UWTASP

tele-antimicrobial stewardship program

Penicillin allergy evaluation sans skin testing

David Coleman, MD

Allergy and Immunology, University of Washington

Goals of the talk

- Understanding the basic building blocks of index reaction risk stratification
- Look at key studies where skin testing is omitted

The theme of the day is…

- Risk stratification!

- Some index reactions (aka- what happened around the time the patient took penicillin and had a ”reaction”) are low hanging fruit for delabeling. Some are “never rechallenge” reactions

Important Distinctions: Challenge versus desensitization

VS

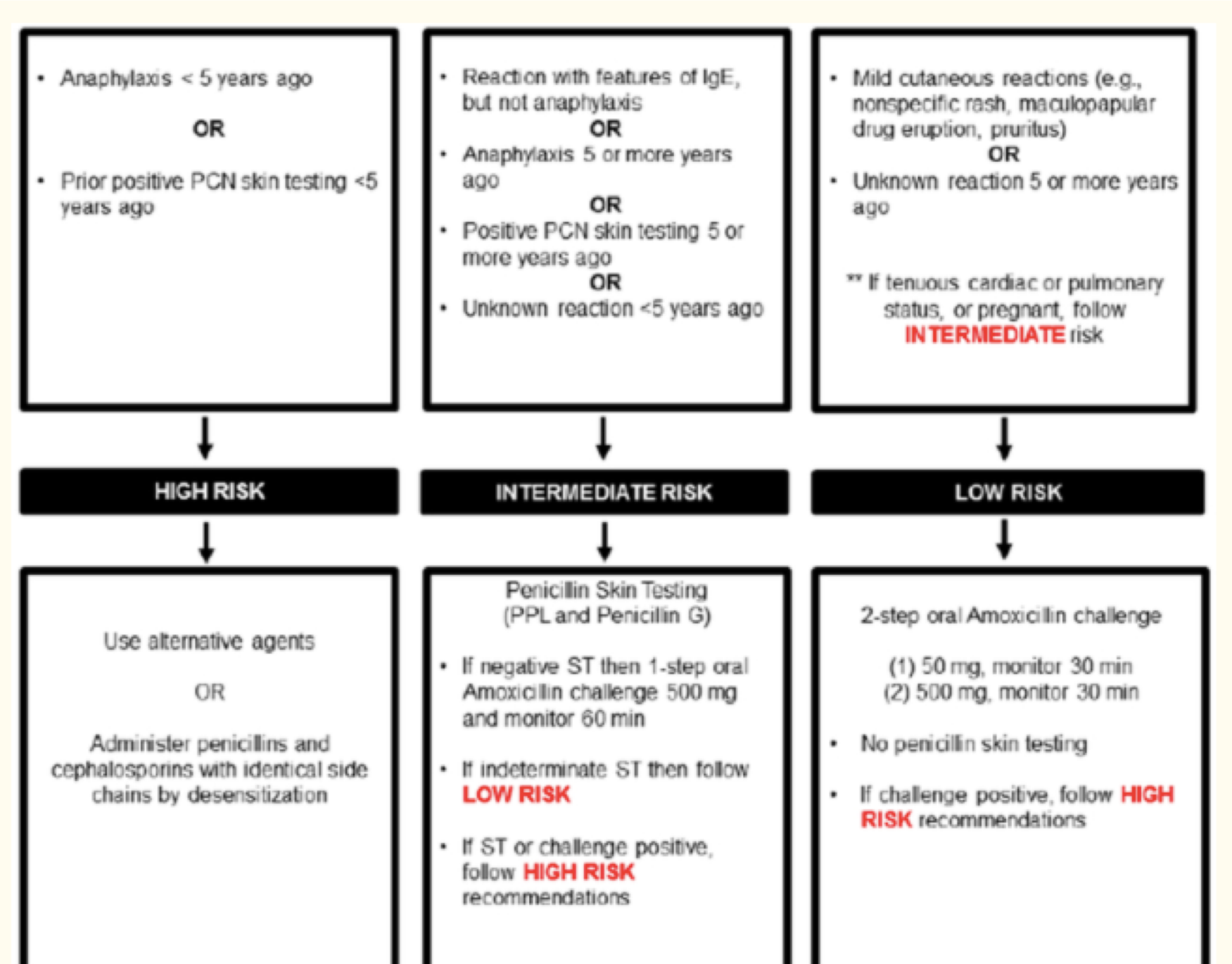
Graded Oral/IV Challenge

- Performed when there is low likelihood of allergic reaction
- Quickly escalating dilutions (1:10 -> 1)
- Cleared to take med until a subsequent allergic type reaction occurs (not expected)

Desensitization

- Performed when there is high likelihood of allergic reaction, and patient needs the medication
- Slowly escalating dilutions
- Must take med as soon as desensitization is performed. If discontinued, must re-desensitize

Blumenthal


• Anaphylaxis < 5 years ago
OR
• Prior positive PCN skin testing <5 years ago
HIGH RISK
Use alternative agents
OR
Administer penicillins and cephalosporins with identical side chains by desensitization
• Reaction with features of IgE, but not anaphylaxis
OR
• Anaphylaxis 5 or more years ago
OR
• Positive PCN skin testing 5 or more years ago
OR
• Unknown reaction <5 years ago
INTERMEDIATE RISK
Penicillin Skin Testing
(PPL and Penicillin G)
• If negative ST then 1-step oral Amoxicillin challenge 500 mg and monitor 60 min
• If indeterminate ST then follow LOW RISK
• If ST or challenge positive, follow HIGH RISK recommendations
• Mild cutaneous reactions (e.g., nonspecific rash, maculopapular drug eruption, pruritus)
OR
• Unknown reaction 5 or more years ago
** If tenuous cardiac or pulmonary status, or pregnant, follow INTERMEDIATE risk
LOW RISK
2-step oral Amoxicillin challenge
(1) 50 mg, monitor 30 min
(2) 500 mg, monitor 30 min
• No penicillin skin testing
• If challenge positive, follow HIGH RISK recommendations

- Anaphylaxis 1 or more years ago*
- Reaction with features of IgE< 5 years ago
- Prior positive PCN skin testing

HIGH RISK

Penicillin skin testing
PCN, Pre-Pen, Ampicillin without minor determinants

- If negative ST then 1-step oral Amoxicillin challenge 500 mg and monitor 60 min
- If indeterminate ST then 2-step oral challenge 50 mg, monitor 30 min 500 mg, monitor 30 min
- If ST or challenge positive, use alternative agents, or administer penicillins and cephalosporins with identical side chains by desensitization

* Anaphylaxis < 1 year will be assessed with ST for diagnostic purposes only

- Reaction with features of IgE, 5 or more years ago
- Mild non-IgE cutaneous reaction (e.g., maculopapular drug eruption, pruritus)
- Unknown reaction

** If tenuous cardiac or pulmonary status, or pregnant, follow **HIGH** risk

LOW RISK

2-step oral Amoxicillin challenge ONLY

(1) 50 mg, monitor 30 min
(2) 500 mg, monitor 30 min

- No penicillin skin testing

IF PATIENT REPORTS SYMPTOMS, OR THERE ARE OBJECTIVE ALLERGIC OR NON-ALLERGIC SIGNS DURING CHALLENGE

- **Document symptoms and signs for immediate or delayed symptoms**
- **If there is no allergy, do not treat with anti-allergic medications and delete the allergy from the electronic health record**
- **If there is an allergy, specify symptoms, signs, and likely type, including photos and treatment administered**
- **When allergy determination is unclear, ask the patient to return for a 1-step challenge to amoxicillin 500 mg PO or placebo challenge (especially if multiple drug allergy or intolerance syndromes)**
- **Document any change of allergy status clearly in the electronic health record and communicate it clearly to: (1) patient (2) primary care provider (3) primary outpatient pharmacy**

Takeaway points from Blumenthal risk stratification

- “I don’t remember” reactions are low risk
- “rash” is low risk
- “IgE mediated non-anaphylaxis >5 years ago is low risk
- Evaluation during pregnancy is treated as relatively higher risk

Vanderbilt risk stratification- Stone, Phillips

Higher Risk History		Low Risk History
Highest Risk: Severe delayed symptoms at any point in the past:	**Moderate to High Risk: Anaphylaxis, especially in the last 5 years:**	
• Mouth or eye ulcerations • Skin or mucosal sloughing or blistering • Serum sickness • Immune-mediated kidney injury • Immune-mediated liver Injury • Stevens-Johnson Syndrome (SJS) • Toxic epidermal necrolysis (TEN) • Drug reaction with eosinophilia and systemic symptoms (DRESS) • Acute generalized exanthematous pustulosis (AGEP) • Febrile skin rash without a better explanation	After administration of the first dose of a new treatment course with a penicillin, patient developed any of the following severe symptoms within one hour, up to 6 hours. • Disseminated Hives/ Urticaria/Flushing/Pruritis • Angioedema/Swelling of Face/Throat • Shortness of Breath, Wheezing, Coughing • Shock • Weak Pulse • Loss of Consciousness/ Confusion • Severe Gastrointestinal Symptoms (Diarrhea, Vomiting)	• Urticaria only, >5 years have passed • Self-limited cutaneous rash at any point • Gastrointestinal symptoms only • Remote childhood reaction with limited details • Family history of penicillin allergy only • Avoidant from fear of allergy only • Known tolerance of a penicillin since the original reaction occurred • Other symptoms, non-allergy

Risk Group	Low Risk: Challenge Performed ($n = 54$)	Low Risk: Declined Challenge ($n = 14$)	Higher Risk (Both Groups) ($n = 46$)
Median age (IQR), yr	57 (46–66)	48 (41–59)	50 (41–65)
Sex, F	24 (44)	5 (36)	29 (63)
Race			
White	51 (94)	12 (86)	41 (89)
Black	3 (6)	2 (14)	4 (9)
Asian	0 (0)	0 (0)	1 (2)
Non-Hispanic ethnicity	54 (100)	14 (100)	44 (96)
Immediate challenge outcome			
Tolerated amoxicillin oral challenge, leading to allergy removal from the chart	54 (100)	N/A	N/A
Primary outcomes at 7 mo			
Subsequent use of a penicillin treatment course	17 (31)	2 (14)	2 (4); 1 direct treatment, 1 after a desensitization
More than one subsequent penicillin treatment	4 (7)	1 (7)	0 (0)
No. of penicillin labels reentered into the chart during subsequent care	1 (2)	N/A	N/A

Definition of abbreviations: IQR = interquartile range; N/A = not applicable.

Data are presented as *n* (%) unless otherwise noted.

Take away points- Vanderbilt

- Similar risk stratification to Blumenthal team
- Low risk reactions only were challenged without skin testing
- High success rate with this strategy

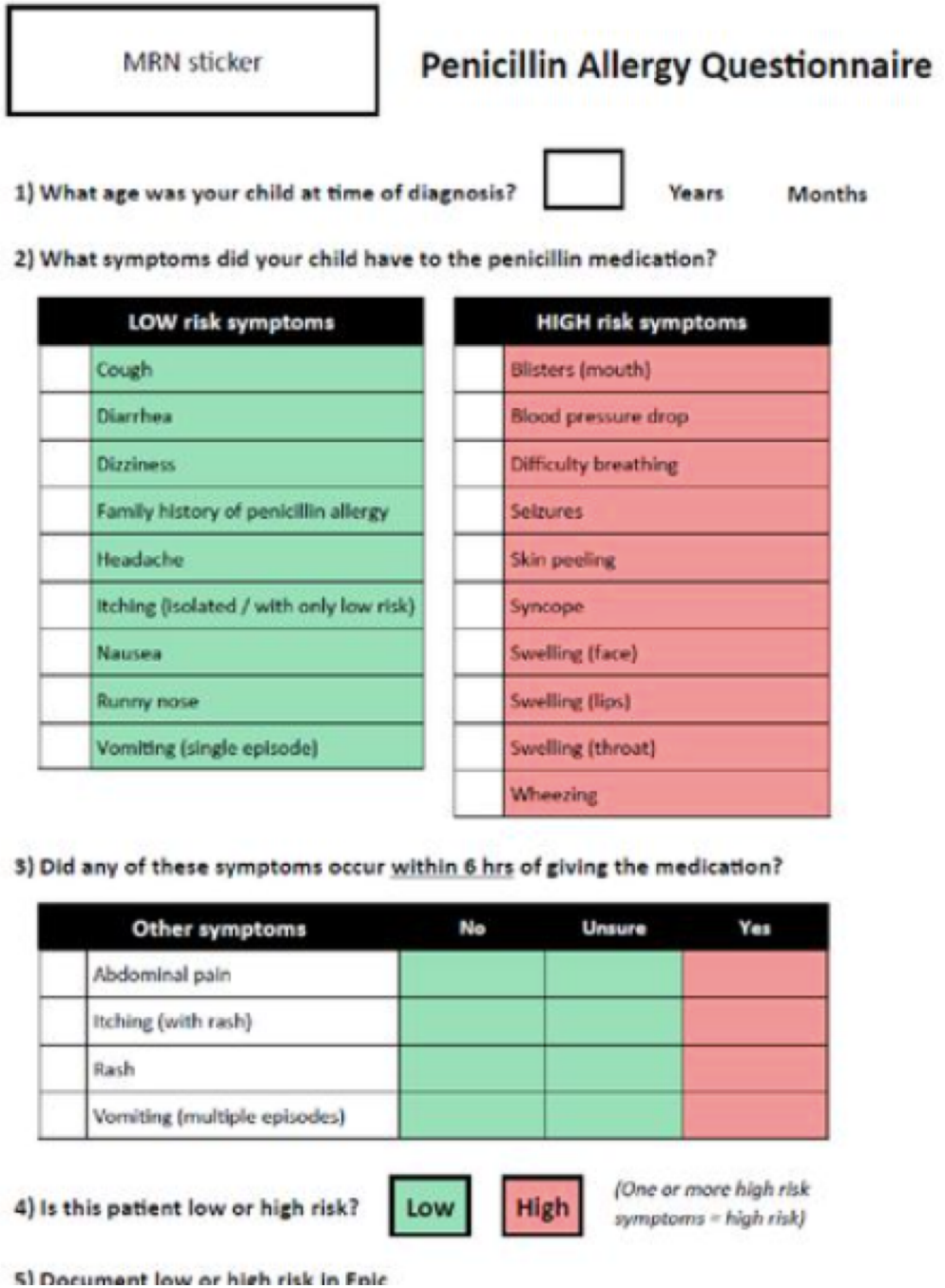
Time from index reaction seems to be important in the risk stratification tool

- So would children be harder to delabel?

Viles Group- Medical College of Wisconsin

- Delabeling in the pediatric emergency department

Nursing administered



MRN sticker

Penicillin Allergy Questionnaire

1) What age was your child at time of diagnosis? ☐ Years Months

2) What symptoms did your child have to the penicillin medication?

	LOW risk symptoms
☐	Cough
☐	Diarrhea
☐	Dizziness
☐	Family history of penicillin allergy
☐	Headache
☐	Itching (isolated / with only low risk)
☐	Nausea
☐	Runny nose
☐	Vomiting (single episode)

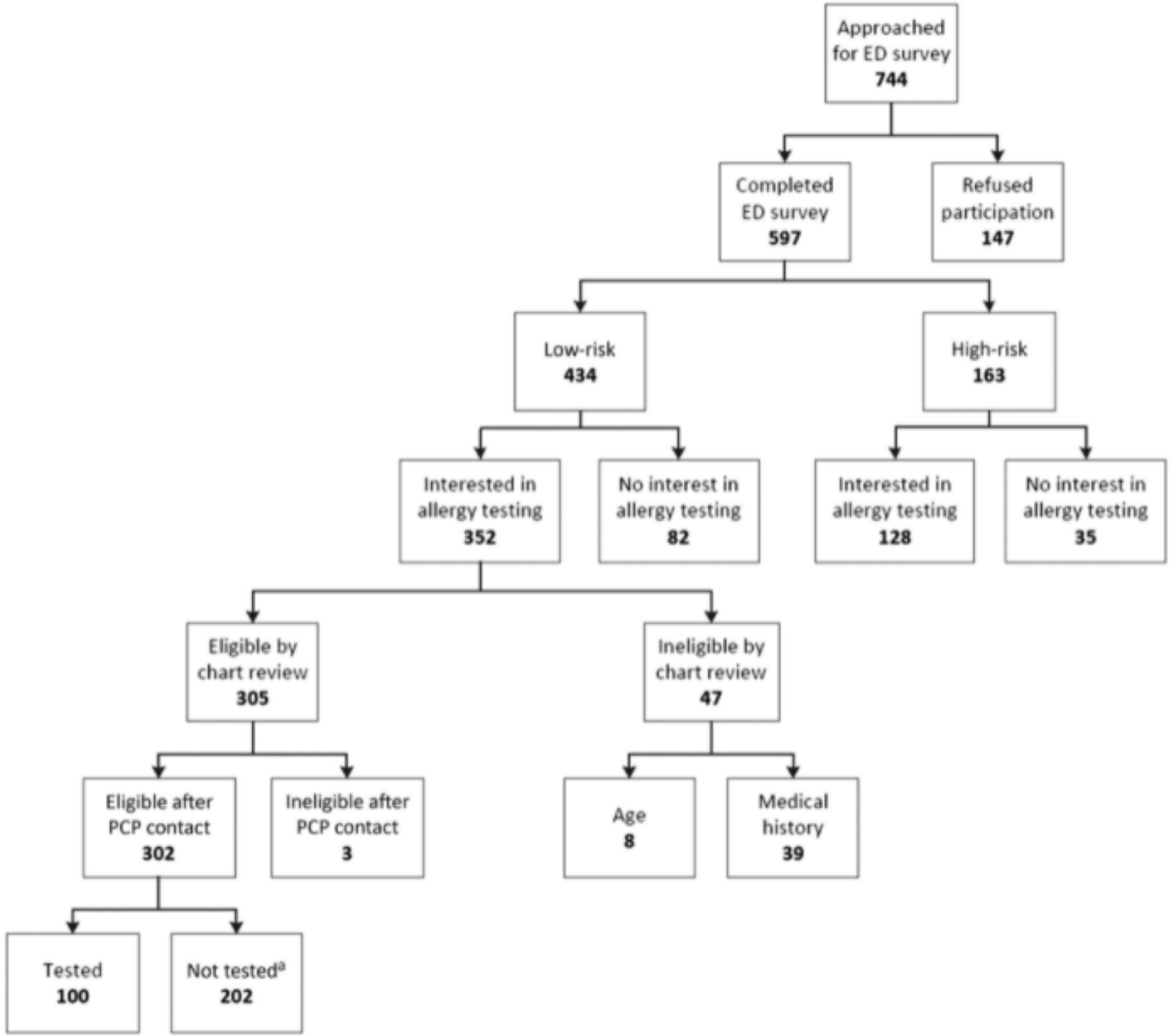
	HIGH risk symptoms
☐	Blisters (mouth)
☐	Blood pressure drop
☐	Difficulty breathing
☐	Seizures
☐	Skin peeling
☐	Syncope
☐	Swelling (face)
☐	Swelling (lips)
☐	Swelling (throat)
☐	Wheezing

3) Did any of these symptoms occur within 6 hrs of giving the medication?

	Other symptoms	No	Unsure	Yes
☐	Abdominal pain			
☐	Itching (with rash)			
☐	Rash			
☐	Vomiting (multiple episodes)			

4) Is this patient low or high risk? Low High *(One or more high risk symptoms = high risk)*

5) Document low or high risk in Epic


Approached for ED survey 744
Completed ED survey 597
Refused participation 147
Low-risk 434
High-risk 163
Interested in allergy testing 352
No interest in allergy testing 82
Interested in allergy testing 128
No interest in allergy testing 35
Eligible by chart review 305
Ineligible by chart review 47
Eligible after PCP contact 302
Ineligible after PCP contact 3
Age 8
Medical history 39
Tested 100
Not tested[a] 202

Initial study- was using skin testing but subsequently has gone straight to oral challenge

- 98% passed without a reaction. Two had self limiting hives

What percentage of patients are “low risk?”

- Coleman et al (me) surveyed roughly 1000 patients with a penicillin allergy
- Approximately 70% recalled their index reactions as low risk
- The 70% percent number is pretty consistent in the literature

Take home points

- Oral challenge only has been conducted in the literature with high success rate
- Risk stratification of index reaction is important- Oral challenge only has only been performed in LOW risk patients
- This can even be done with good success in children
- The evaluation of pregnant patients should be considered high risk and skin testing should be employed