

Asthma: Yesterday, Today and Tomorrow

Addressing the Asthma and Allergy Epidemics

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Disclosures

Previous: Advisory board, Merck Childhood Asthma Network

Technical Advisory Board: CarboNix LLC

No discussion of off label drug use

Research Support: National Institutes of Health

Legal Fees: None

Gifts: None

Other: Chair, Allergy, Pulmonary and Rheumatology Products Advisory Committee, US FDA

Clinical reviews in allergy and immunology

Series editors: Donald Y. M. Leung, MD, PhD, and Dennis K. Ledford, MD

The allergy epidemics: 1870-2010

Thomas A. E. Platts-Mills, MD, PhD, FRS *Charlottesville, Va*

Current controversies in allergy and asthma epidemiology:

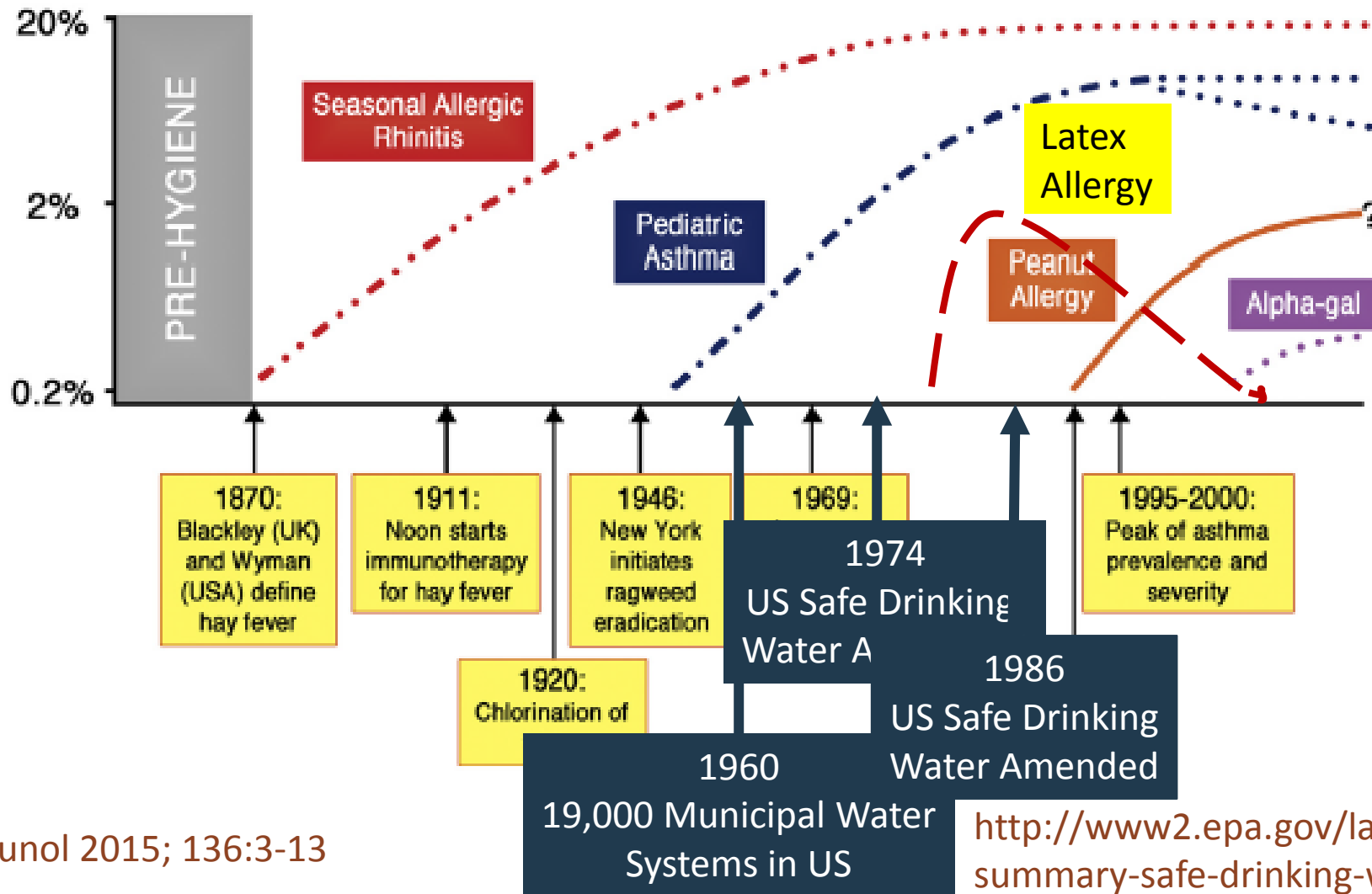
- General trends or specific circumstances

- New allergens

- Recognition of new diseases or pathophysiologies

- How can asthma prevalence be decreased

Sequential rises in three different allergic diseases



Asthma Yesterday

A PRACTICAL MANUAL
OF THE
DISEASES OF CHILDREN
WITH A
FORMULARY

BY
EDWARD ELLIS, M.D.

LATE SENIOR PHYSICIAN TO THE VICTORIA HOSPITAL FOR SICK CHILDREN; LATE PHYSICIAN
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THIRD EDITION

WILLIAM WOOD & COMPANY
NEW YORK
27 GREAT JONES STREET
1879

between large and small bronchi. Its site is usually in the upper part of the chest, as the disease advances, it is replaced by large crepitations. Hence they say the value of subcrepitant rhonchus as a diagnostic sign of bronchitis differs with the age of the child. If in a child under five this sound is heard on one or both sides of the chest there is danger that the bronchitis is complicated with lobular pneumonia. In older children there is less probability of such being the case. When there is crepitant rhonchus pneumonia is almost certainly present. Bronchitis in children not unfrequently assumes a chronic form with copious perspirations and flushes of fever especially towards night; the disease then bears a strong resemblance to phthisis.

Prognosis.—Bronchitis is dangerous in children at the breast, and under five years of age. Capillary bronchitis, broncho-pneumonia, and collapse of the lung are all very fatal.

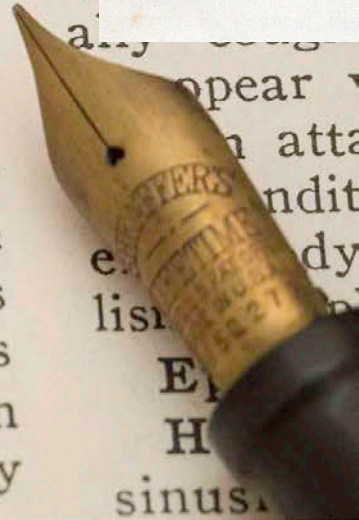
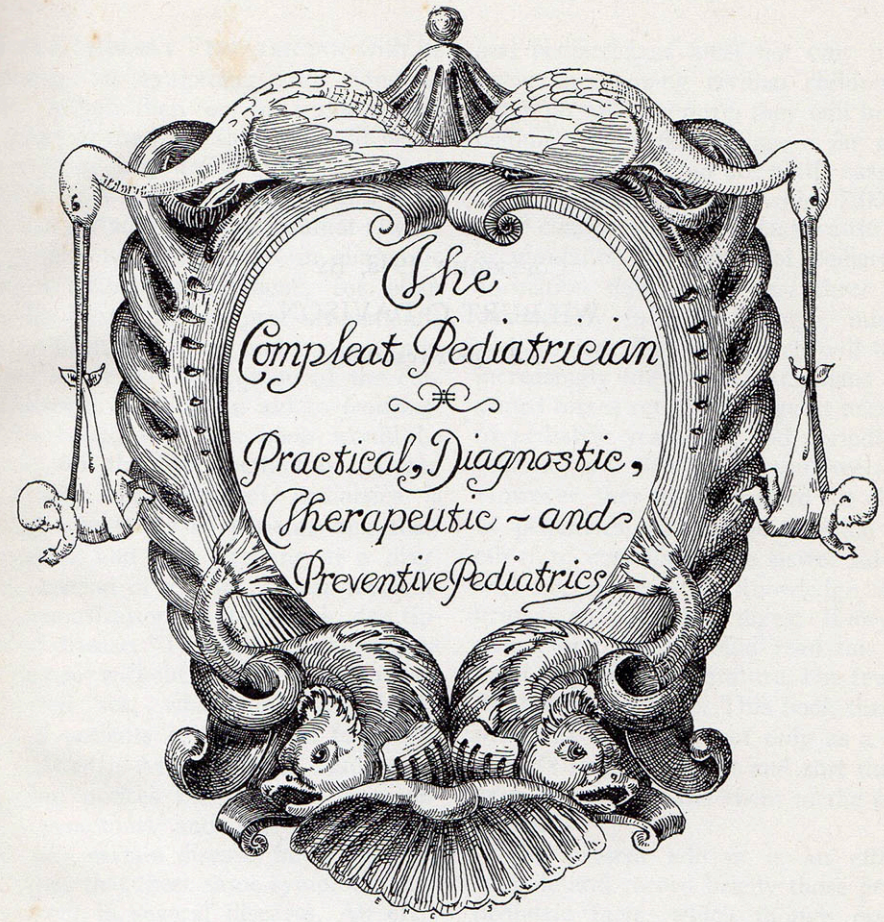
Broncho-pneumonia.—Rare during the first year of life; is common after that period up to the fifth or sixth year, when its frequency diminishes. It is a sequela of capillary bronchitis, and also of pertussis, measles, and collapse of the lung. It is more acute in character when supervening on capillary bronchitis; less so when occurring as a sequela of pertussis. The onset—say in the course of capillary bronchitis—is marked by an accession of fever, increased frequency of pulse, and respiration elevated temperature and orthopnoea. The face becomes livid, and the child struggles for breath, are soon succeeded by coma and apathy, pallor, and stimulating embrocations afford the only chance of success. The physical signs are those of slowly occurring consolidation, which are, in fact, character, increase in vocal fremitus and fine crackles, first heard in the lower part of the chest, spreading over the chest.



Dearness. (Continued.)
Eagle.)

3. ALLERGY (atopy) is sensitivity to bacteria, foods, plants, animals, dust, sera, etc. (*allergens*). It is *common*, and results in the various types of reactions described below,** which may occur alone or combined. Allergy is a dominant hereditary trait with variable expressivity.²³⁹ The laboratory tests, treatment and prevention, which apply to all allergic manifestations, are discussed in the last 5 paragraphs.

Asthma: The average age at the *onset* of the first attack usually is 4-5 yr., but it may occur at 8 months. Generally, though not always, it follows a "cold."² The initial symptoms are "wheezing," dyspnea and orthopnea,¹ and frequently cannot be distinguished from those of an upper respiratory infection.² Pallor, cyanosis, increased sweating, bradycardia¹¹⁹ and cough¹ also may be present. Rales¹ may be heard throughout both lungs. These symptoms usually disappear after several days but are followed by a recurrence a few weeks or months later. The attacks are more common in the winter but in some children occur only



Davidson WC. The Complete Pediatrician, 4th ed, Duke Univ. Press, Durham, 1943, pp 3

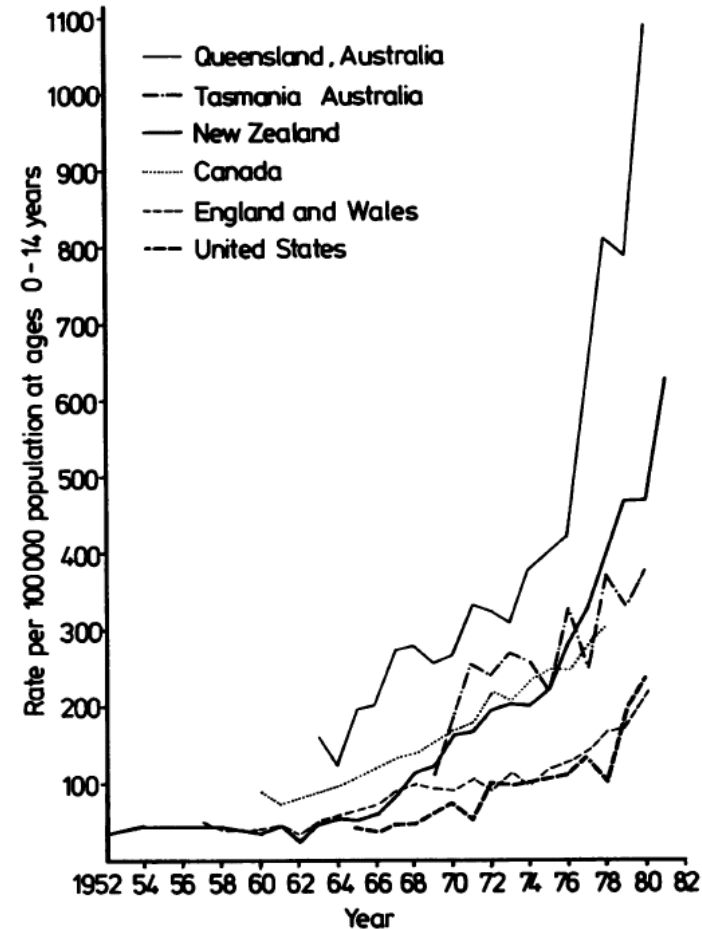
Childhood Asthma 1950's-1960's

Review 18 studies of asthma in children from various countries

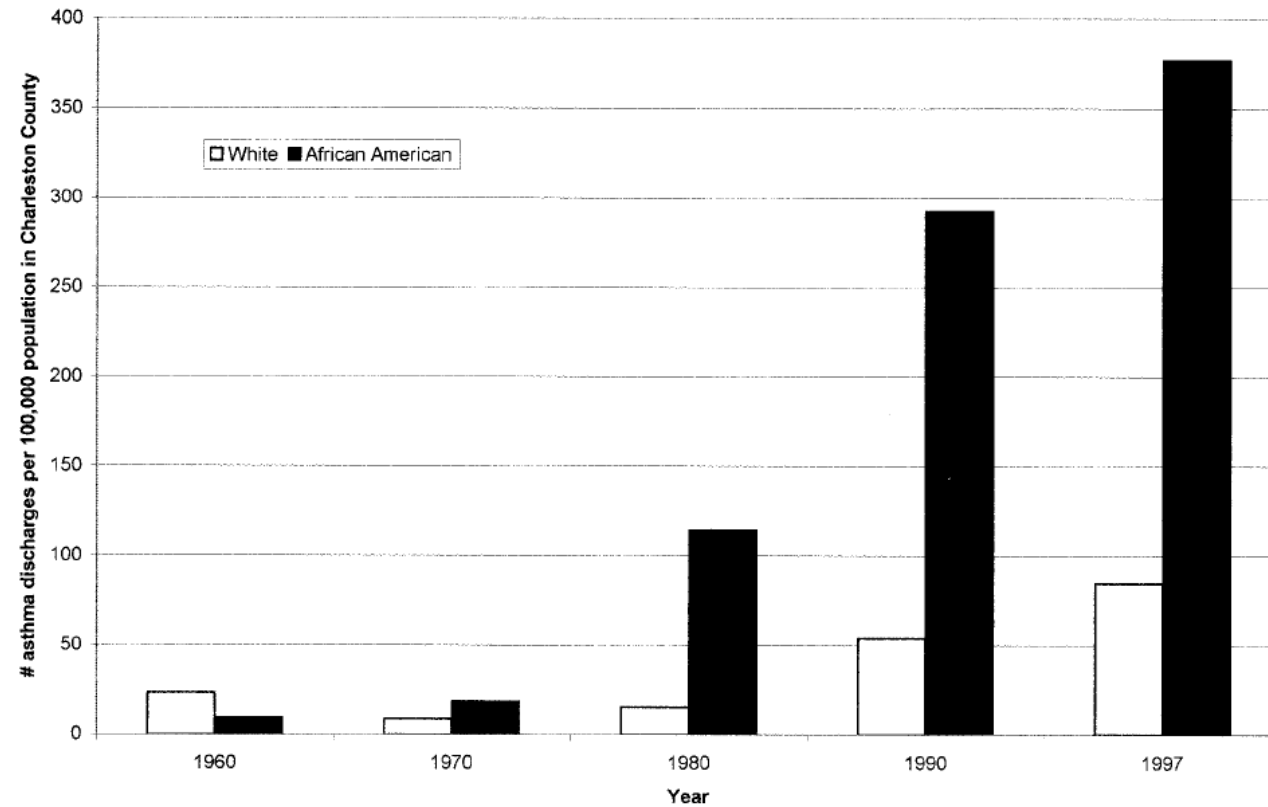
- Rates per 1,000 population
- Highest rate Broder (1962) Tecumseh, MI, 6-19 years: probable = 117/1,000; definite only 39/1,000
- Second highest Milne (1969) Lower Hutt, New Zealand, 11-13 years = 71.4/1,000
- Distribution of rates in 18 studies, 1950 - 1968:

Rate per 1,000 children	Number of studies
< 10	6
10 - 30	6
30-100	5
>100	1

Asthma Hospital Admissions in English Speaking Countries: 1952-1982



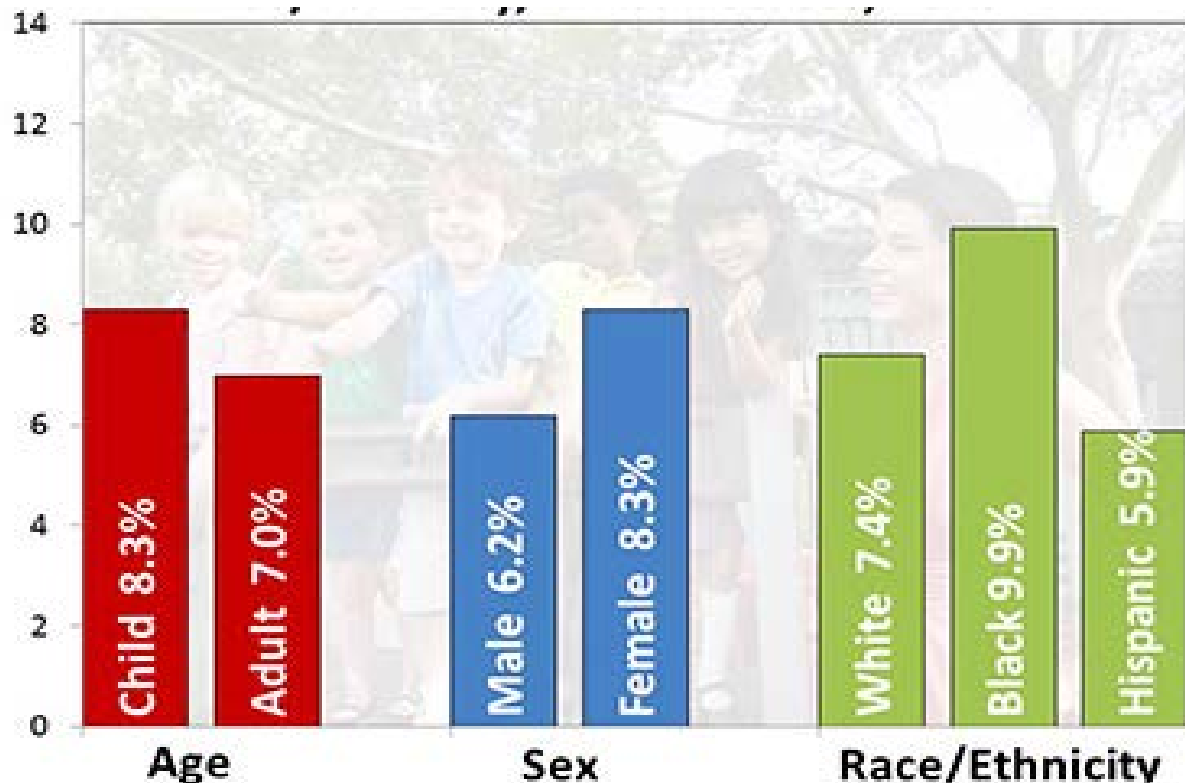
MUSC Asthma Discharges, 0-18 yr, Annual Rate per 100,000 population 0-18



Crater DD, et al. Pediatrics 2001;108:e97

Asthma Today

Current Asthma Prevalence Percents by Age, Sex, Race/Ethnicity, USA, 2013



Source: National Health Interview Survey, National Center for Health Statistics, Centers for Disease Control and Prevention

Current Asthma, 2013, United States		
Age	Number with Asthma	Percent with Asthma
Child (<18 yr)	6,109,000	8.3
Adult (18+ yr)	16,540,000	7.0

<http://www.cdc.gov/asthma/asthmadata.htm>

http://www.cdc.gov/asthma/most_recent_data.htm

Current Asthma Prevalence, 2013, United States

Strata	Number, thousands	Percent
White, non Hispanic	14,383	7.4
Child	2,920	7.5
Adult	11,463	7.3
Black, non Hispanic	3,712	9.9
Child	1,344	13.4
Adult	2,368	8.6
Hispanic	3,157	5.9
Child	1,307	7.4
Adult	1,850	5.2

http://www.cdc.gov/asthma/most_recent_data.htm

Current Asthma Prevalence, 2013, United States

Federal Poverty Threshold	Number, thousands	Percent
< 100% of poverty level	5,321	10.9%
100-250% of poverty level	6,260	7.0%
250-450% of poverty level	5,280	6.2%
>450% of poverty level	5,859	6.6%

http://www.cdc.gov/asthma/most_recent_data.htm

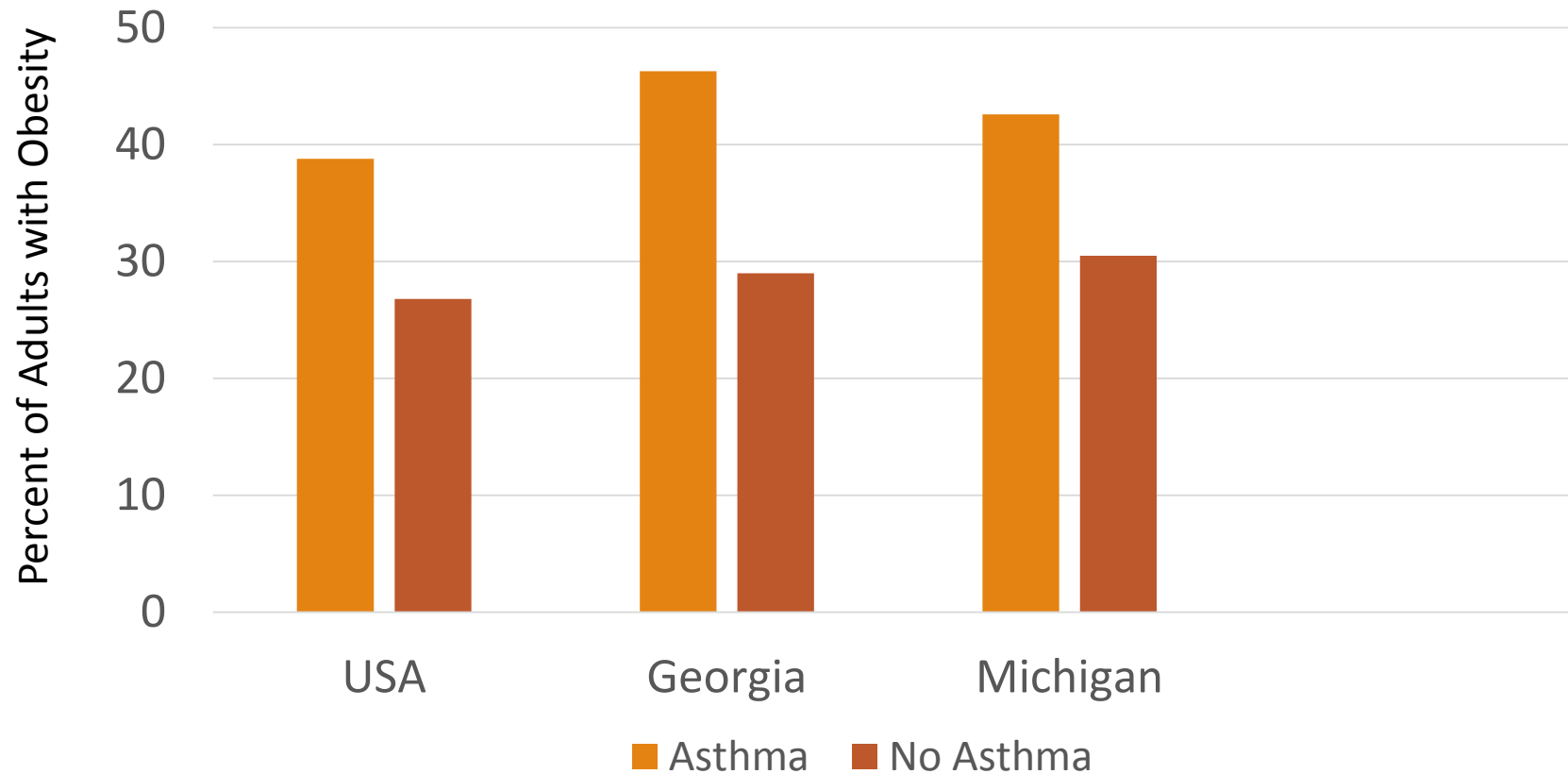
Child Current Asthma, 2013 BRFSS, Compared to Symptom Surveys

State	Sample #	Prevalence %	95% CI	Prevalence #
Georgia	1864	10.8%	9.1 - 12.7	259,917
Michigan	2715	10.9%	9.5 – 12.5	238,422

State	Sample #	Current Diagnosed Asthma Prevalence %	Current UnDiagnosed, %	Prevalence %, Diagnosed and Undiagnosed
Georgia, rural	2523	13.7%	7.3%	13.7 + 7.3 = 21.0
Michigan, Detroit	7297	15.0%	7.8%	15.0 + 7.8 = 22.8

Ownby DR, Tingen MS, et al. J Allergy Clin Immunol 2015;136:595-600

Obesity and Asthma in the USA



Asthma Tomorrow

Important Public Health Questions

- National prevalence estimates suggest that the rapid increase seen from 1970 to 2000 has stopped
- Poverty is not likely to be eliminated within the next 20 years
 - Poor housing (indoor & outdoor air quality); family, social, neighborhood stress; access to medical care; health literacy
- Obesity continues to increase and will likely continue to increase
 - Clinically difficult to separate obesity related shortness of breath (breathing impairment) from asthma
 - Causal relationship between obesity and asthma or common root cause
- Common causes of obesity and asthma
 - Relationship between diet and asthma: balance of calories versus quality of foods, salt intake
 - Less food with viable bacteria: root vegetable, fermented foods (yoghurt, sauerkraut, home cider)

Conclusions

Asthma is a major chronic disease affecting nearly 10% of the US population

Asthma is probably the largest contributor to the cost of health care in the US that can potentially be reduced in prevalence within one generation

Improving air quality, especially in cities, will reduce exacerbations of asthma

Improving the quality of food consumed by children and reducing the prevalence of obesity will likely reduce the prevalence of asthma

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