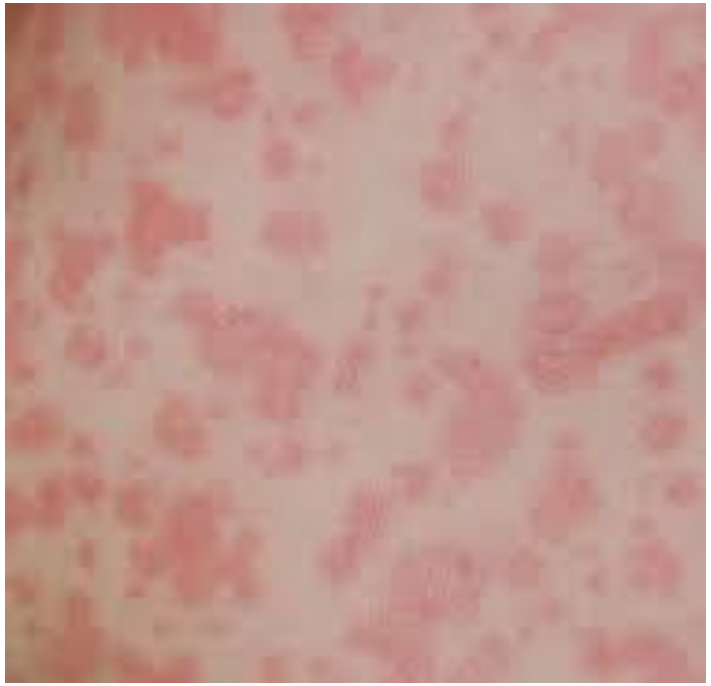
Not a Food Allergy

- Chronic rhinitis
- Asthma
- Behavior changes
- Autism
- Chronic abdominal pain, constipation
- Headaches
- Chronic Hives

Case Scenerio

K.C.

- 4yo male
- Diagnosed with ear infection last week and started on Amoxicillin.
- Developed a rash
- Calling nurse advice line
- What else do we want to know?



Additional Information

- Amoxicillin was started 9 days ago
- Rash is described as fine pinpoint bumps on chest and back
- Denies, pain, swelling, itching, blisters or peeling of skin
- Afebrile
- Previously tolerated Amoxicillin
- No new foods, soaps, lotions, detergents
- No treatment given

Recommendations

Stop

- Stop Amoxicillin

Start

- Start Antihistamine if pruritis is present
  - Cetirizine in AM
  - Diphenhydramine at bedtime

Contact

- Contact PCP when office opens

L.M.

- 17yo female
- Woke up with hives on hands and lip swelling
- Treated with Benadryl and no additional symptoms but awoke the next day with same symptoms

- What else do we want to know?

Additional information

- Denies any ingestion of food prior to onset
- Used her sister’s soap the night before but had used before
- No new makeup or lotion
- No new medications
- No additional symptoms- denies any breathing difficulties
- COVID positive 10 days prior

Recommendations

- Start cetirizine 10-20mg daily for a few days
- Diphenhydramine for breakthrough symptoms
- No additional testing is needed
- Follow up with PCP office if hives not responsive to antihistamine
- Go to UCC or ED if difficulty breathing develops

Questions

- Contact Information:
- Jashroba@cmh.edu