Pharmacoequity & Cost-Effective Care in the Allergy Immunology Clinic

Understanding the challenges we face to providing the right care, at the right time, every time, to everyone

Marcus Shaker, MD, MSc, FAAAAI, FACAAI FAAP
Professor of Pediatrics and Medicine
Geisel School of Medicine at Dartmouth

Learning Objectives

- Discuss pharmacoequity as an essential component to ensure treatment options and modalities are available to all patients regardless of race, ethnicity, and class.
- Describe a role of cost-effective care in addressing racial and socioeconomic disparities and beyond.

“What is the right care for Jeremy?”

- You are counseling the family of a 16 year old adolescent with severe persistent asthma
- The medical history is notable for
  - Three asthma admissions, 2 ICU stays, 1 admission
  - Multiple environmental and food allergies
  - Ongoing issues of adherence
- His insurer has refused to allow reimbursement for an asthma biologic until his insurance claims demonstrate regular use of an inhaled corticosteroid

What is Pharmacoequity?

- **The US pays more for medical care than anywhere else in the world**
- **The costs are not equitably distributed**
- **Unequal access = unequal care**

- ***"Pharmacoequity is equity in access to ensure that all patients, regardless of race, ethnicity, socioeconomic status, or availability of resources, have access to the highest quality of pharmacotherapy to mange their health condition"***

Chalasani et al. J Health Policy Law 2022

Agency for Healthcare Research and Quality

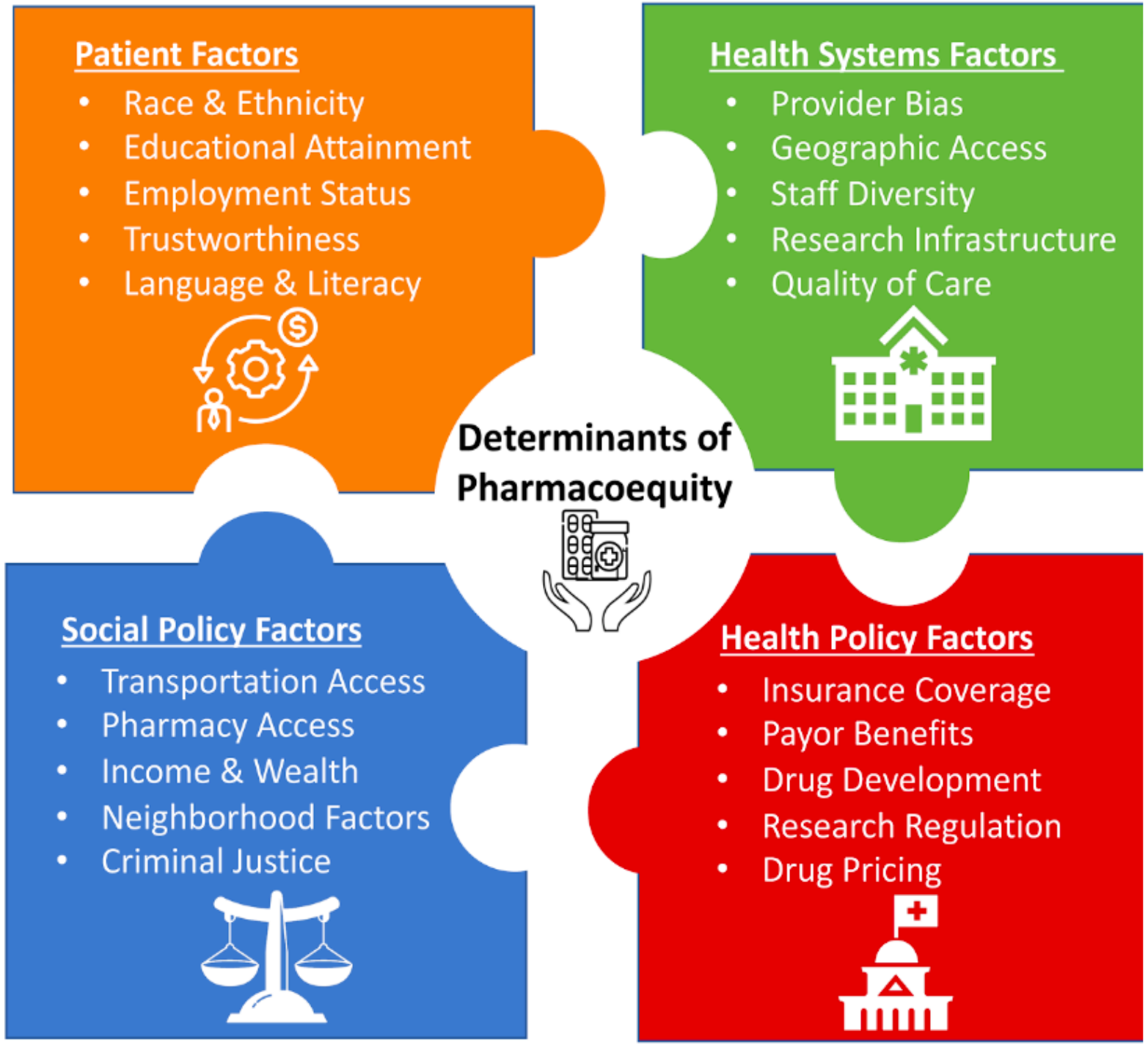
TABLE I. Six domains of health care quality[11]

Domain	Description
Safe	Avoids harm from care that is intended to be helpful
Effective	Services based on scientific knowledge; avoidance of services that are not beneficial
Patient-centered	Care that is based on individual patient needs and values and guided by these needs and values
Timely	Reducing wait and delay as much as possible
Efficient	Avoiding waste of medical equipment, supplies, and time
Equitable	Consistent quality of care across personal characteristics

Healthcare Quality Imperative for Pharmacoequity

Abrams E, Singer A, Shaker M, Greenhawt M. What the COVID-19 Pandemic Can Teach Us about Resource Stewardship. JACI In Practice 2021; ahrq.gov

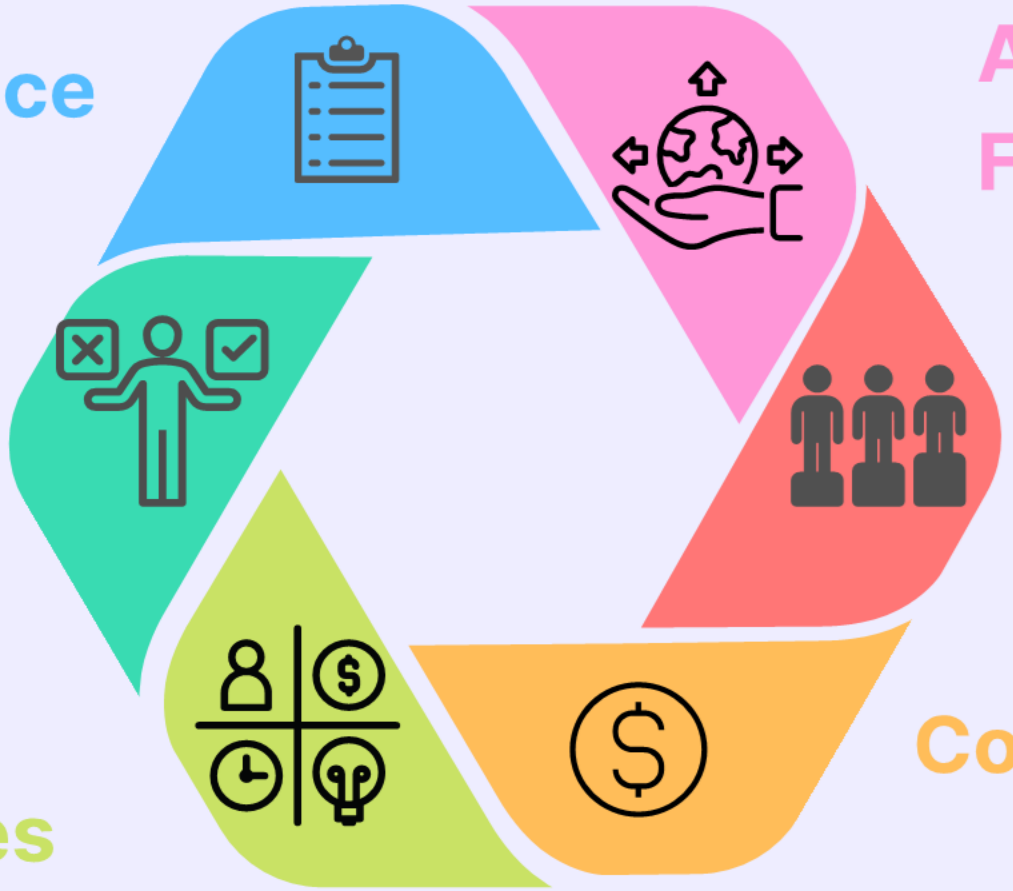
Multilevel Determinants of Pharmacoequity



Chalasani et al. J Health Policy Law 2022

Certainty of Evidence

Acceptability and Feasibility



Patient Preference

Equity

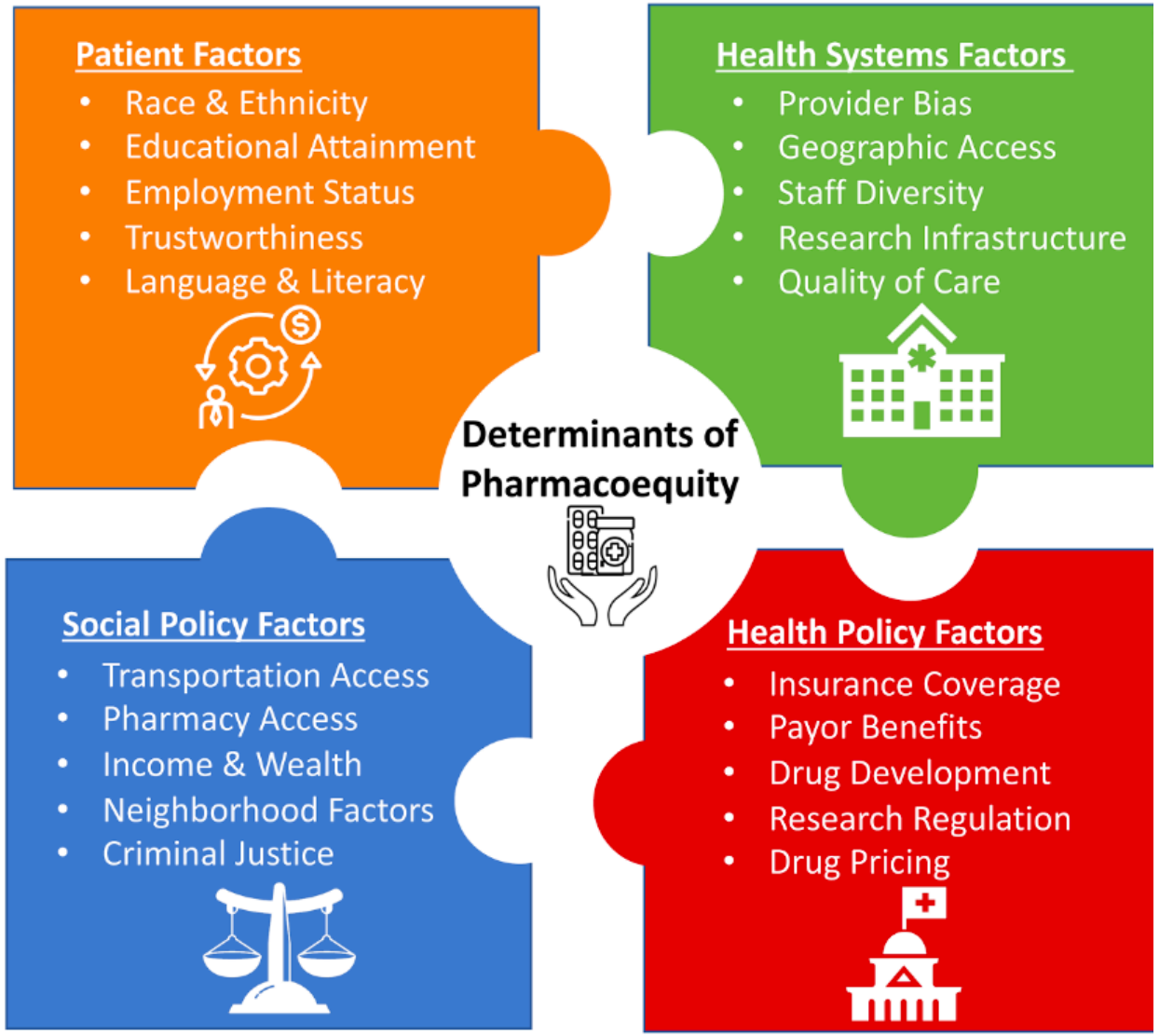
Resources

Cost-Effectiveness

Pharmacoequity & Value-Based Care

Shaker et al. Estimating Value. Encyclopedia of Food Allergy 2023; Shaker et al. Value-Based Cost-Effective Care: The Role of the Allergist Immunologist. JACI IP. 2023.

Challenges to Pharmacoequity

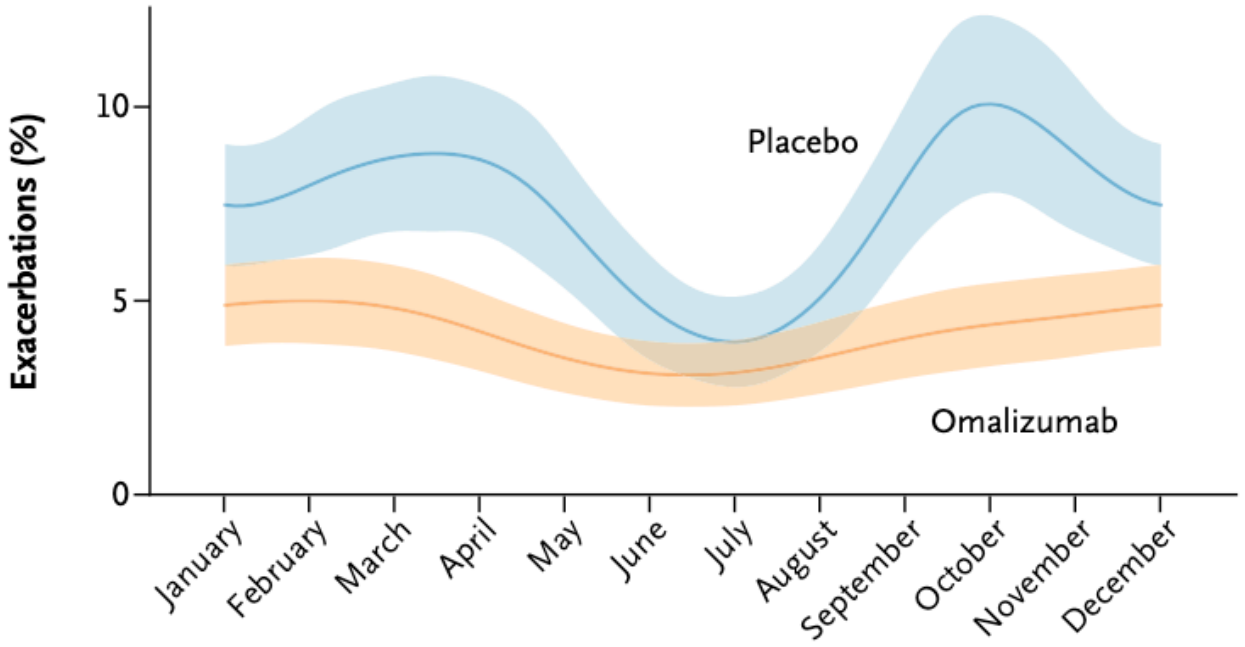


- Cost-effectiveness
- SES
- Race and ethnicity
- Geography
- Age
- Health System
- Indication & Prior Authorization
- Coupon/Rebate & Patient Assistance Programs

Chalasani et al. J Health Policy Law 2022

Pharmacoequity and SES

Trends and Disparities in Asthma Biologic Use in the United States



Biologic use was more likely in those with:

- Middle age
- Higher income
- Commercial insurance
- Specialist access

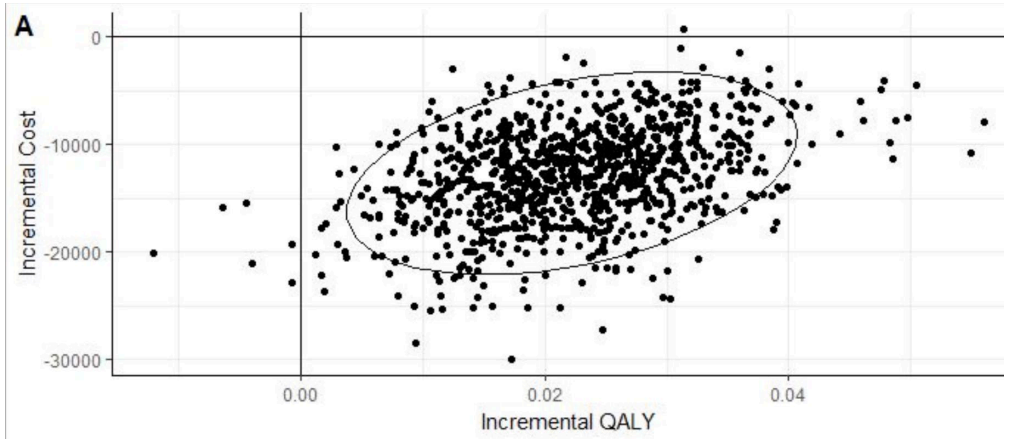
Inselman et al. JACI IP 2020

Adding omalizumab to guideline directed therapy for inner-city youth is VERY effective. In the ICATA study adherence to therapy was 85% in those receiving treatment

Missed Opportunities

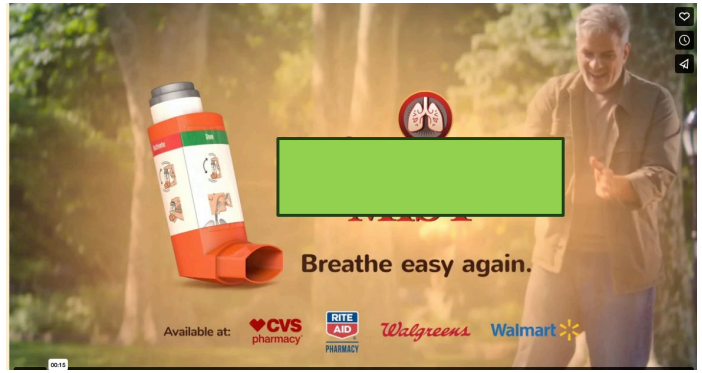
Inner City Anti IgE Therapy for Asthma Study. Busse et al. NEJM 2011.

Access to SMART for the Underinsured



- Compared to OTC epinephrine, OTC budesonide-formoterol:
  - **Was associated with <u>11,865</u> fewer deaths**
  - **Saved <u>$70.29 billion</u>**
  - **Prevented <u>14.64 million</u> severe exacerbations**

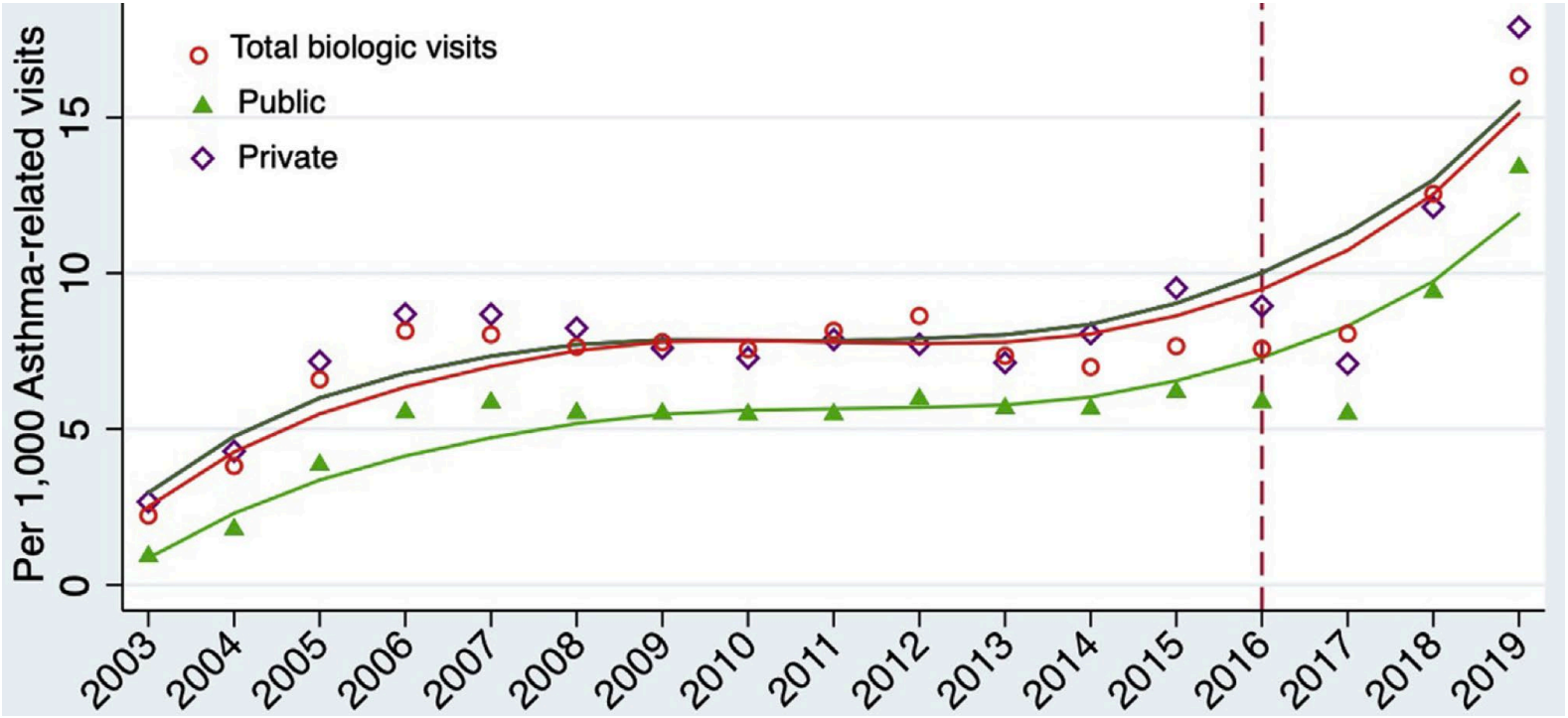
Microsimulation of Underinsured U.S. Patients (n=5,250,000 patients with mild asthma per arm)



- **When used to manage asthma, inhaled epinephrine has well-founded safety concerns, as beta-agonists use alone without inhaled corticosteroids increases the risk of asthma death, whereas inhaled corticosteroids can prevent asthma fatalities**
- **In 2021, full year sales for a particular OTC epinephrine inhaler increased by 41% up to $73 million**
- **No professional society recommends use of this drug**

Ho J, Shaker M, et al. Annals of Allergy, Asthma, Immunology 2023
Feldman et al JAMA 2022; Spitzer et al NEJM 1992; Suissa et al NEJM 2000;
www.generics.pharmaintelligence.inofrma.com. Accessed December 18, 2022

Pharmacoequity and race



Akenroye et al. JACI IP 2021

- In a 2021 evaluation of the IQVIA (a sample of 3,700-4,100 office-based physicians) national database no biologics were recorded for those without insurance
- Biologic use is lower in those publicly insured
- Among the publicly insured, Black patients are particularly under-represented compared to White patients

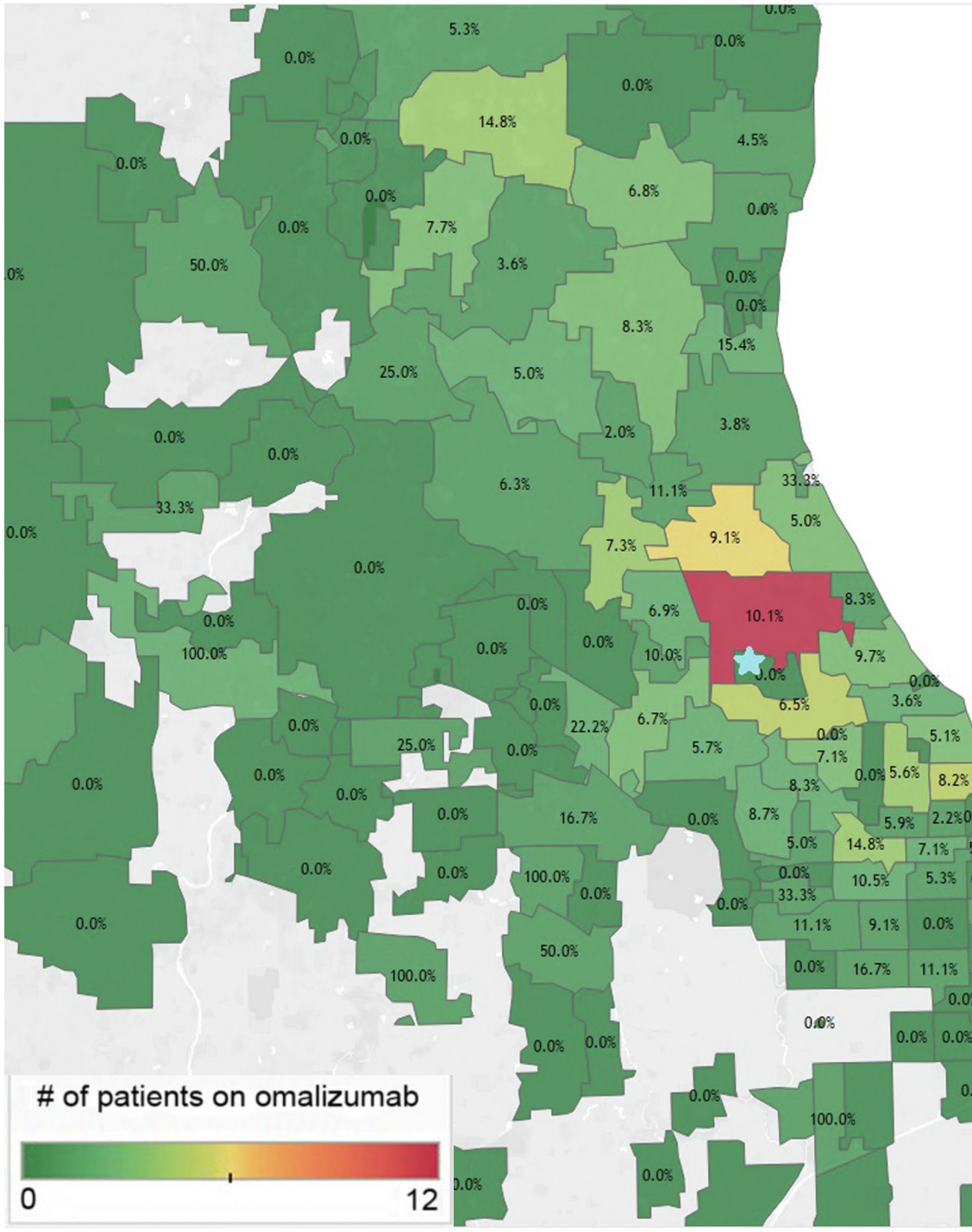
Do regional geography and race influence management of chronic spontaneous urticaria?

Giselle S. Mosnaim, MD, MS,[a,b] Matthew Greenhawt, MD, MSc, MBA,[c] Polina Imas, BS,[d] Loretta Au, PhD,[d] Stephanie Mehlis, MD,[b,e] John Oppenheimer, MD,[f] David Lang, MD,[g] Jonathan Bernstein, MD,[h,i] and Marcus Shaker, MD, MS[j,k,l] *Evanston and Chicago, Ill; Aurora, Colo; Newark, NJ; Cleveland, Ohio; and Lebanon and Hanover,*

JACI IP 2022

Geography and Race

- In a large Chicago-area health care system, small-area geographic practice variation was noted
- Rates of omalizumab use varied by patient zip code with greater rates near the academic medical center
- Higher rates of omalizumab use were associated with White race in patient-level analyses



Estimation of Health and Economic Benefits of Clinic Versus Home Administration of Omalizumab and Mepolizumab

Marcus Shaker, MD, MSc[a,b], Aaron Briggs, MD[b], Ahmad Dbouk, MD[b], Emily Dutille, PharmD[a,b], John Oppenheimer, MD[c], and Matthew Greenhawt, MD, MBA, MSc[d] *Lebanon and Hanover, NH; Newark, NJ; and Aurora, Colo*

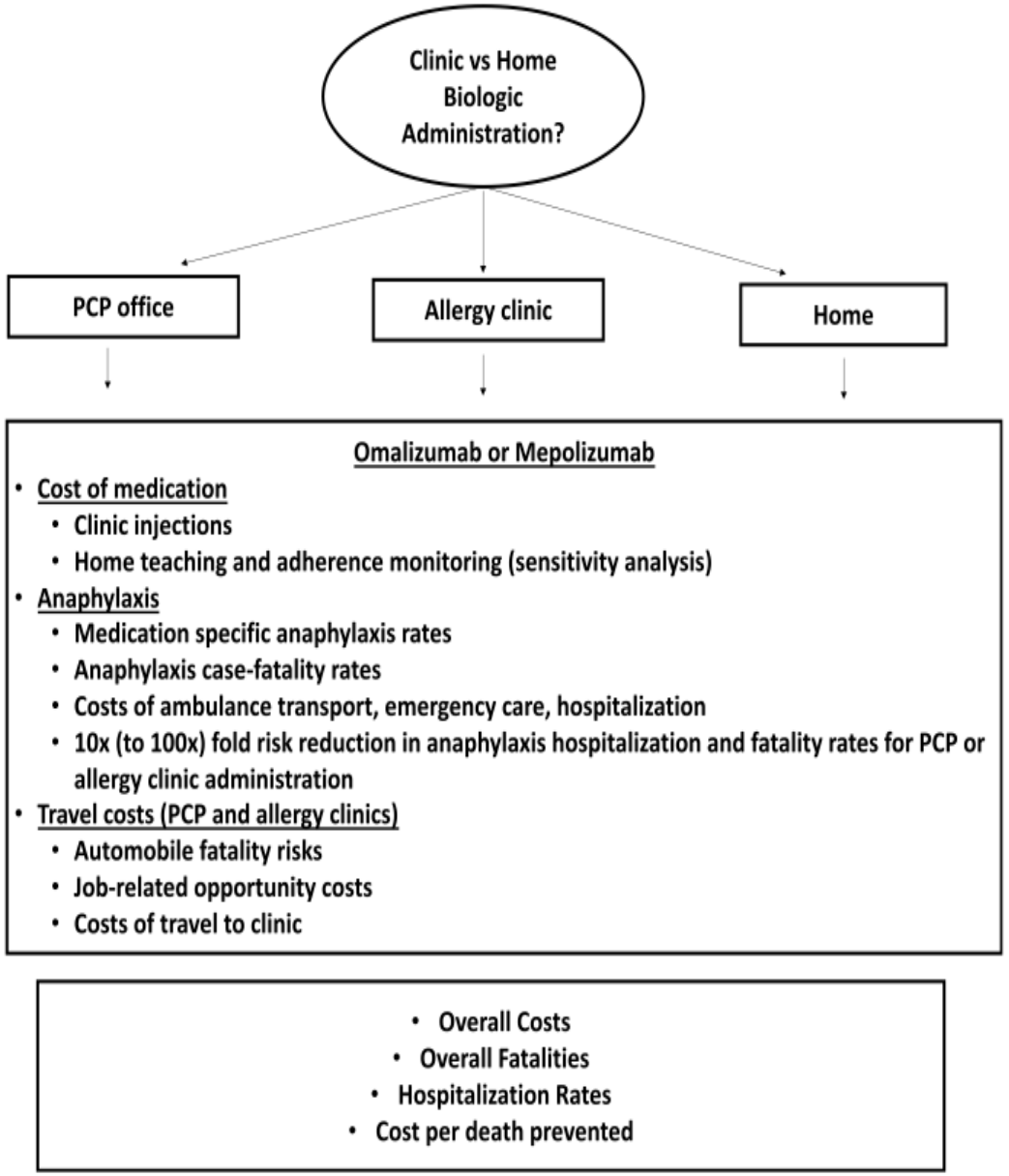
JACI IP 2020

Geography, Access, & Risk

- A universal requirement for indefinite administration of omalizumab in the specialist clinic was associated with greater costs and worse outcomes because the risk of automobile-related fatalities from repeated clinic visits offset the risk of fatal anaphylaxis

Also of note: each year 3.6 million people in the United States do not obtain medical care due to transportation issues

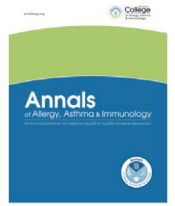
American Hospital Association. www.aha.org



ELSEVIER

Omalizumab for chronic urticaria in children younger than 12 years

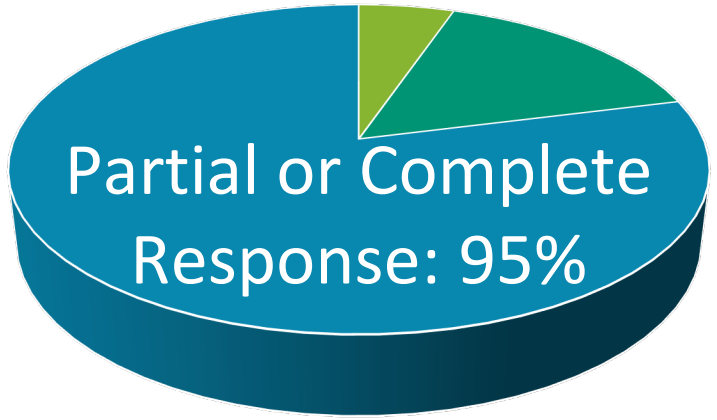
Al-Shaikhly et al. Annals of Allergy, Asthma, and Immunology 2019



Pharmacoequity by Age

- In a 2019 systematic review of omalizumab for urticaria 95% of those treated had a partial or complete response
- Still, despite approval for asthma to 6 years of age, omalizumab is denied to many younger patients who would benefit from the therapy

Response



- None (n=1)
- Partial (n=3)
- Complete (n=15)

NIH National Library of Medicine
National Center for Biotechnology Information

ClinicalTrials.gov

Preventing Asthma in High Risk Kids (PARK)

ClinicalTrials.gov ID NCT02570984

RECRUITING

Can Omalizumab prevent asthma in preschoolers?

Pharmacoequity by Indication

HIGHLIGHTS OF PRESCRIBING INFORMATION
These highlights do not include all the information needed to use XOLAIR safely and effectively. See full prescribing information for XOLAIR.

----------INDICATIONS AND USAGE----------

XOLAIR is an anti-IgE antibody indicated for:

- Moderate to severe persistent asthma in adults and pediatric patients 6 years of age and older with a positive skin test or in vitro reactivity to a perennial aeroallergen and symptoms that are inadequately controlled with inhaled corticosteroids (1.1)
- Chronic rhinosinusitis with nasal polyps (CRSwNP) in adult patients 18 years of age and older with inadequate response to nasal corticosteroids, as add-on maintenance treatment (1.2)
- Chronic spontaneous urticaria (CSU) in adults and adolescents 12 years of age and older who remain symptomatic despite H1 antihistamine treatment (1.3)

Limitations of Use:

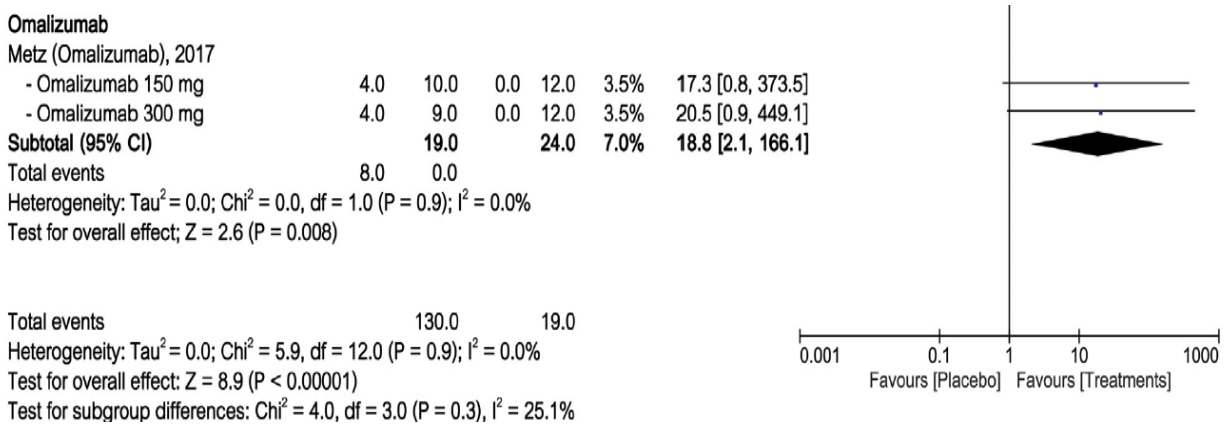
- Not indicated for acute bronchospasm or status asthmaticus. (1.1, 5.3)
- Not indicated for other allergic conditions or other forms of urticaria. (1.1, 1.3)

Omalizumab may be effective in other conditions but access is limited by variable ability to advocate for off-label use

Treatments of cold urticaria: A systematic review

Kanokvalai Kulthanan, MD,[a] Saowalak Hunnangkul, PhD,[b] Papapit Tuchinda, MD,[a] Leena Chularojanamontri, MD,[a] Puncharas Weerasubpong, MD,[a] Chanika Subchookul, MD,[a] and Marcus Maurer, MD[c] *Bangkok, Thailand, and Berlin, Germany*

JACI 2019



"Omalizumab at 150 and 300 mg every 4 weeks was shown to be effective for patients with ColdU refractory to antihistamines."

White bagging, brown bagging and site of service policies: best practices in addressing provider markup in the commercial insurance market

Pearson et al
2023

Journal of Comparative Effectiveness Research

"Policies should be structured to promote health equity by keeping front and center the risks to patients with less income and social support who may have the greatest challenges navigating these policies"

Pharmacoequity by Health system

- Traditional 'buy and bill' is replaced by another entity supplying the drug to the clinician and reimbursing the clinician only for administration
- Payers favor this to reduce costs
- Health systems express concerns for patient safety, misrouted medications, and access

"Site of service" policies pose similar logistic hurdles

The patient can be stuck in the middle if there are not rapid exceptions made for clinical & social factors

Special Article

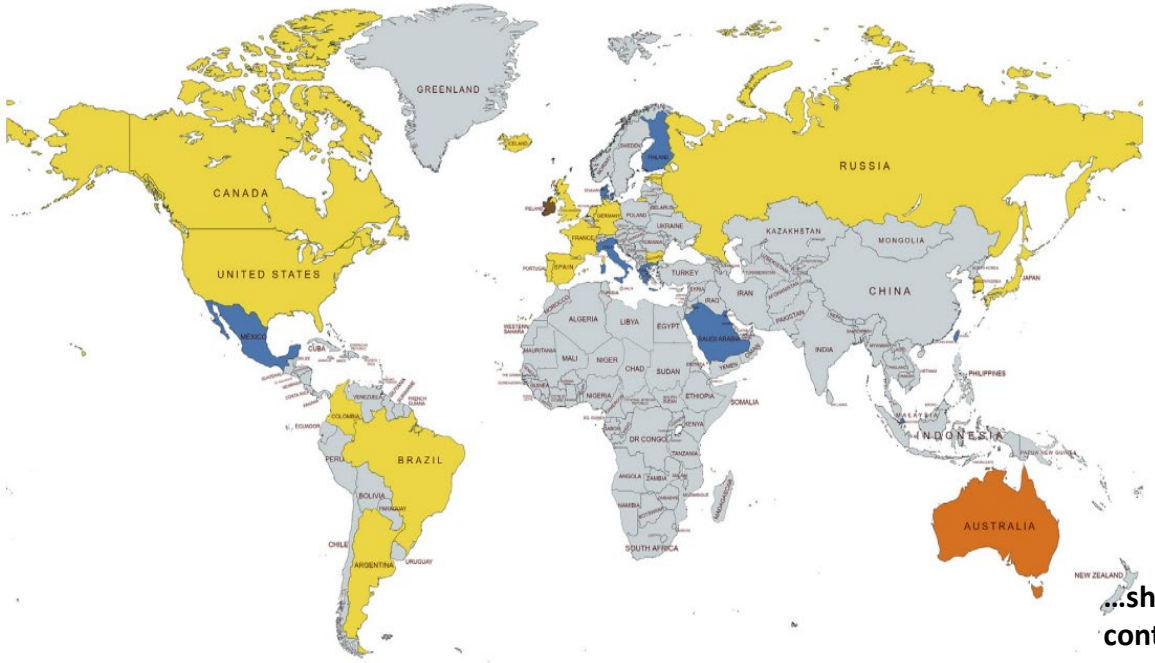
Porsbjerg et al JACI IP 2023

Global Variability in Administrative Approval Prescription Criteria for Biologic Therapy in Severe Asthma

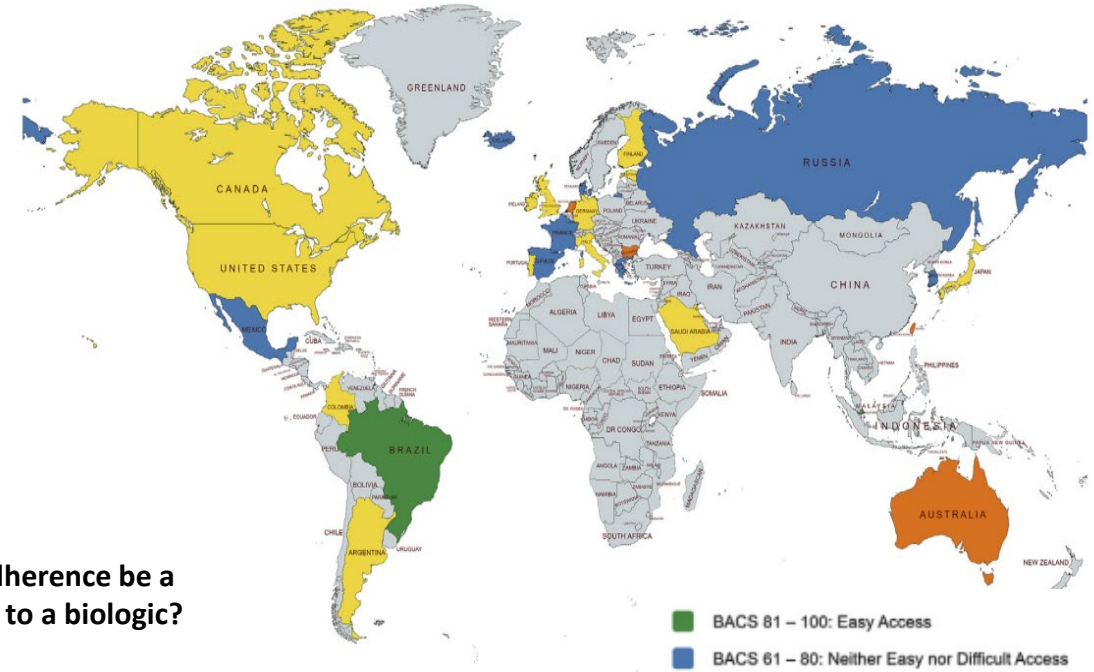
"Biologic prescription criteria differed substantially across 28 countries from five continents"

Pharmacoequity by Prior Authorization

Omalizumab



Mepolizumab



…should poor adherence be a contraindication to a biologic?

- BACS 81 – 100: Easy Access
- BACS 61 – 80: Neither Easy nor Difficult Access
- BACS 41 – 60: Moderately Difficult Access
- BACS 21 – 40: Difficult Access
- BACS 1 – 20: Very Difficult Access
- BACS 0: No Access
- Non-Collaborating Countries (no data collected)

- *Step therapy that increases care complexity – is the paradigm patient-centered?*
- *Delay in access of therapy increases risk for disease exacerbation*

Dudiak et al. Prior authorization delays biologic initiation and is associated with a risk of asthma exacerbations Allergy Asthma Proc 2021

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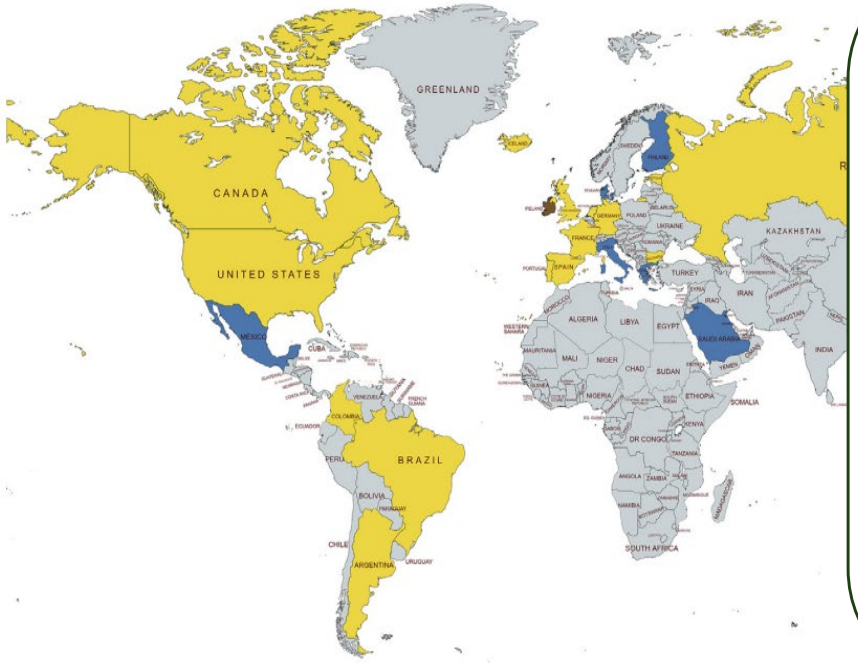


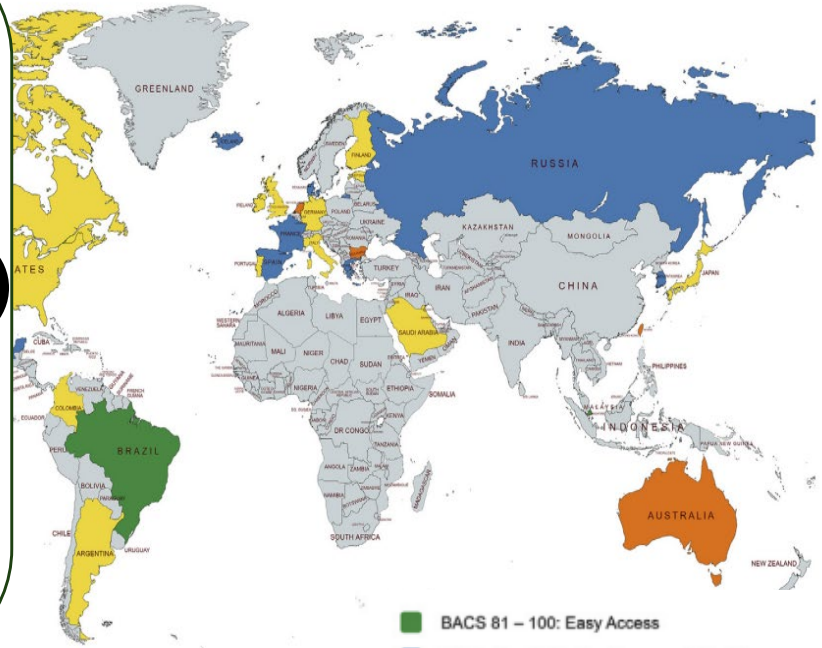
Payer
"Prove that you need it"

Clinician
"Real world effectiveness is not efficacy…"

Patient
"You haven't earned it…"

…should poor adherence be a contraindication to a biologic?

Mepolizumab



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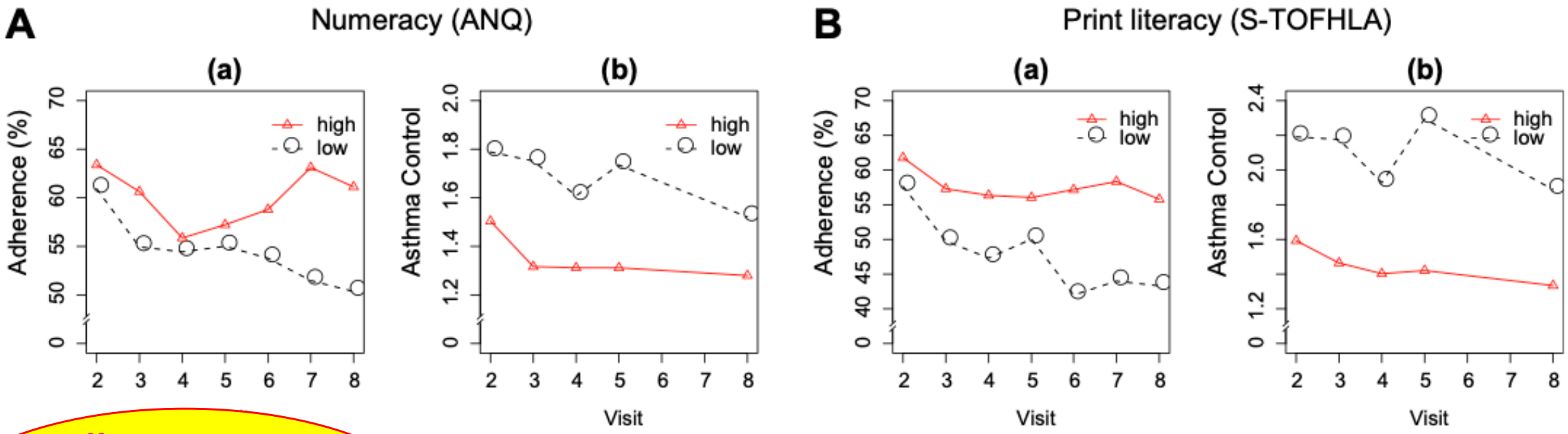
Dudiak et al. Prior authorization delays biologic initiation and is associated with a risk of asthma exacerbations Allergy Asthma Proc 2021

Adherence Rates: Correspond to health literacy, asthma control, and inpatient admission



Adherence as a barrier to a biologic threatens equity

Asthma Numeracy and Print Literacy Score = Number correct
Asthma Control Questionnaire. 0 = Total control, 6 = Extremely uncontrolled

Apter et al. JACI 2013; Poowuttikul et al. Global Pediatric Health 2017

Pharmacoequity through PAP's

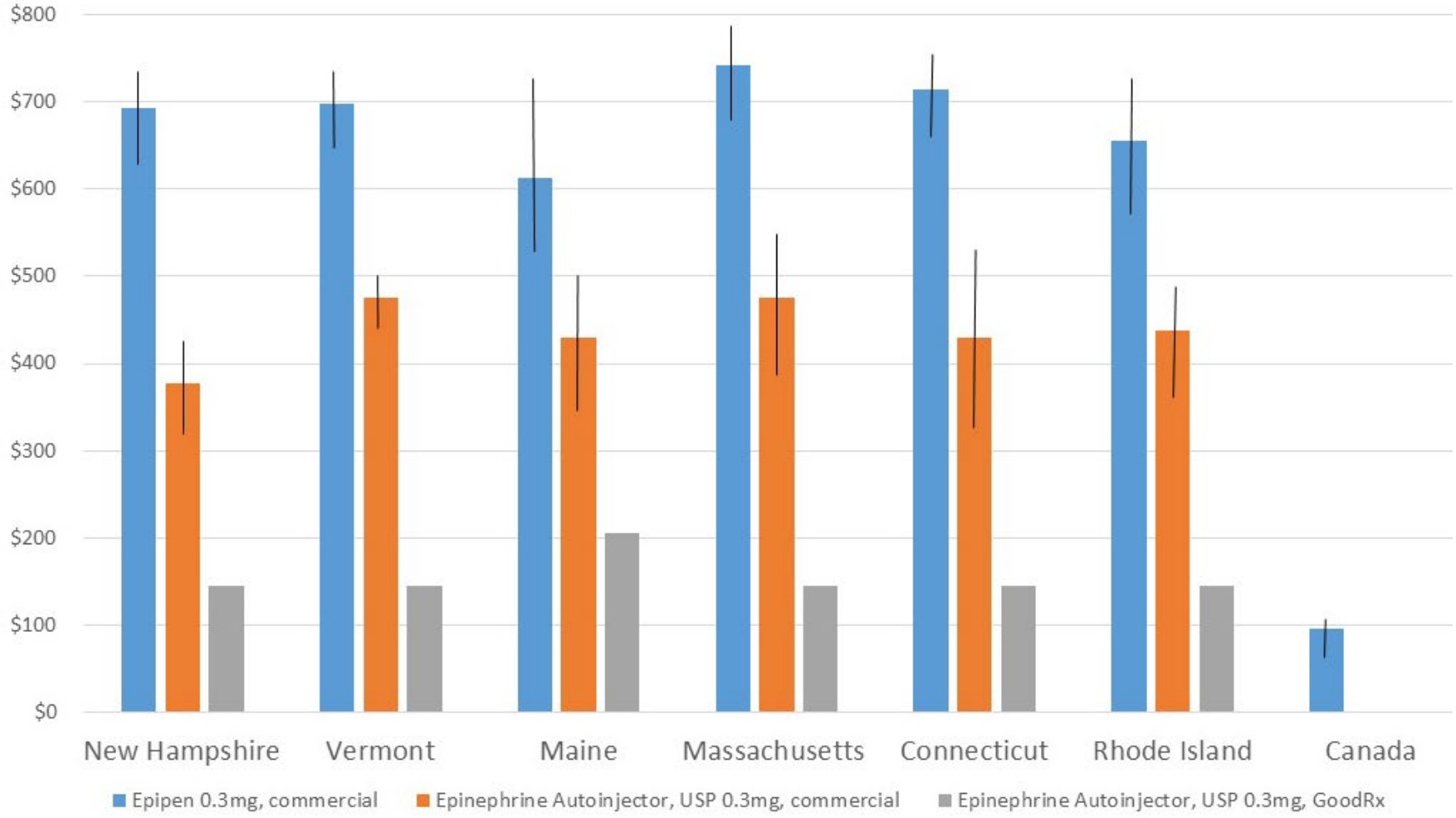
- **Despite best intentions, Patient Assistance Programs may represent a "Band-Aid solution for an imperfect system"**

Zafar SY, Peppercorn JM. Patient Assistance Programs: A Path to Affordability or Barrier. J Clin Onc. 2017

- **PAPs can be a solution for some who are underinsured but there can be a lack of transparency in these programs**
- **PAPs increased care complexity**
- **However, PAPs are not accessible to everyone and generally require**
  - **Permanent legal residency in the U.S. or Puerto Rico**
  - **Proof of lack of insurance or lack of coverage**
  - **Additional eligibility requirements**
  - **Manufacture rebates violate Federal Anti-kickback law and are not accessible to patients receiving Medicare or Medicaid**

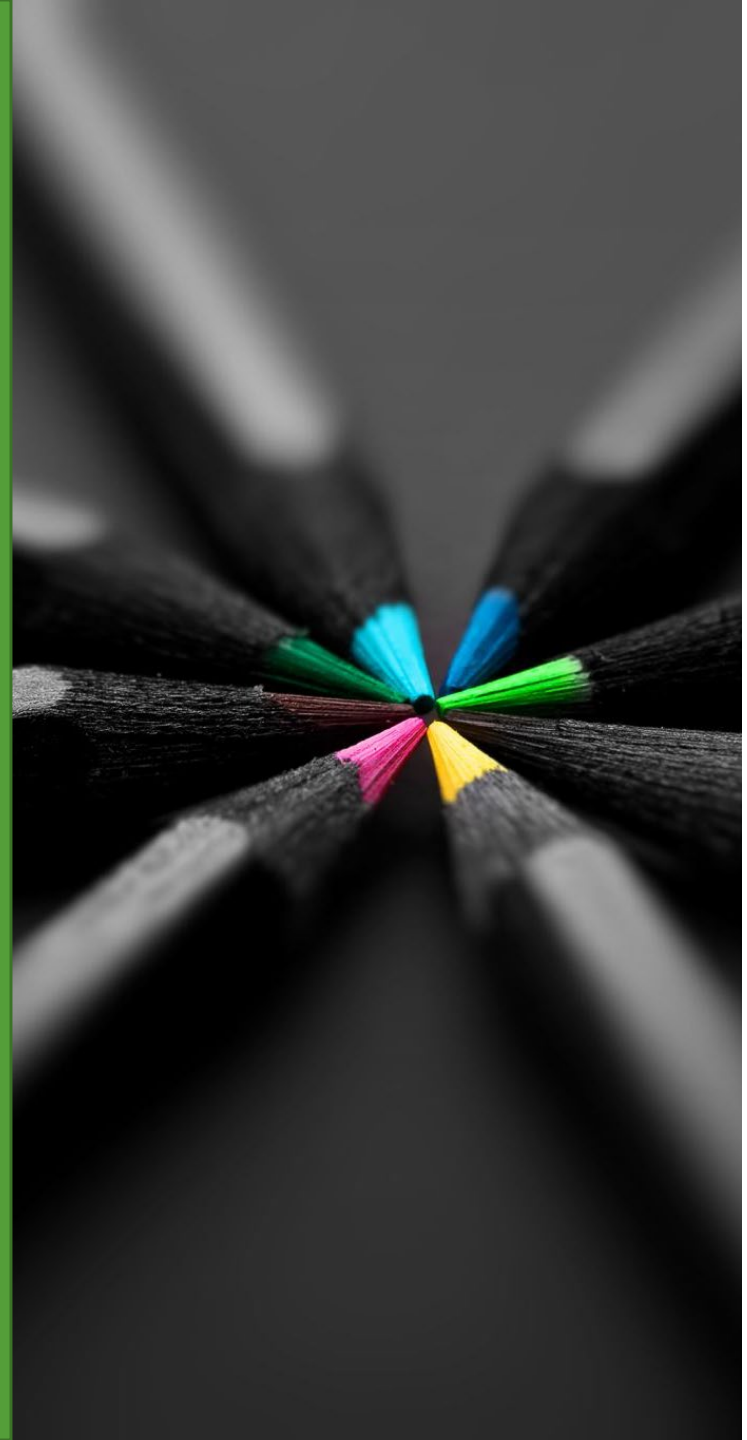
Patient Assistance Programs: What Are They and How Do They Work? – GoodRx
Medicare Patients Aren't Allowed To Use Drugmaker Discount Coupons : Shots - Health News : NPR

The Problem of Cost: Geographic Variation in SIE costs



Significant variation in cost = variation in access

Shaker M, Bean K, Verdi M. Annals of Allergy, Asthma, and Immunology 2017



What is Cost-Effective Care Look Like?

PLANET MONEY

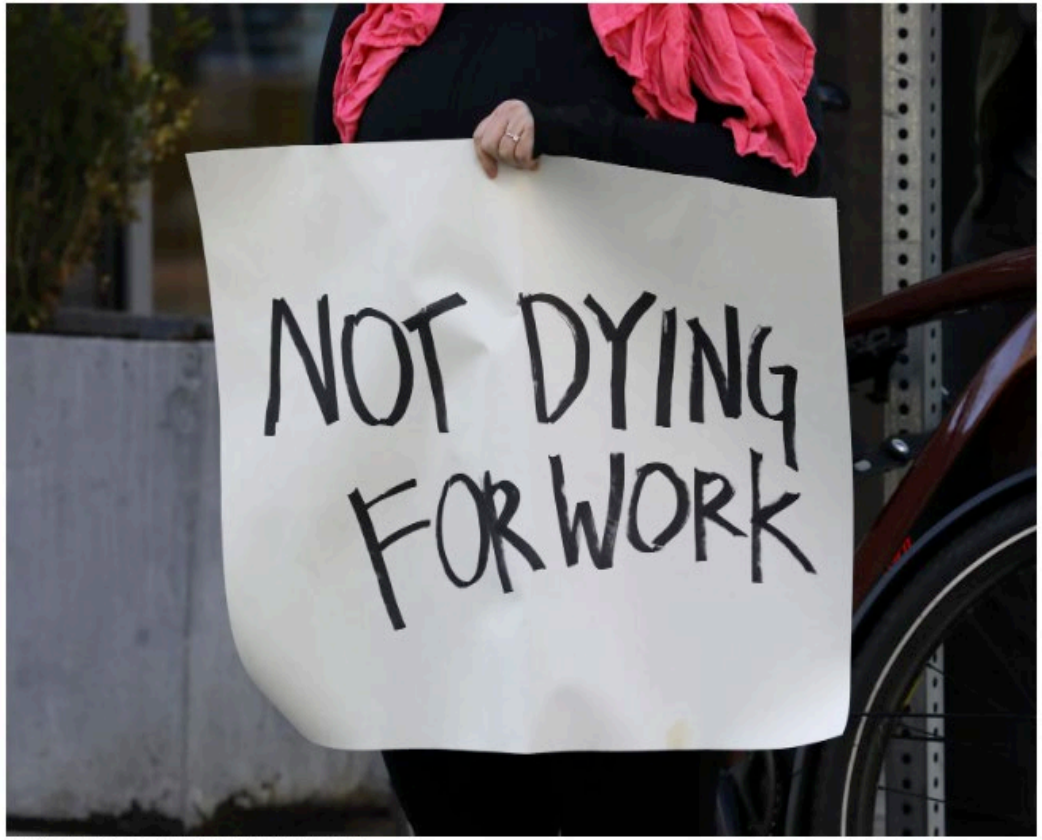
LISTEN & FOLLOW

Lives Vs. The Economy

APRIL 15, 2020 · 4:21 PM ET

By Sarah Gonzalez, Kenny Malone

25-Minute Listen + PLAYLIST



Pat Greenhouse/Boston Globe via Getty Images

ICER $50,000 to $100,000/QALY

($10 million/death prevented)

(Net monetary benefit)

CE Ratio

$$= \frac{Cost_{treatment} - Cost_{Comparator}}{Eff_{treatment} - Eff_{Comparator}}$$

+

QALYS

DOMINANT

$

Health State Utilities

Cost-Effectiveness of Biologics for Allergic Diseases

Ann Chen Wu, MD, MPH[a], Anne L. Fuhlbrigge, MD, MSc[b], Maria Acosta Robayo, BA[a], and Marcus Shaker, MD, MSc[c,d]

Boston, Mass; Aurora, Colo; and Lebanon and Hanover, NH

Agent	Price*	Value-based*
Reslizumab	$28,900	$6,500-10,400
Benralizuamb	$27,800	$8,300-$11,900
Omalizumab	$28,900	$9,000-$13,300
Mepolizumab	$29,500	$9,200-$13,400
Dupilumab	$31,000	$10,100-$14,300

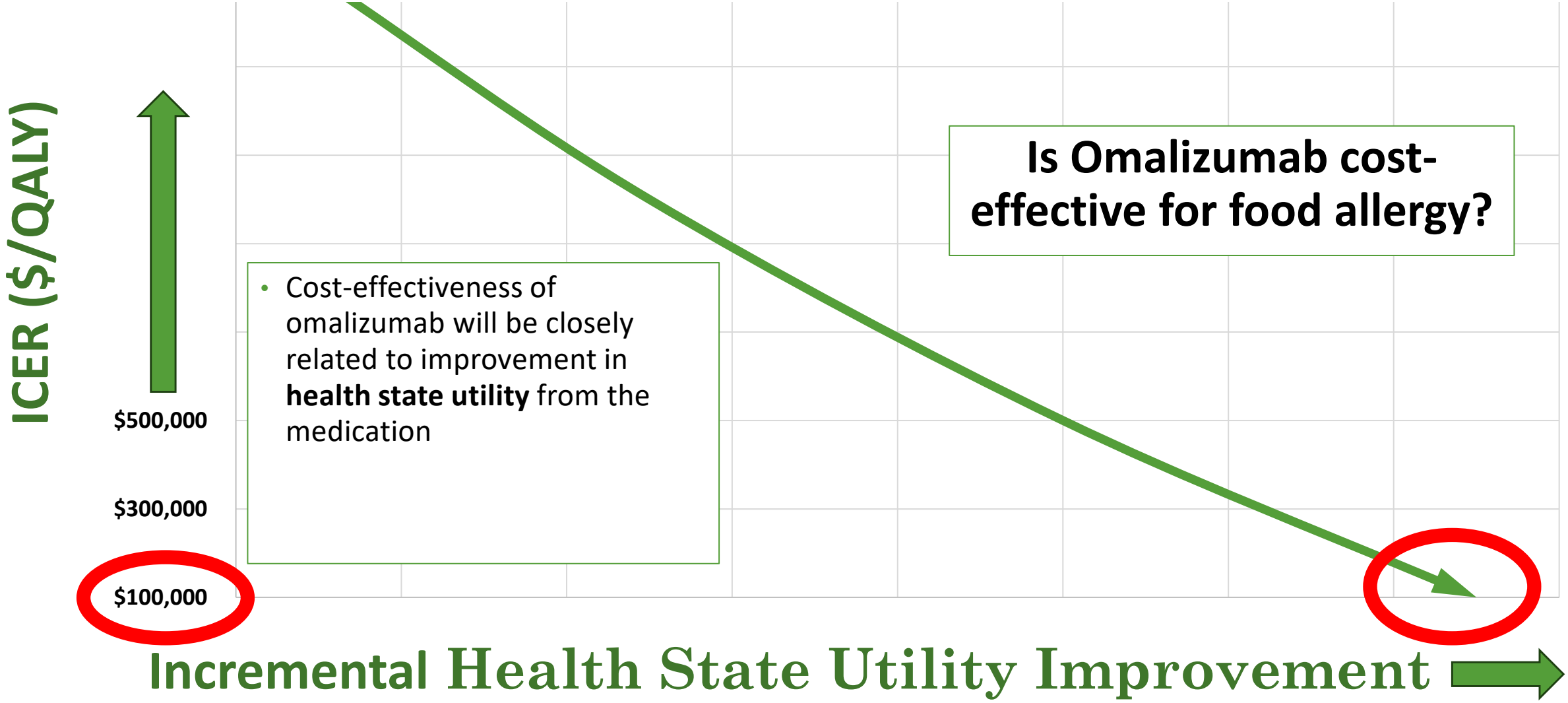
*Annual estimates by the Institute for Clinical & Economic Review 2018. ICERs $100k-$150k/QALY

Even value-based costs are too high!

*"Ultimately, critical medications must be **affordable** and available to patients who need them, and if this cannot be achieved, then the tremendous investment to discover specific pathways and develop safe and effective medications represents a failure to achieve our common goal to provide the right care, for the right patient, at the right time, every time."*

JACI In Practice 2021

Cost-Effectiveness of Biologics for Allergic Diseases



> J Allergy Clin Immunol Pra
doi: 10.1016/j.jaip.2024.06.0

The Cost-Effe
Treatment of F

Marcus Shaker [1], Aikaterini
Karen S Hsu Blatman [6], Joh

Affiliations + expand

PMID: 38925250 DOI: 10.1

Abstract

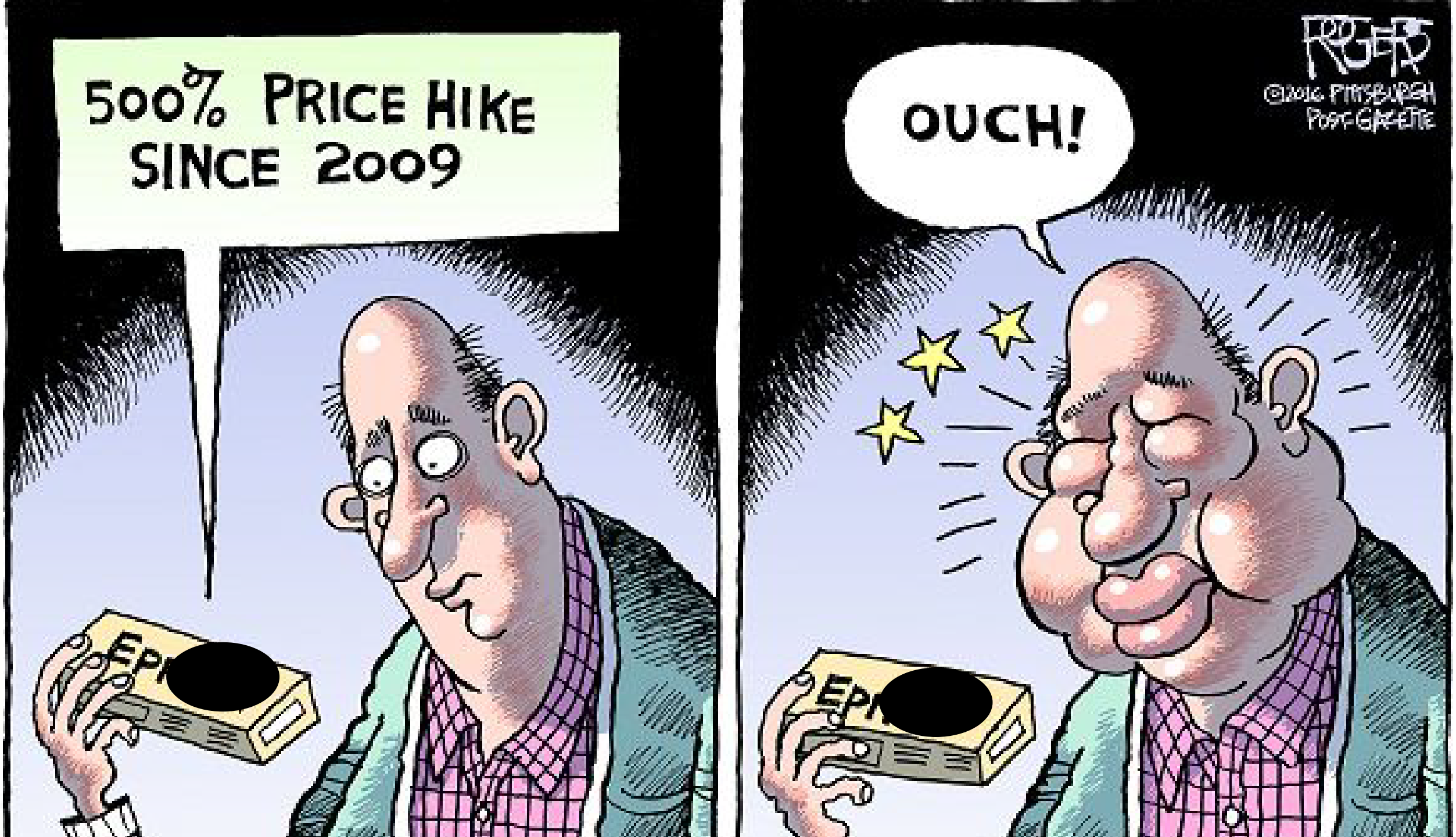
Background: Omalizumab is a newly FDA approved anti-IgE therapy for allergen agnostic treatment of single or multiple food allergies in patients ages >1 year.

Objective: Evaluate the cost-effectiveness of omalizumab as a food allergy treatment.

Methods: Health and economic outcomes were evaluated in Markov cohorts of simulated food allergic infants randomized to receive omalizumab using a 15-year time horizon. Monte Carlo simulation was used (n=40,000 subjects) to evaluate cost-effectiveness from a societal perspective, incorporating both a family-level and individual-level analysis. Family-level analysis was included to incorporate broad perspective for health utility change, given treatment effects likely benefit all parties at home (e.g., caregivers, siblings, spouses), not just the patient, representing the sum of changes in all such persons. Supplemental analyses explored lower omalizumab cost and home initiation. Deterministic and probabilistic sensitivity analyses were performed.

Results: In the family-level cohort analysis, omalizumab exceeded cost-effectiveness thresholds ($185,183/QALY). Comparing the omalizumab strategy (OMA) to the non-omalizumab strategy (NOMA), the cost of OMA exceeded NOMA ($315,020 vs $136,609) with greater incremental effectiveness (12.668 QALY vs 11.699 QALY). In the individual-level analysis, the cost-effectiveness of OMA was $573,698/QALY. In base-case assessments, OMA was cost-effective (WTP, $100,000/QALY) at a health state utility improvement of 0.265. OMA's value-based cost ranged from $14,166-$23,791 when considered at the individual and family-unit levels. Requiring OMA administration in-clinic was not cost-effective (ICER, $260,239).

Conclusions: In the base-case and at current pricing, omalizumab is not cost-effective, but could be at a lower retail price or if use creates large health utility shifts in the family and patient.


500% PRICE HIKE SINCE 2009
OUCH!
ROGERS
©2016 PITTSBURGH POST-GAZETTE

Comparative Cost-effectiveness

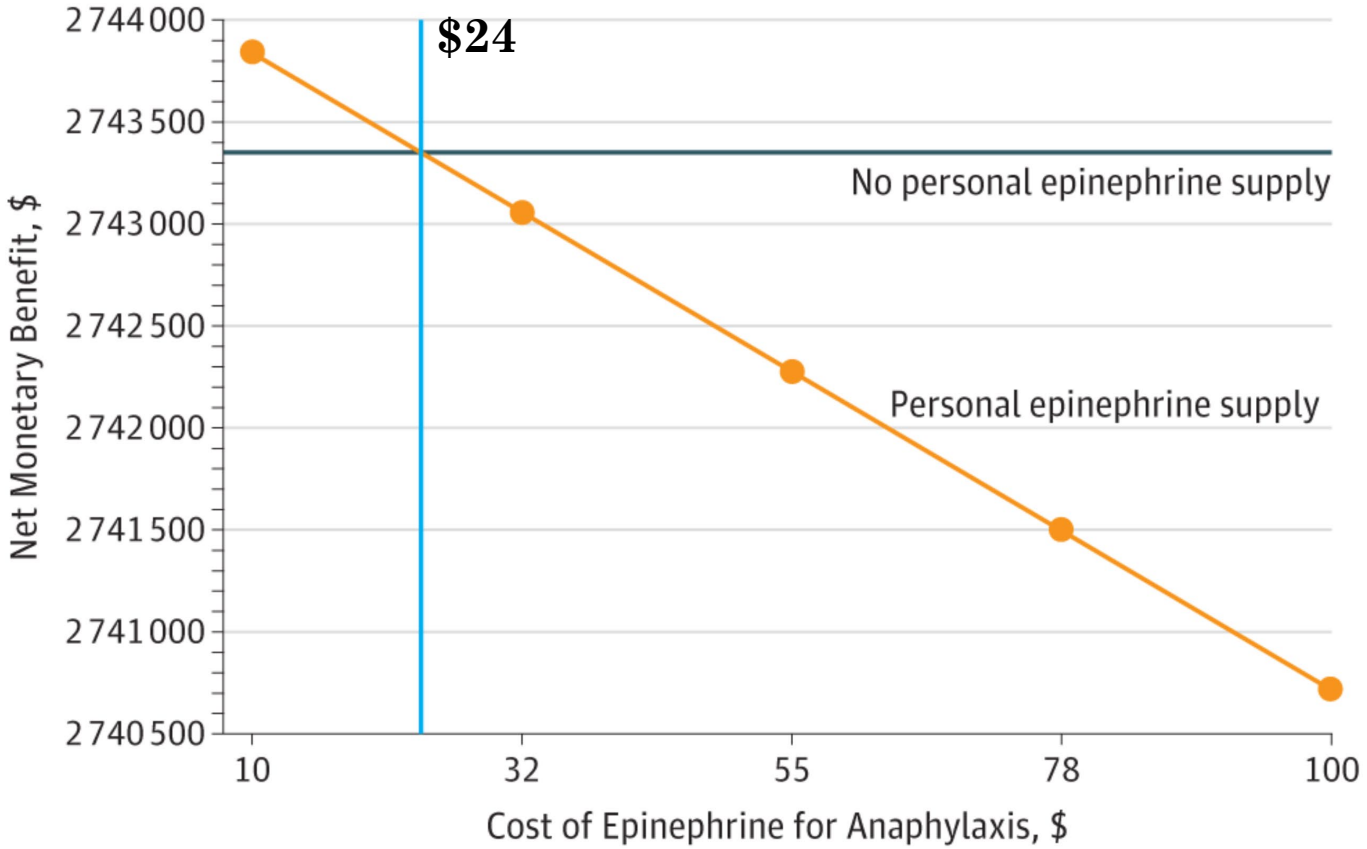
Table 2. Cost-effectiveness of Personal Self-injectable Epinephrine

	$715 per Year				$30 per Year	
Anaphylaxis Preparedness Strategy	Cost, $	QALY, No.	Risk-Specific Fatalities, No.	ICER, $	Cost, $	ICER, $
Annual personal epinephrine prescriptions (95% CI)	25 478 (25 399-25 557)	27.4446 (27.4247-27.4645)	0.00056 (0.000414-0.000706)	2 742 697	1685 (1675-1695)	161 810
No annual personal epinephrine prescriptions (95% CI)	654 (645-663)	27.4335 (27.4134-27.4536)	0.00148 (0.001242-0.001718)		NA	

Abbreviations: ICER, incremental cost-effectiveness ratio; NA, not applicable; QALY, quality-adjusted life-year.

Shaker MS, Greenhawt M. JAMA Netw Open. 2018

Deterministic Sensitivity Analysis → Lower Prices Needed



Meaning: Epinephrine is central to managing anaphylaxis, and $24 personal auto-injectors are cost-effective for community-based anaphylaxis management

Sensitivity Analysis of Personal Epinephrine Cost-effectiveness at a willingness-to-pay threshold of $100 000 per quality-adjusted life-year demonstrates a ceiling value-based cost of $24 for an annual personal epinephrine prescription in the base-case analysis.

Net Monetary Benefit (NMB = "Life Dollars" - expenses)

QALY * $100K/QALY = "Life dollars"

Shaker MS, Greenhawt M. JAMA Netw Open. 2018

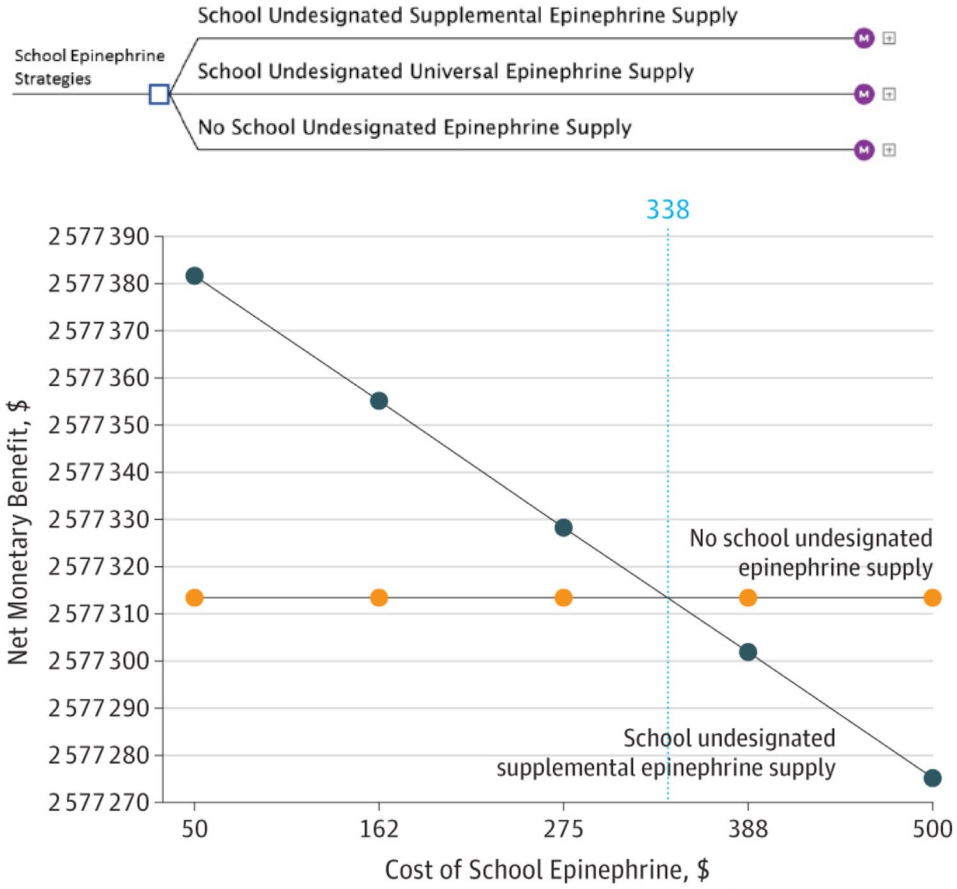
Value-Based Pricing

Too
Expensive!

Shareconomy

What About Devices in Schools?

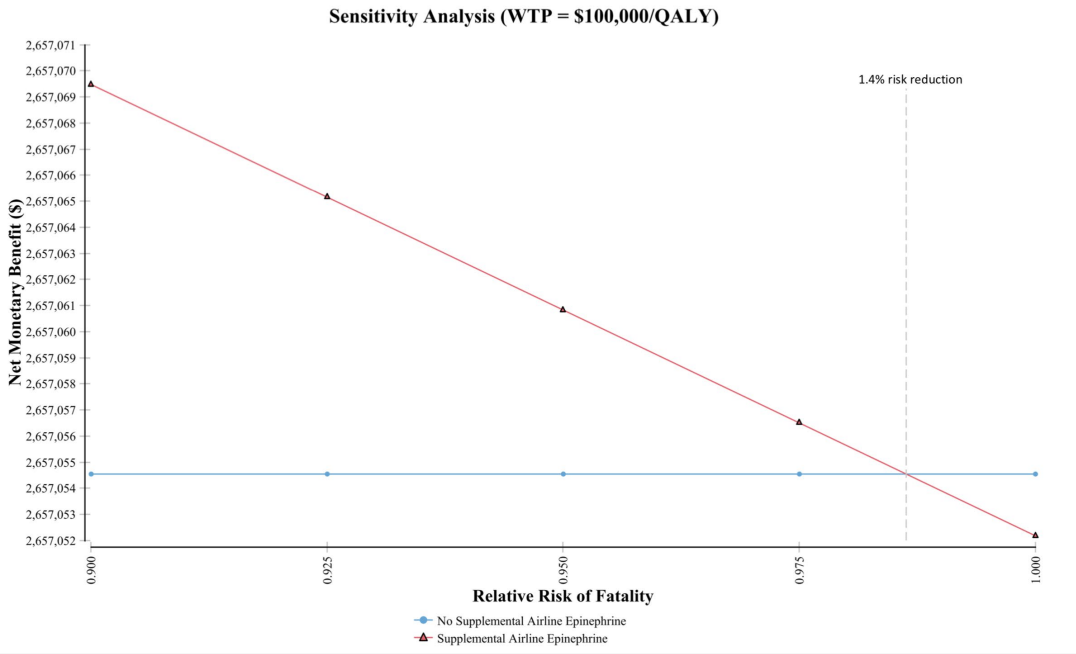
- **Shared epinephrine is cost-effective when the annual school epinephrine expenditures do not exceed $338 per school (10-fold fatality risk reduction)**
- **A Universal Model dominates a Supplemental Model**



Shaker MS, Greenhawt M JAMA Pediatr. 2019
DeSantiago-Cardenas et al. Am J Prev Med 2015
Shaker MS, Greenhawt M. JAMA Netw Open. 2018

And Elsewhere…

- Also cost-effective on airplanes
- 771 million passengers each year
- 7309 aircraft in the US commercial fleet
- At the school based cost of $338 per aircraft, cost is $0.08 per at-risk passenger
- Cost-effective if autoinjectors provide at least a 1.4% fatality risk reduction.



Shaker MS, Greenhawt M JACI In Practice 2019

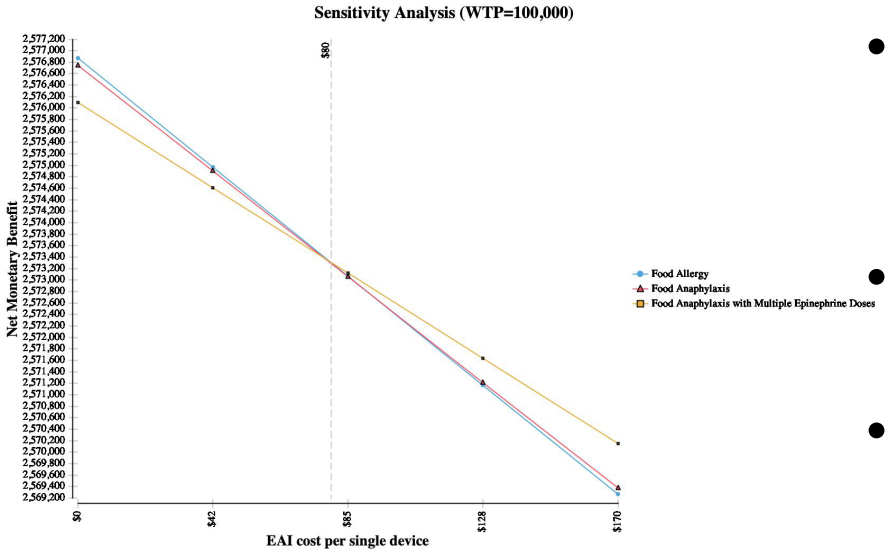
Dartmouth-Hitchcock

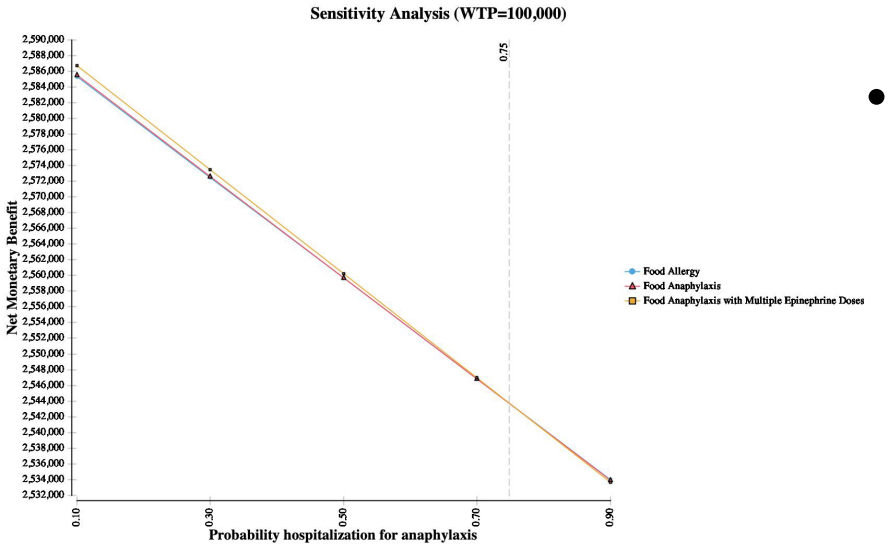
Fewer Devices = Lower Cost

- **The dogma in food allergy management is to always have 2 epinephrine autoinjector devices on one's person at all times**
  - **Fewer than 12% of children require 2nd epinephrine dosing, schools now stock undesignated epinephrine, and people don't carry 1 device let alone 2 devices….**
- **We compared three scenarios: everyone gets 2 devices (universal approach), 2nd device only given with a prior history of anaphylaxis (PMH anaphylaxis), and 2nd device only given with prior history of anaphylaxis requiring multiple epinephrine doses (multi-epi)**

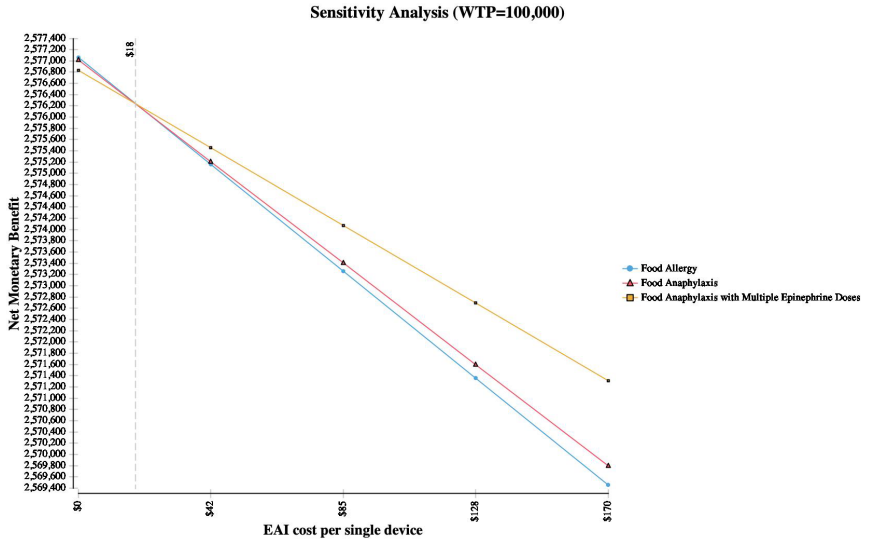
Shaker, Turner, Greenhawt. Journal of Allergy and Clinical Immunology In Practice. 2021

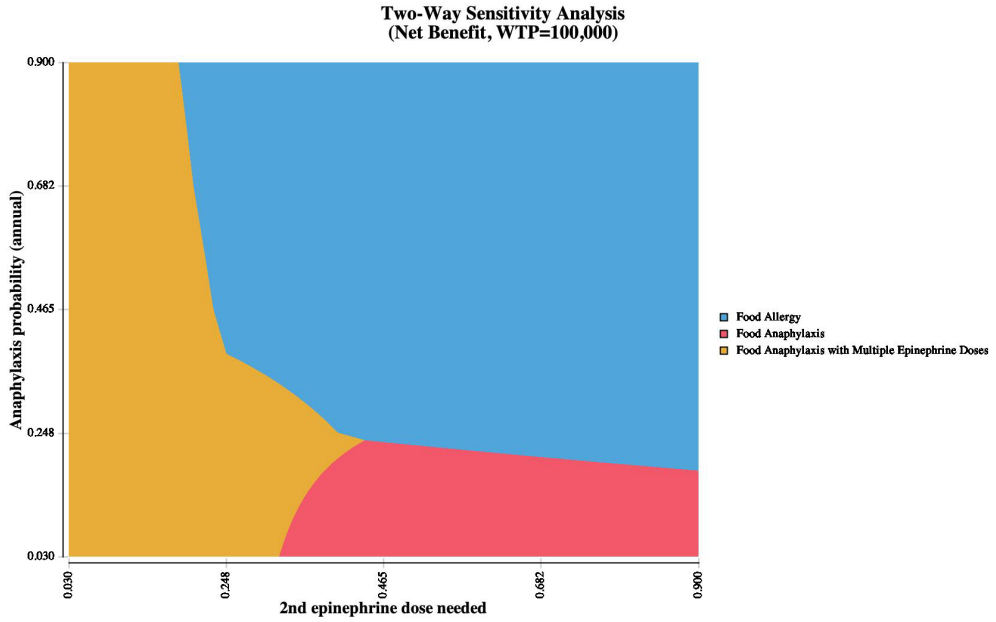
Sensitivity Analyses: When It makes sense that everyone get two…





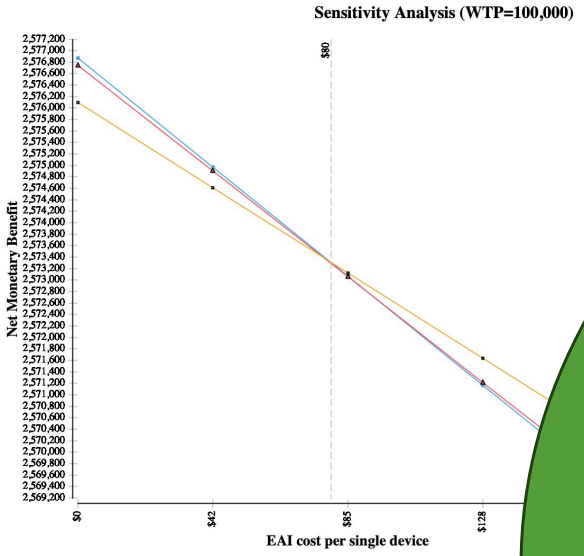
- **Device cost <$80 in the US or $18 in the UK**
- **Hospitalization costs >$18,435**
- **Probability of hospitalization after use >75%**
- **Interaction between the probability of anaphylaxis and needing a second dose of epinephrine**

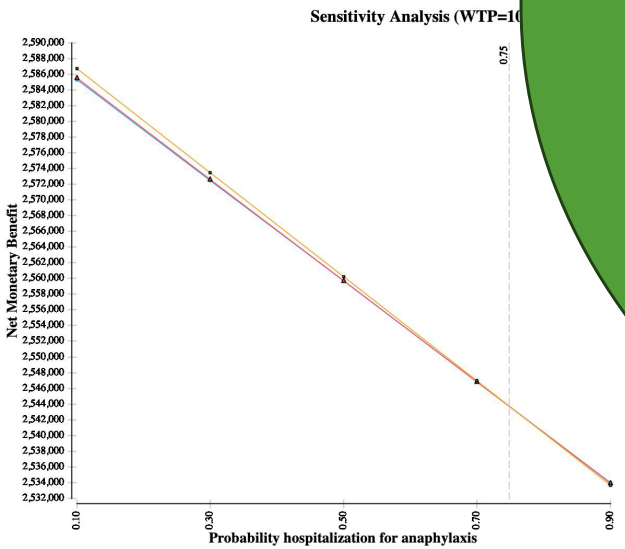


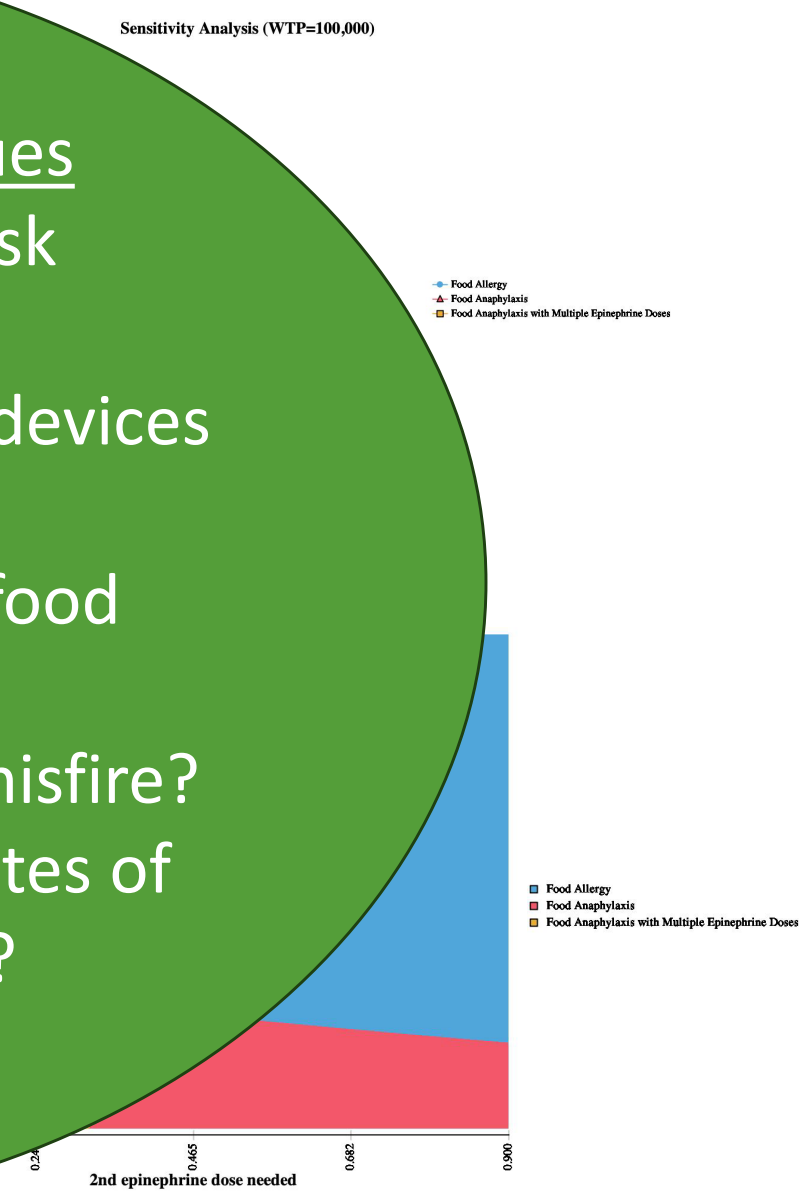


Shaker, Turner, Greenhawt. JACI In Practice. 2021

Sensitivity Analyses: When It makes sense that everyone get two…







Additional contextual issues

- What is the patient's risk threshold?
- Have they needed multiple devices in the past?
- Do they have a high risk food allergen?
- What of the risk of device misfire?
- How do non-injectable routes of epinephrine factor in?

Shaker, Turner, Greenhawt. JACI In Practice. 2021

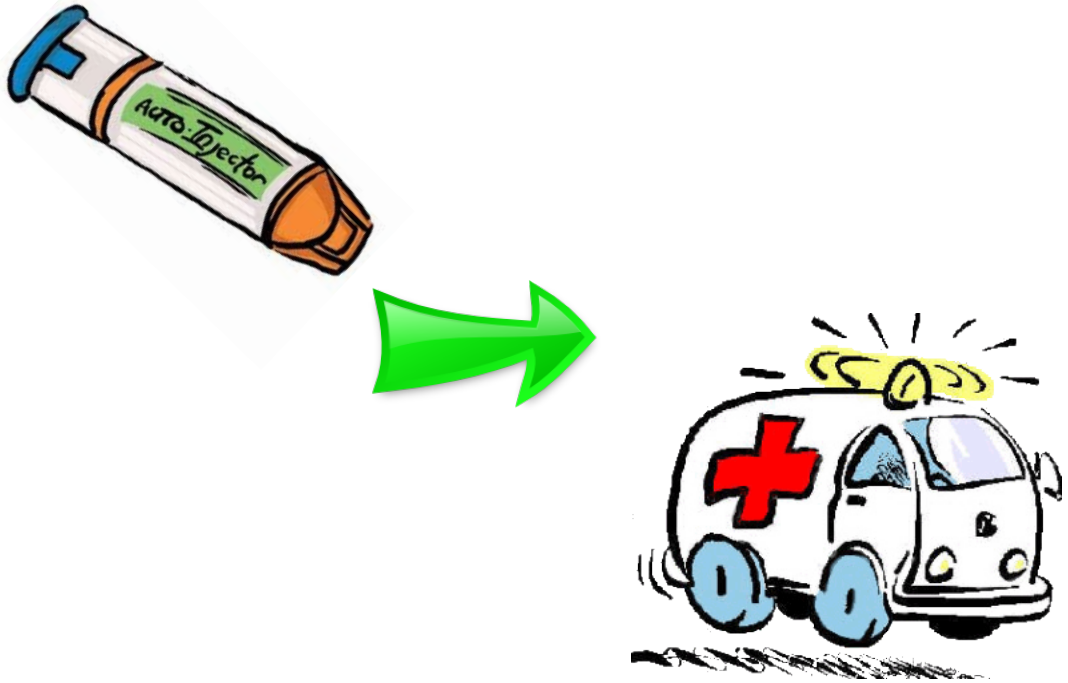
Anaphylaxis Practice Parameter 2023

CBS 26 *Strength: Conditional* *Evidence certainty: Very low*	**We suggest that clinicians counsel patients that immediate activation of EMS may not be required if the patient experiences prompt, complete, and durable response to treatment with epinephrine, provided that additional epinephrine and medical care are readily available, if needed. We suggest that clinicians counsel patients to always activate EMS following epinephrine use, if anaphylaxis is severe, fails to resolve promptly, fails to resolve completely or nearly completely, or returns or worsens following a first dose of epinephrine.**

Golden DBK, Wang, et al. Anaphylaxis: A 2023 Practice Parameter Update. Annals of Allergy, Asthma, and Immunology. 2023

An important step to assure costs of care are necessary

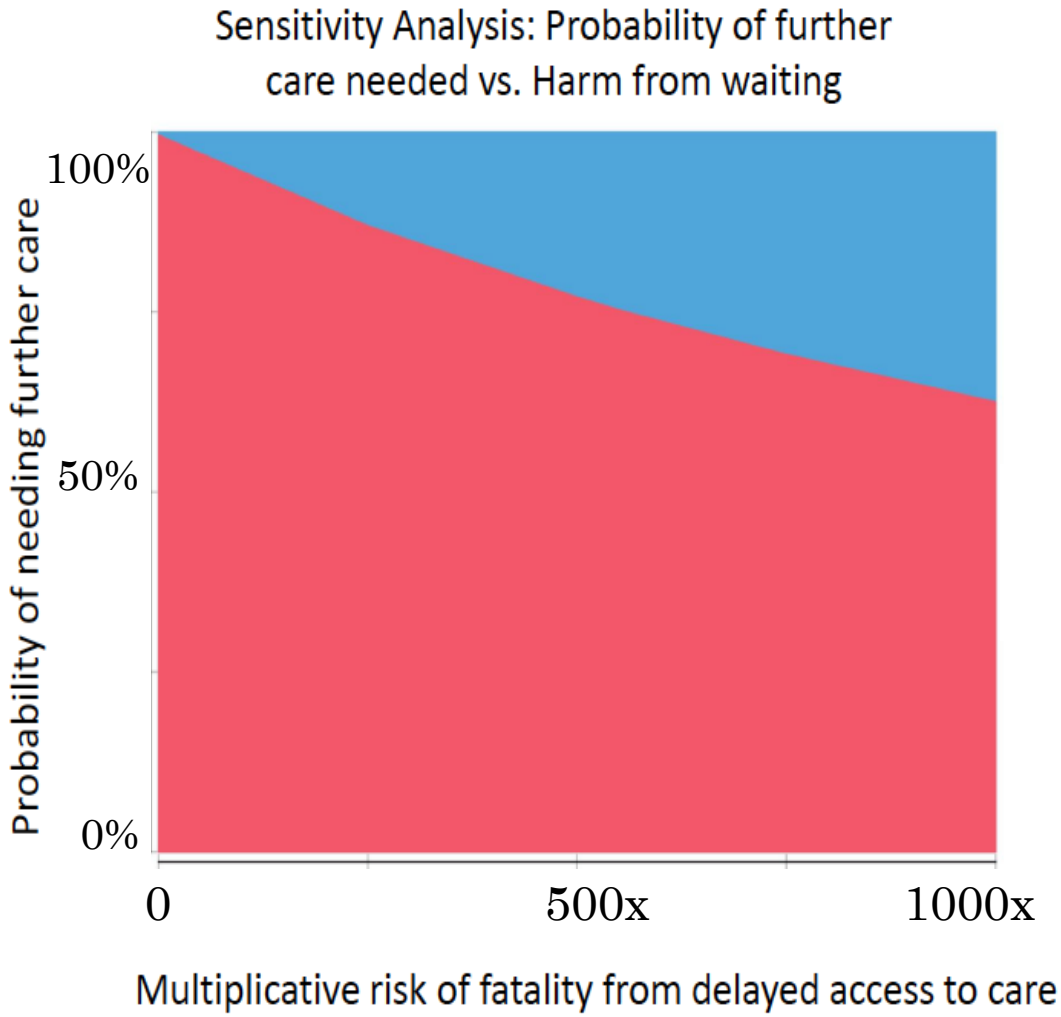
Reflex EMS for Resolved Symptoms…



- The incremental cost per life year saved was nearly $150M/QALY for reflex EMS
- With the cost per death prevented reaching $1.3B

Shaker MS, Kanaoka T, Feenan L, Greenhawt M. Ann Allergy Asthma Immunol. 2018

Reflex EMS



- Early EMS activation could be cost-effective when the **fatality risk increased 500-fold** over a "wait and see" approach, combined with eventual care being required in the "wait and see" cohort 75% of the time

Willingness to pay threshold is $100,000 per life year saved over model horizon

Shaker MS, Kanaoka T, Feenan L, Greenhawt M. Ann Allergy Asthma Immunol. 2018

Considerations for Home Management

- ✓ Patients / caregivers engaged in shared decision making
- ✓ Immediate access to at least 2 epinephrine autoinjectors
- ✓ Immediate access to person(s) who can help
- ✓ Clear understanding of thresholds for further care
- ✓ Understanding of how to use epinephrine device

- ✗ Patient/caregiver not comfortable with home observation
- ✗ No extra epinephrine on hand
- ✗ No access to additional help
- ✗ Unsure (or unwilling) to use epinephrine
- ✗ History of near fatal anaphylaxis
- ✗ Poor adherence to recommendations

Casale TB, Wang J, Oppenheimer J, Nowak-Wegrzyn. Acute At-Home Management of Anaphylaxis: 911: What is the Emergency? J Allergy Clin Immunol Pract 2022

Contextual Considerations

Home observation following first dose of epinephrine	Signs and symptoms that had emerged prior to epinephrine administration resolve within minutes of epinephrine administration, without recurrence. Patient is asymptomatic. Patients with scattered residual hives or other rash (including erythema), even those with newly emerging but isolated hives or erythema without other symptoms occurring after epinephrine administration may be observed at home provided no additional new symptoms develop.
Consider EMS activation and possibly second dose of epinephrine but can continue to observe at home if comfortable	Signs and symptoms that had emerged prior to epinephrine administration are improving or resolving within minutes of epinephrine administration. For example, persistence of a mild sensation of globus, nausea, coughing, or stomachache may be closely observed at home provided symptoms are improving (not worsening and are perceived to be getting better) and do not persist for longer than 10-20 minutes without any additional signs of improvement.
Activate EMS immediately, consider second dose of epinephrine, do not observe at home	Signs and symptoms that had emerged prior to epinephrine administration are not resolving. Particularly concerning symptoms would include respiratory distress, stridor, altered consciousness, cardiovascular instability, cyanosis, or incontinence not typical for their age. This would also include non-skin symptoms that fail to resolve or worsen, including but not limited to repeated (>2 total episodes of vomiting), persistent hoarseness, cough, dysphagia, wheezing, or lightheadedness.

What About Equity in Food Allergy Screening and Allergy Diagnosis?

- Access
- Education
- Transportation
- Diversity
- Cost

Shaker MS, Stukus D, Chan ES, et al. Allergy. 2018
Greenhawt M. Shaker MS. JAMA Network Open. 2019
Shaker MS, Verma K, Greenhawt M. Allergy. 2018
Shaker MS, Iglesia E, Greenhawt M. Allergy. 2019

Remember: each year 3.6 million people in the United States do not obtain medical care due to transportation issues

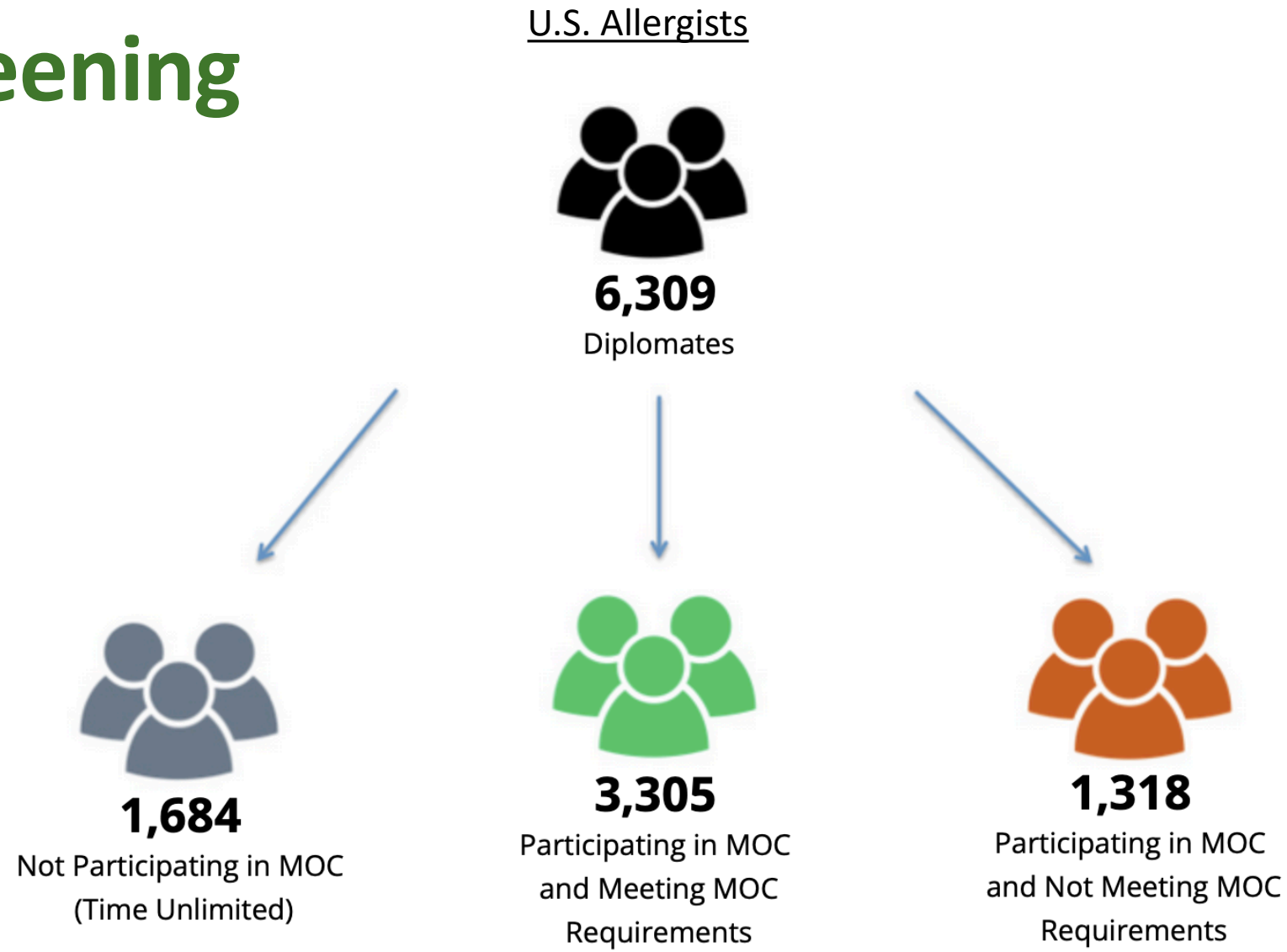
Equity

- Socioeconomic disadvantage may limit access to opportunities for screening and early introduction of potential food allergens
- The cost of food allergy is high
  - Estimated at $4,184 per child in 2013 in the US
  - May disproportionately affect families living in poverty

Gupta et al. The economic impact of childhood food allergy in the United States. JAMA Ped 2013
Jiang et al. Racial, Ethnic, and Socioeconomic Differences in Food Allergies. JAMA Open 2023

Feasibility of Sceening

- Greater than 640,000 infants at risk annually
- Only 40-60% of practicing allergists offer infant food challenges



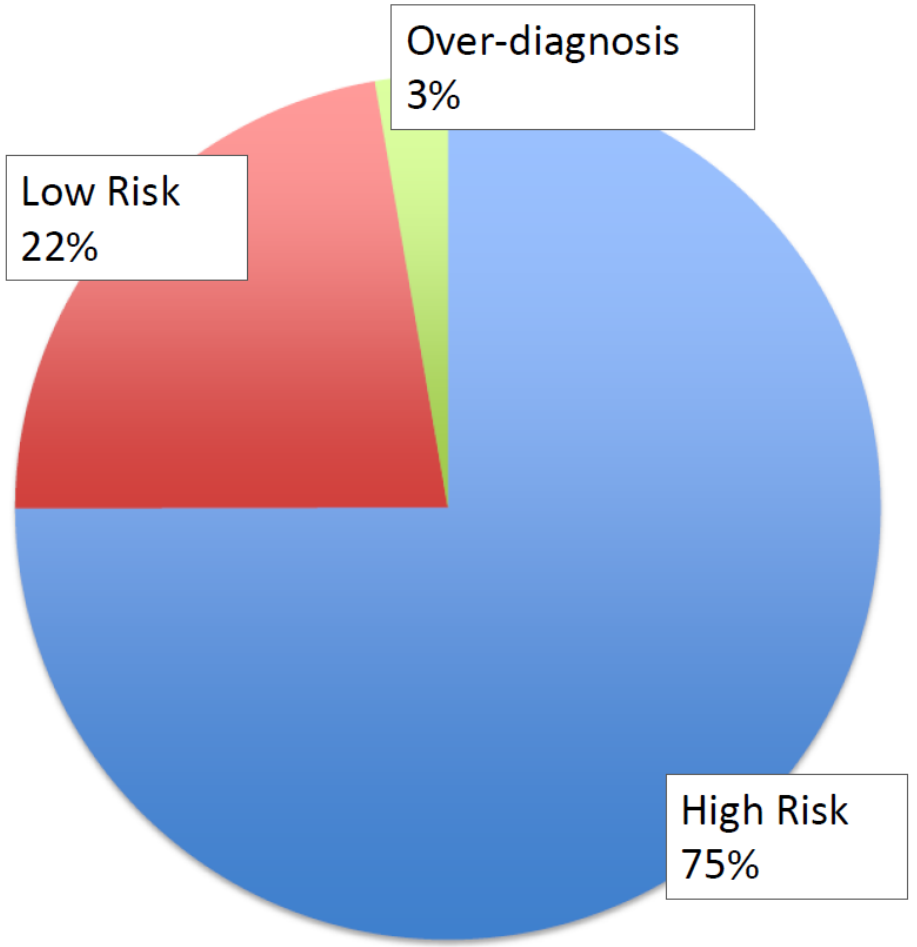
www.abai.org. Accessed October 1, 2023. Shaker et al. 2019; Greiwe et al 2019; Abrams et al 2019

“To Screen or Not to Screen?”

Infants at Risk	Cost Per Patient At Risk	QALY Per Patient At Risk	Allergic Reactions Per Patient At Risk
For Peanut Allergy (Personal History of Early Onset Eczema and/or Egg Allergy)			
No Screening	$6,557	19.63	0.4
Skin Test Screening	$7,576	19.62	0.35
Specific IgE Screening	$7,977	19.6	0.38
Delayed Introduction	$11,708	19.46	0.72
For Peanut Allergy (Sibling History Of Peanut Allergy)			
No Screening	$3,278	19.72	0.2
Skin Test Screening with Challenge	$3,984	19.72	0.2
For Egg Allergy (Early Onset Eczema)			
No Screening, Early Cooked Introduction	$2,235	19.78	0.03
Skin Test	$9,100	19.59	0.12
Specific IgE	$18,957	19.28	0.26
Delayed Cooked Introduction	$10,615	19.53	0.13

“To Screen or Not to Screen?”

- **Compared with alternative international approaches, the US peanut screening strategy costs $654,115,322 from a US societal perspective and results in 3,208 additional peanut allergy diagnoses over a 20 year simulation.**

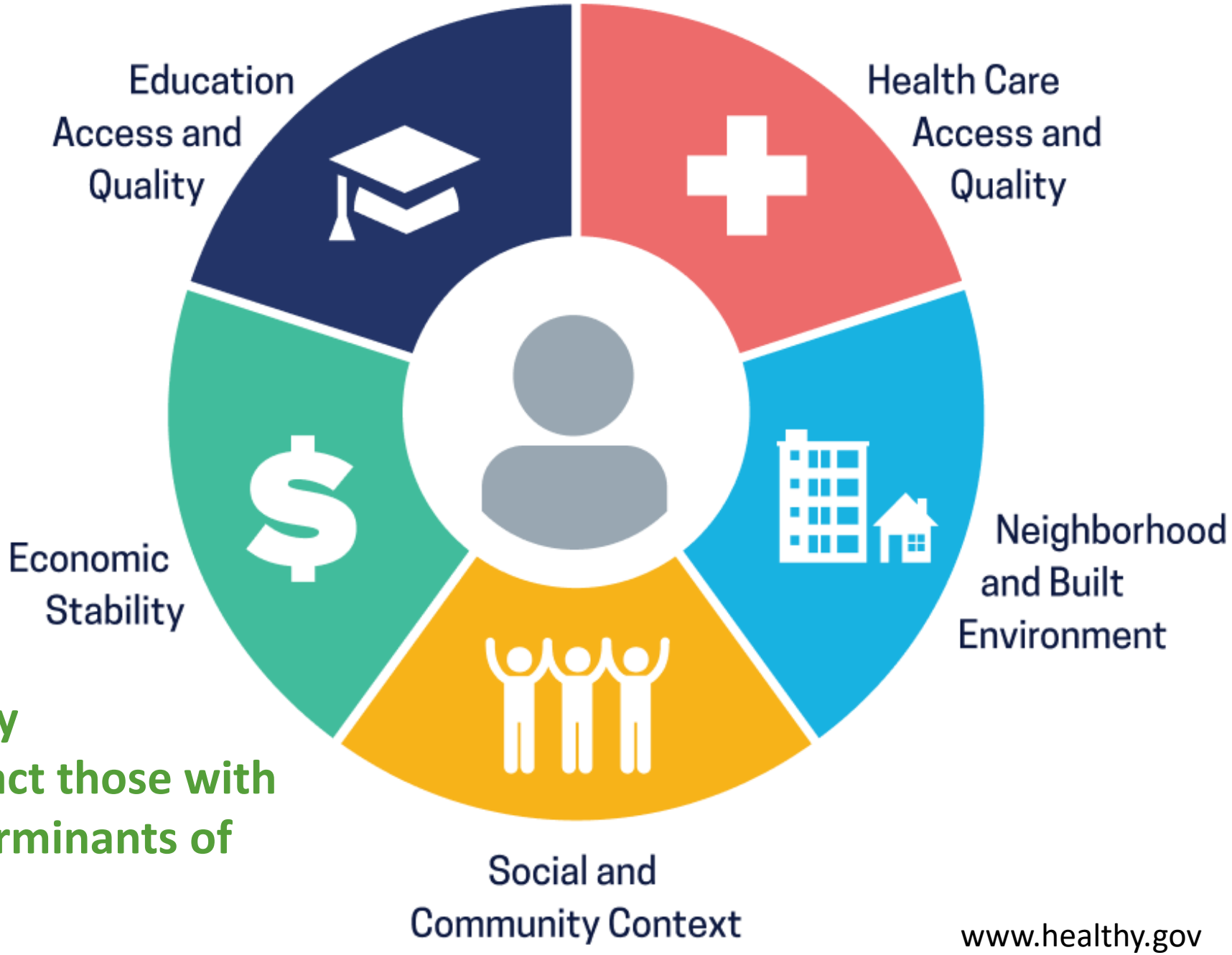


Missed

Almost ¼ of all peanut allergy diagnosed was in the low risk cohort

Shaker MS, Stukus D, Chan ES, et al. Allergy. 2018

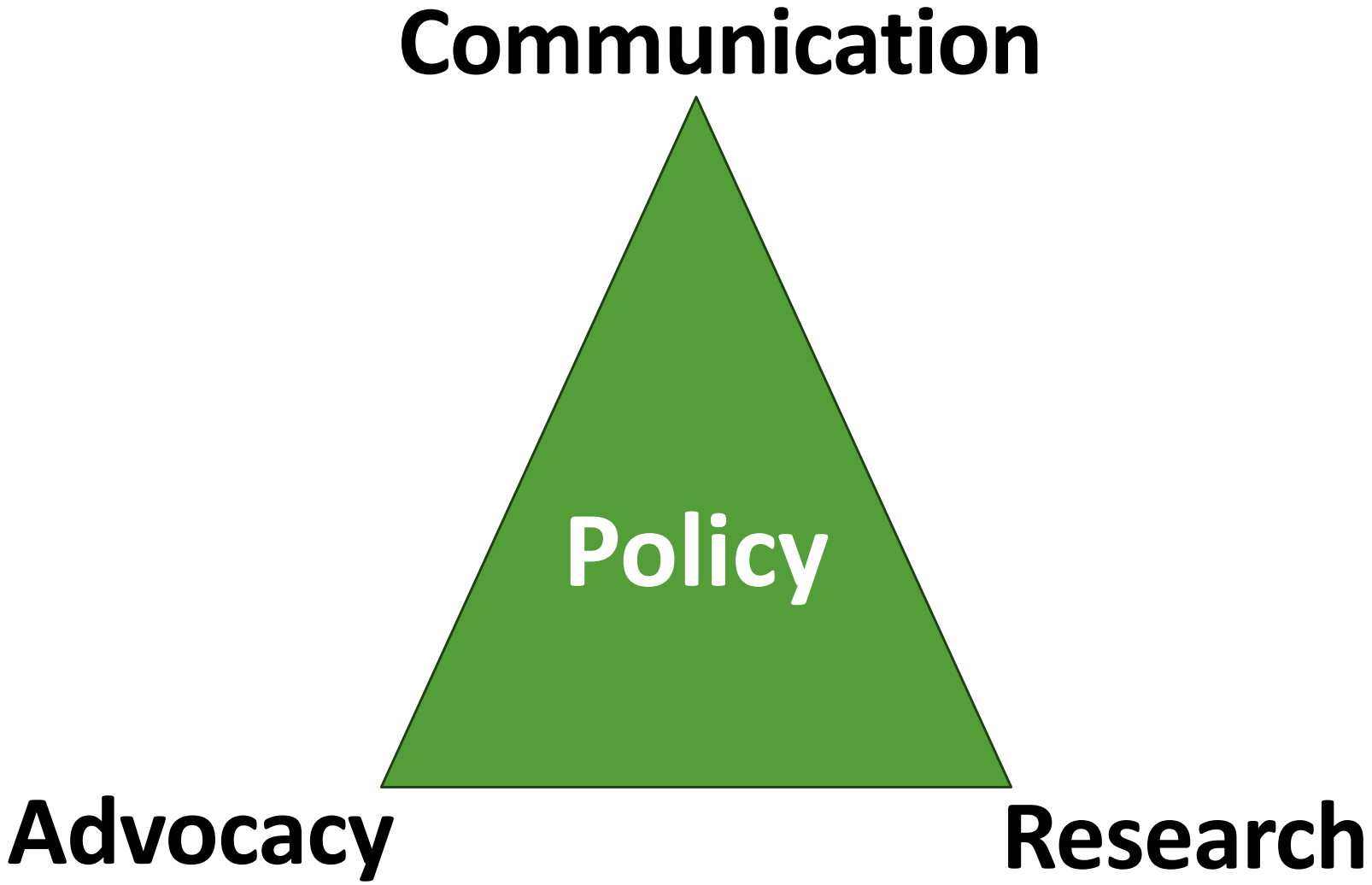
Social Determinants of Health



Low value therapies may disproportionately impact those with inequities in social determinants of health

www.healthy.gov

A Path Forward Toward Pharmacoequity



Take Home Points

- Pharmacoequity involves patient, social, health system, and policy factors
- Many therapies cost too much and patterns of utilization are not equitable
- Current patchwork solutions are not adequate or sustainable

Thank You


Dartmouth
photo by Kawakahi Kaeo Amina '09
www.dartmouth.edu/~gallery