Asthma self-management: Urban truths and consequences

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Faculty Disclosures

Maureen George

- **Relevant financial relationships with a commercial interest:**

Teva	Ad Board; Speaker's Bureau; Consultant
Vernalis	Ad Board

Objectives

- To describe a program of research in asthma self-management focused on achieving and maintaining asthma control
  - Access to self-management education and support
  - Medication adherence
  - Health beliefs
  - Environmental trigger beliefs, behaviors and exposures
  - Patient-provider communication
  - Health literacy

Asthma prevalence: globally

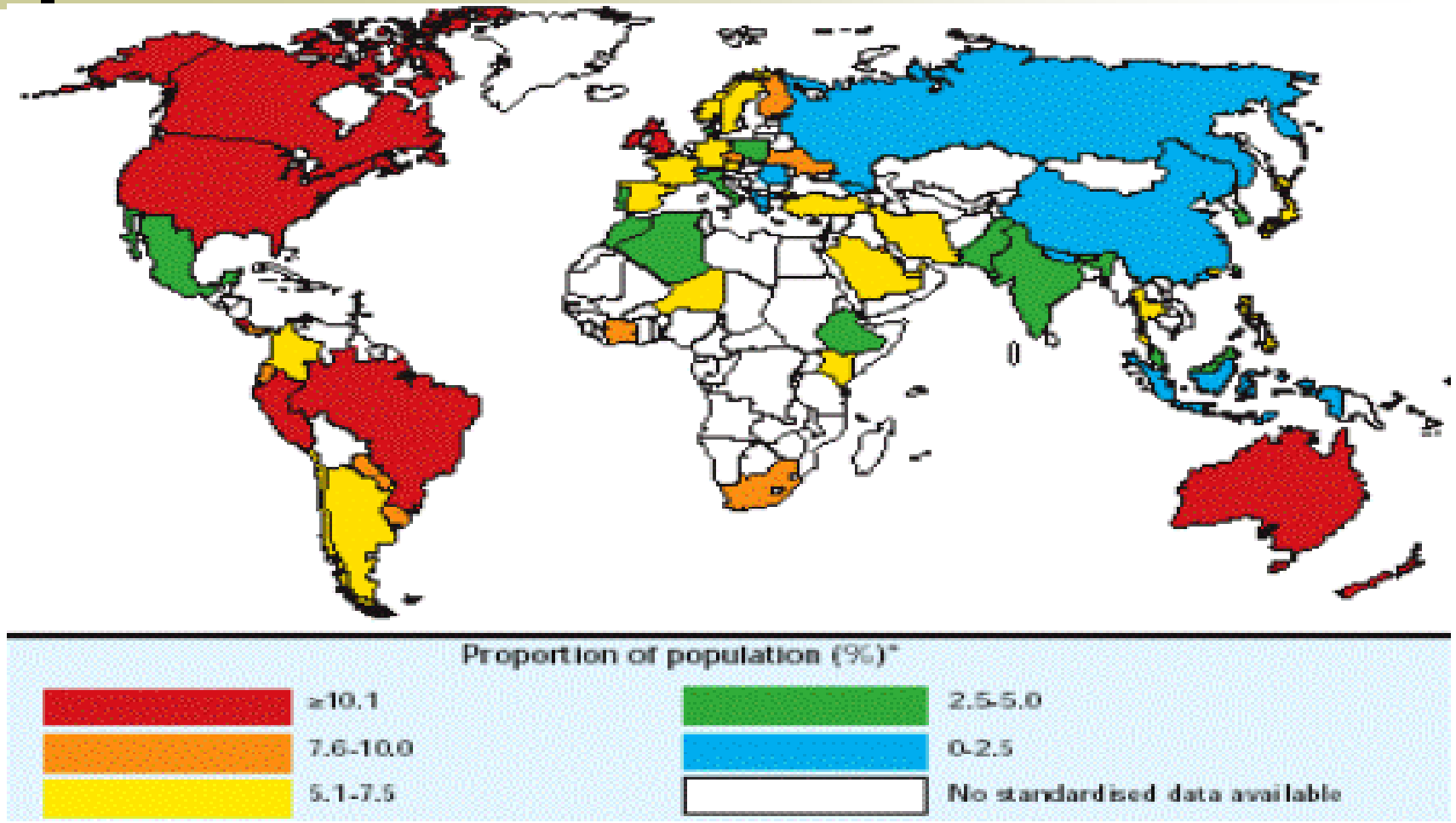
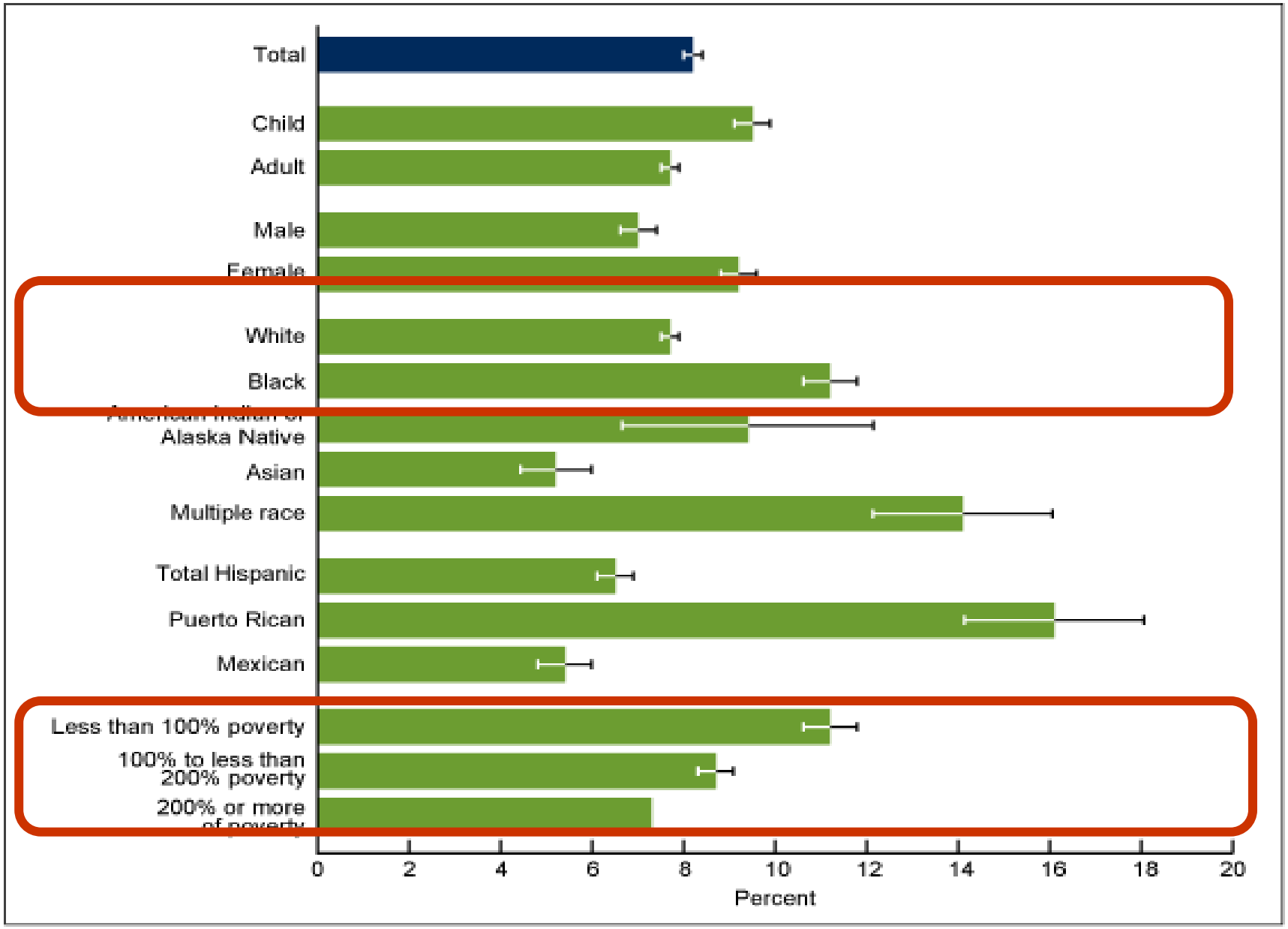
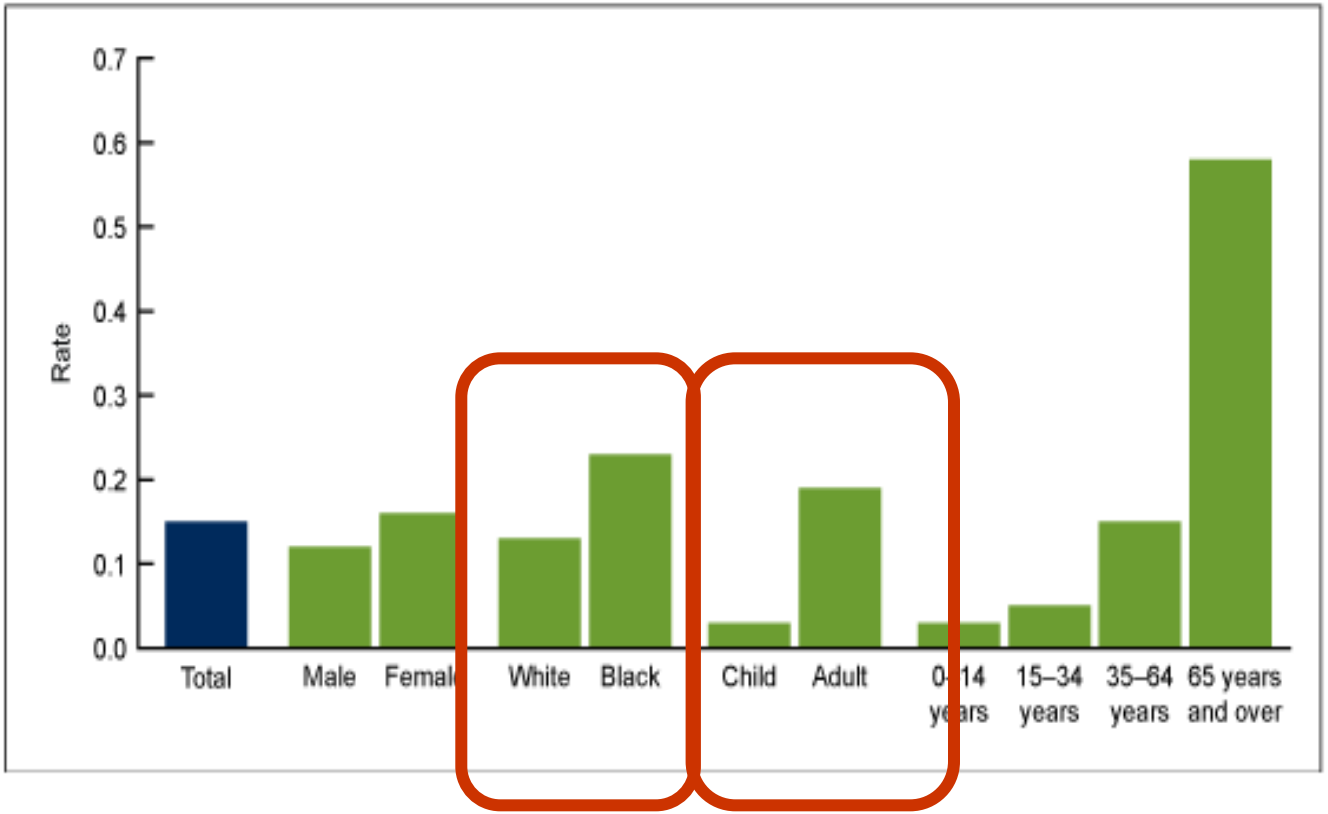


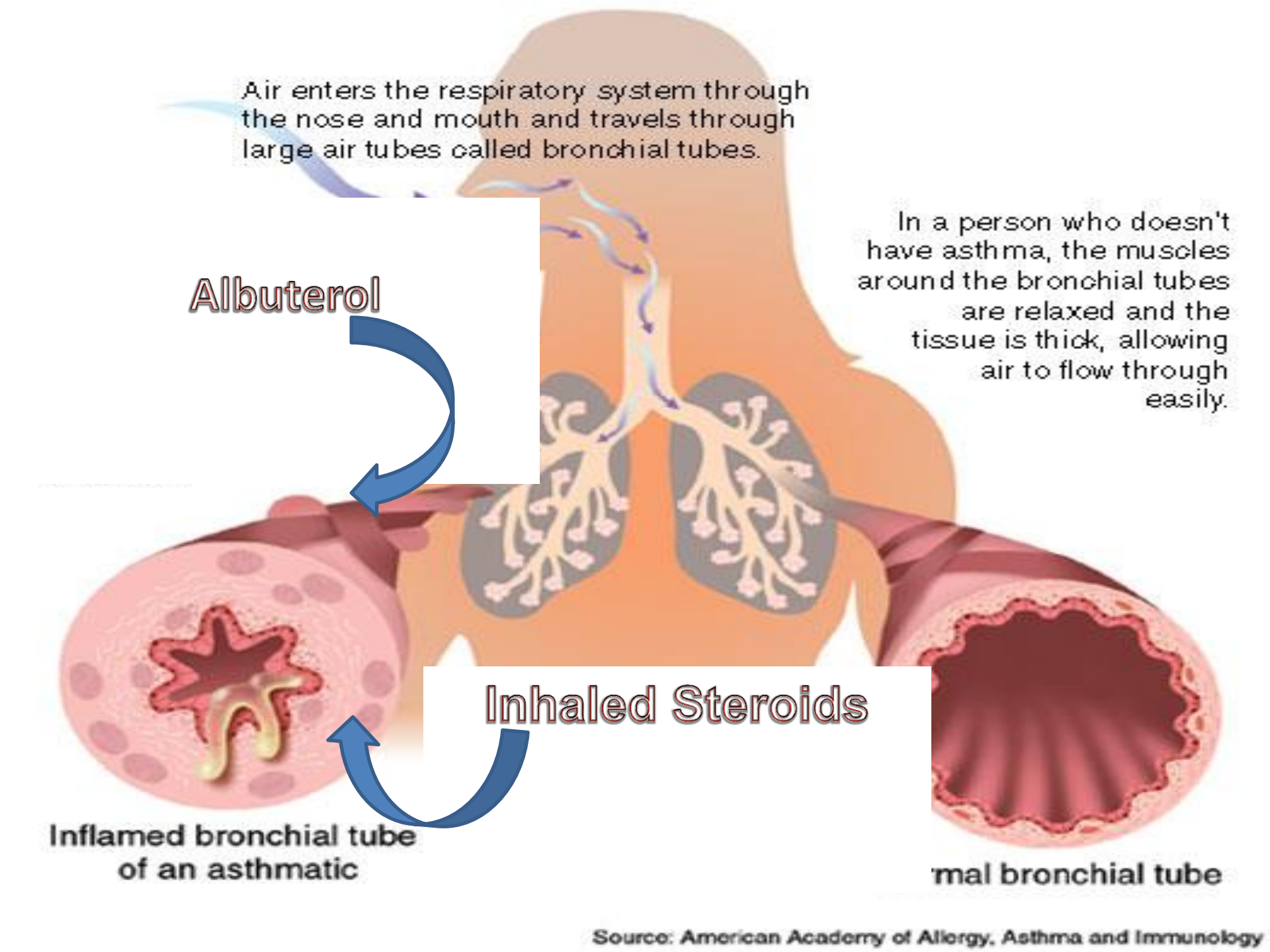
Figure 2. Asthma prevalence, by selected demographic characteristics: United States, average annual 2008–2010



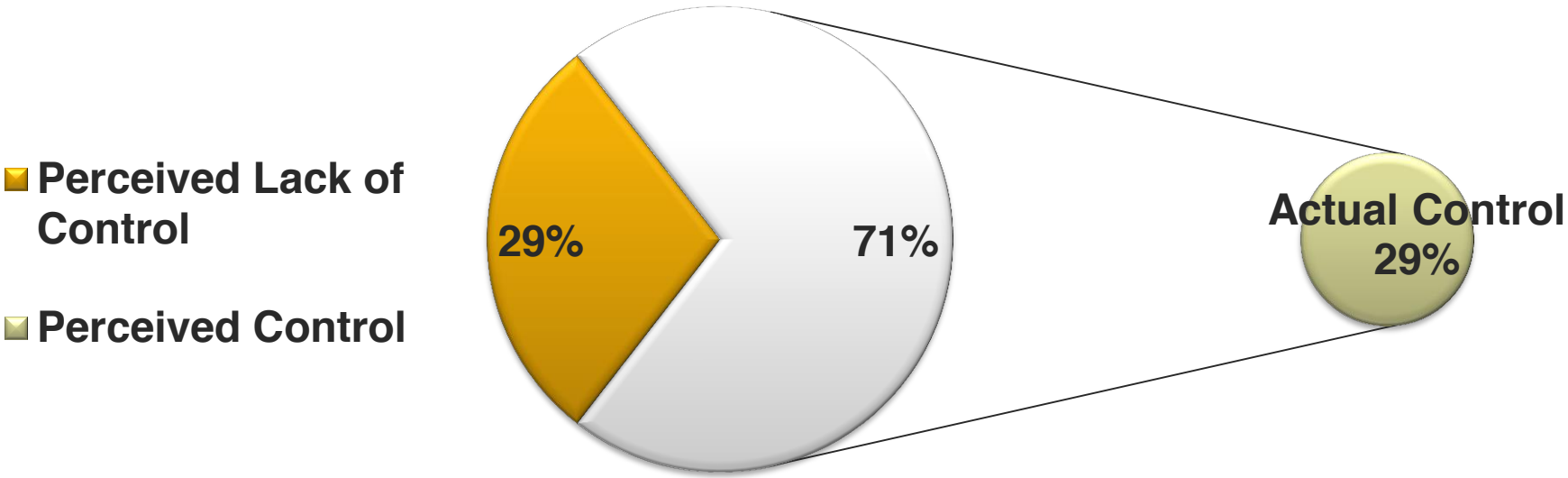
NCHS Data Brief Number 94, May 2012
Trends in Asthma Mortality in the United States, 2001–2010

Figure 5. Asthma deaths per 1,000 persons with asthma, by selected demographic characteristics: United States, average annual 2007–2009




Air enters the respiratory system through the nose and mouth and travels through large air tubes called bronchial tubes.
In a person who doesn't have asthma, the muscles around the bronchial tubes are relaxed and the tissue is thick, allowing air to flow through easily.
Albuterol
Inhaled Steroids
Inflamed bronchial tube of an asthmatic
mal bronchial tube
Source: American Academy of Allergy, Asthma and Immunology

Asthma control: Perceived and actual



AIM study, 2009

Addressing asthma disparities by targeting self-management

- Focus on urban low-income and minority populations
  - Community based participatory research
  - Mixed methods
- Support primary care delivered at federally qualified health centers
  - Interventions to address needs of providers, as well as patients and their social network

Community and Individual Determinants of Asthma Disparities

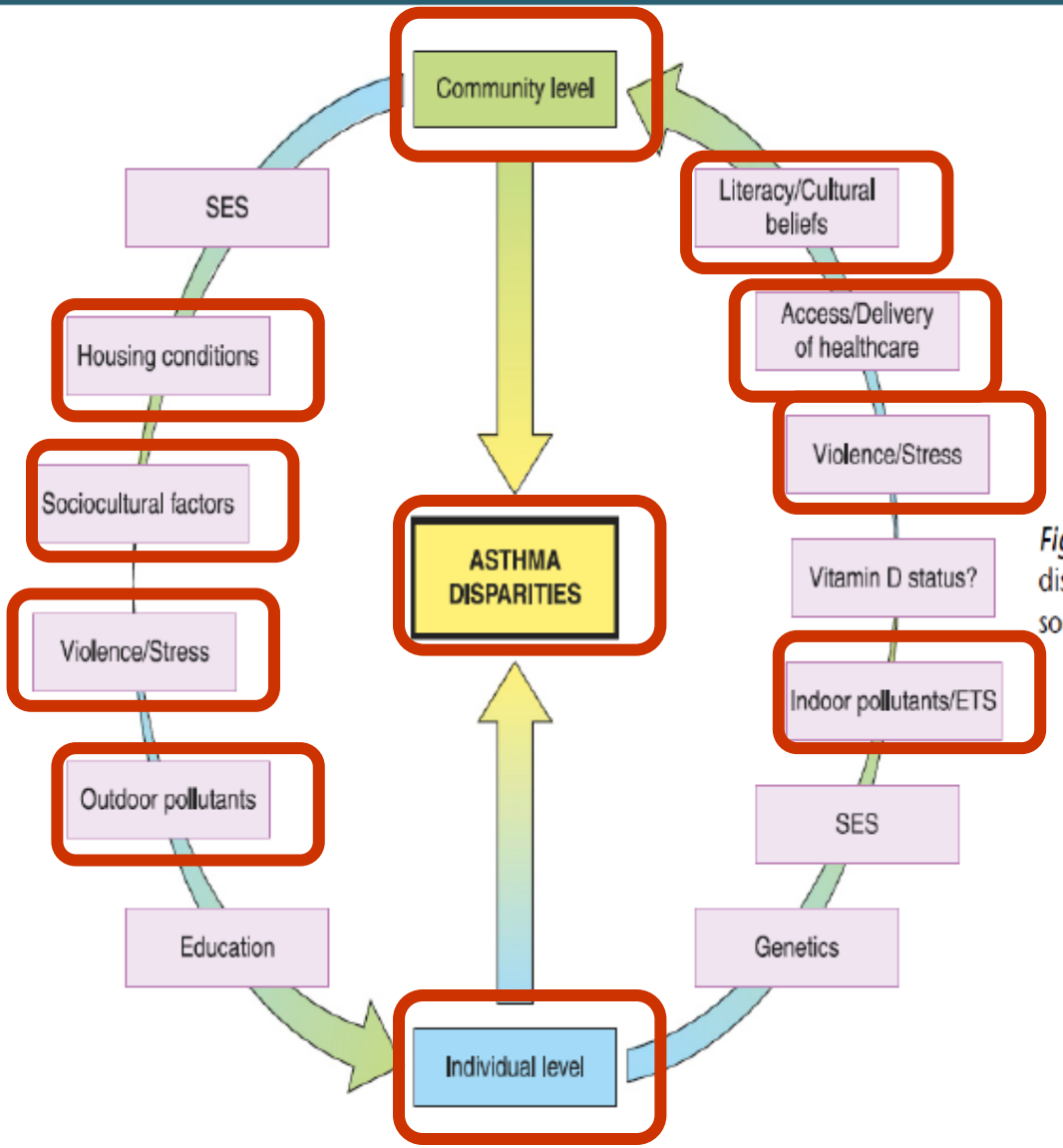
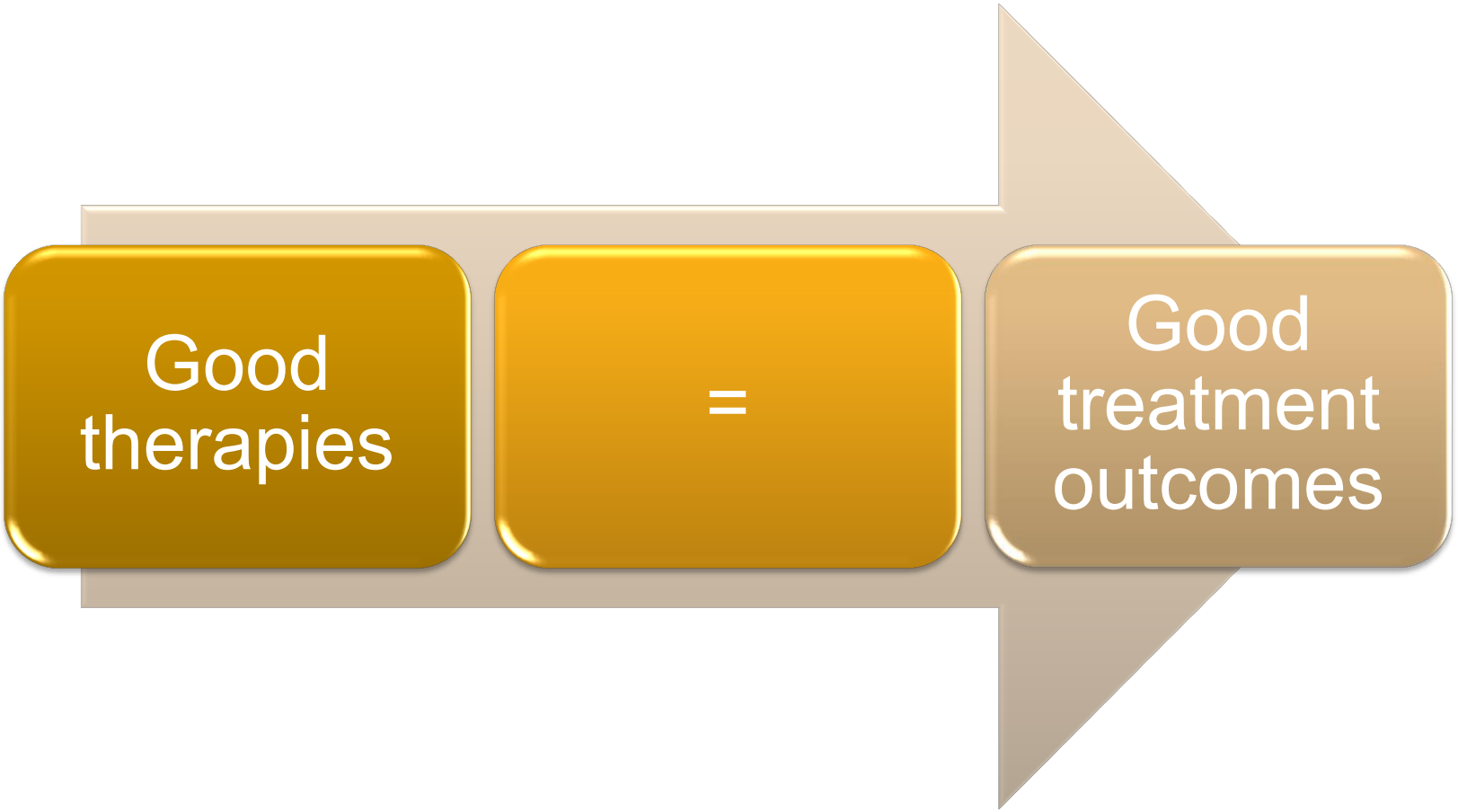
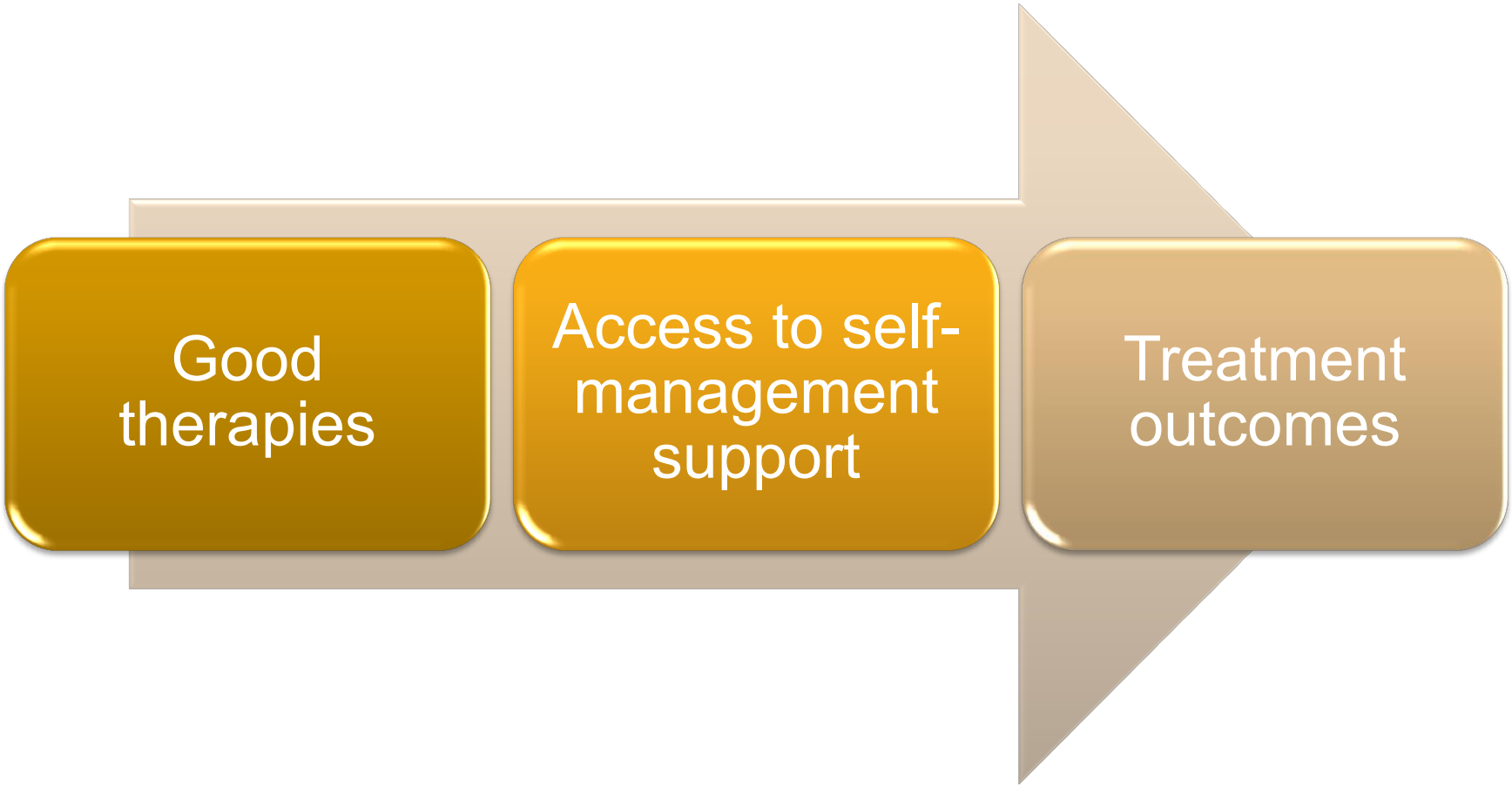


Figure 1. Known or potential determinants of asthma disparities. ETS = environmental tobacco smoke; SES = socioeconomic status.


Good therapies
=
Good treatment outcomes


Good therapies
Access to self-management support
Treatment outcomes

- Does an inpatient education program improve outcomes for adults hospitalized with acute asthma?
  - RCT
    - Usual care
    - Collaborative care
  - Inclusion/exclusion criteria
  - Identical inpatient management
  - Discharge determined by housestaff

George et al. Arch Intern Med 1999;159:1710-1716

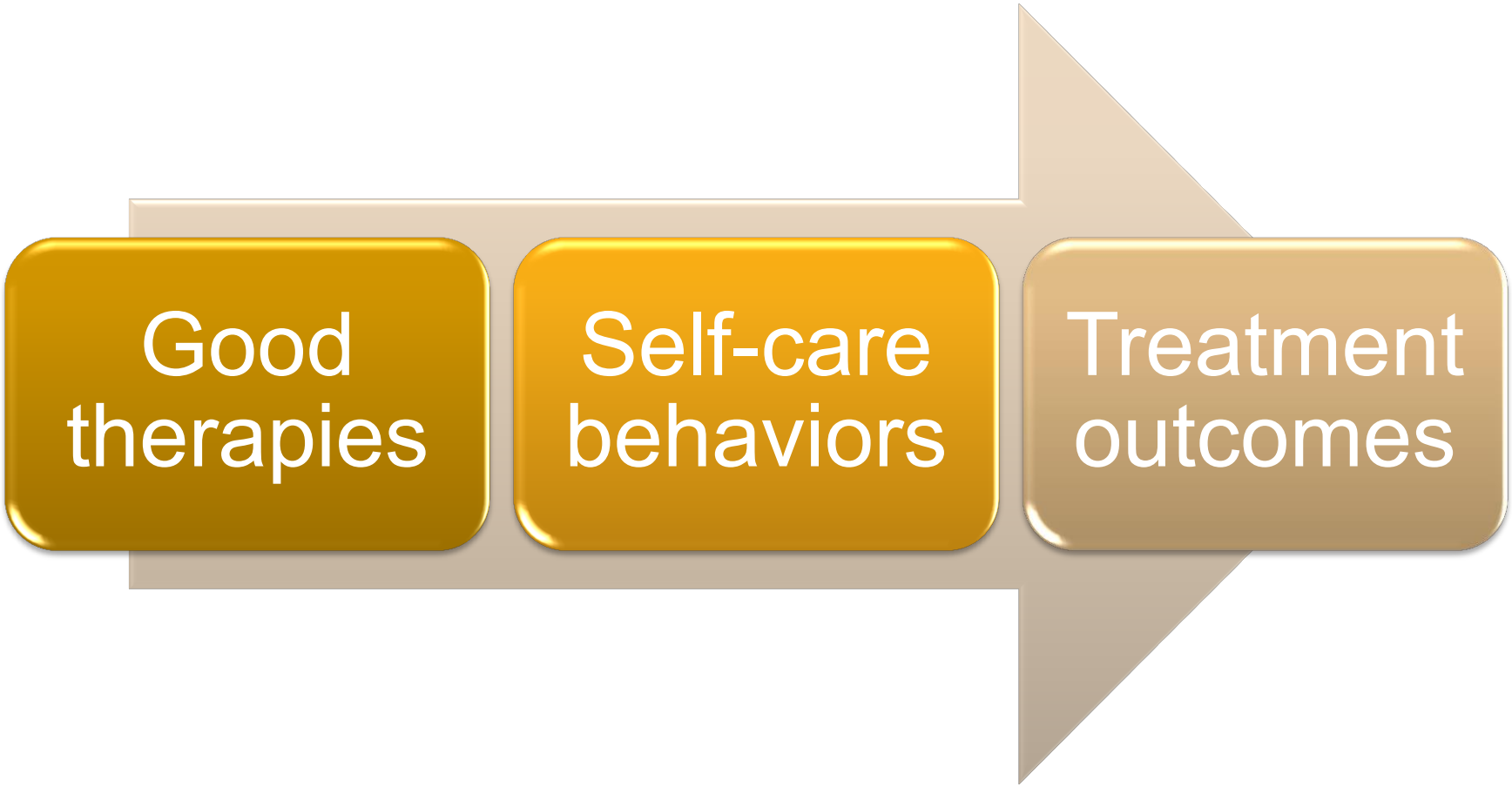
Funding: Mary C. Rockefeller and U Penn SON

Table 2. Hospital Use Data From the Medicaid Managed Care Organization Serving the 2 Study Groups

Hospital Use	Within 6 mo Before Intervention	Within 6 mo After Intervention	Within-Group *P**	Between-Group *P*†
No. of emergency department visits				
Inpatient educational program group (n = 30)	27	3	.003	.04
Routine care group (n = 20)	17	15	.59	
No. of hospitalizations				
Inpatient educational program group (n = 30)	26	3	.002	.04
Routine care group (n = 20)	14	12	.59	

** Wilcoxon signed rank analysis performed.*
† Mann-Whitney analysis performed.

ARCHIVES OF INTERNAL MEDICINE


Good therapies
Self-care behaviors
Treatment outcomes

MDI Log

Day 0 1 4* Electronic Monitoring 37* 42

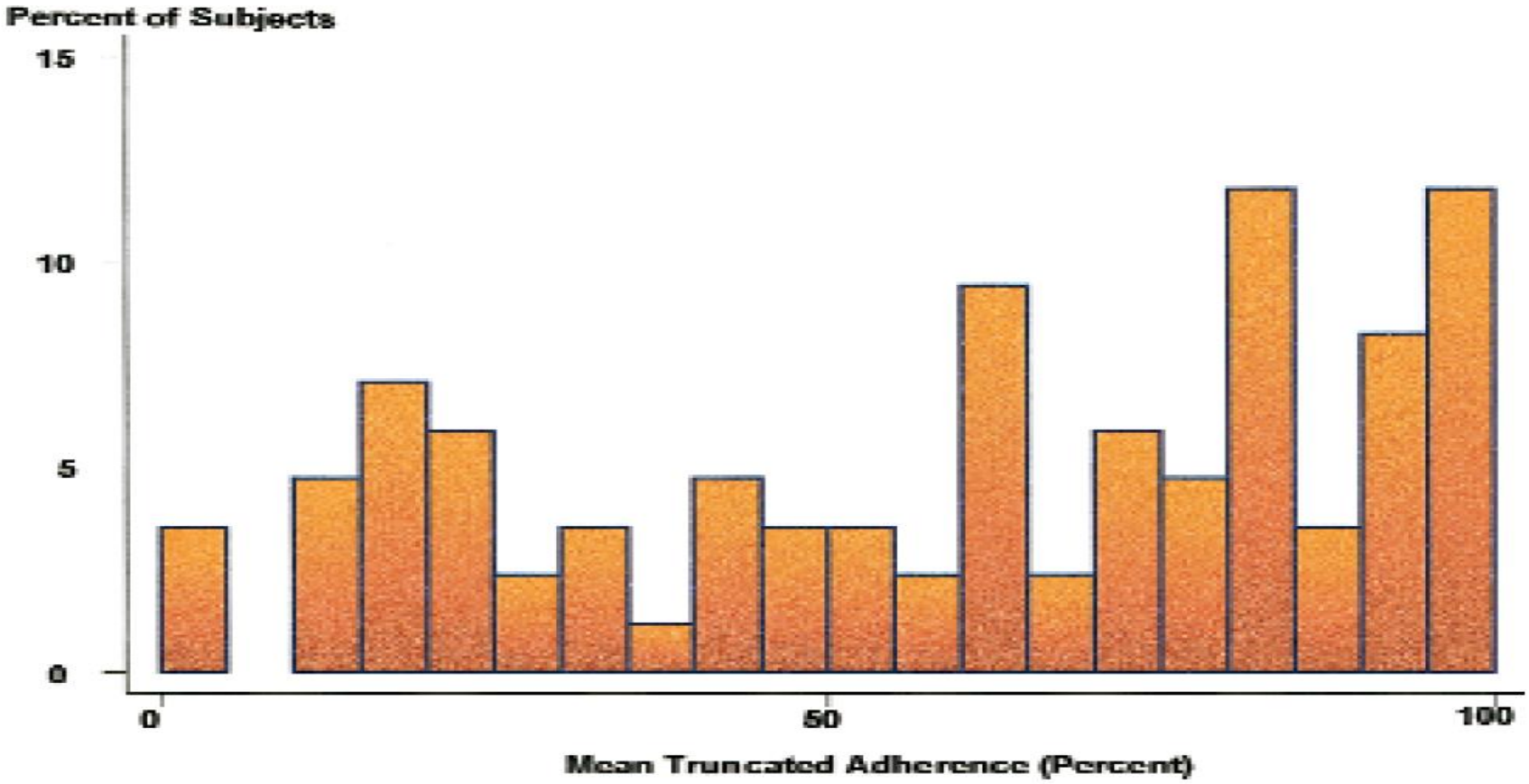
Interview Day 0
- Sociodemographics
- Asthma severity history
- Inhaler Adherence Scale
- Asthma Symptom Utility Index
- Spirometry
- Attitude
- Self-efficacy
- Social Support
- Inhaled Steroid Knowledge
- Patient-physician Communication

Interview Day 42
- CES-D
- Spirometry

*Telephone calls days 4, 37

Apter, Boston, George et al Journal of Allergy and Clinical Immunology 111. 6; 2003,1219-1226

Mean truncated adherence 60%-- 52% for Blacks; 74% for Whites



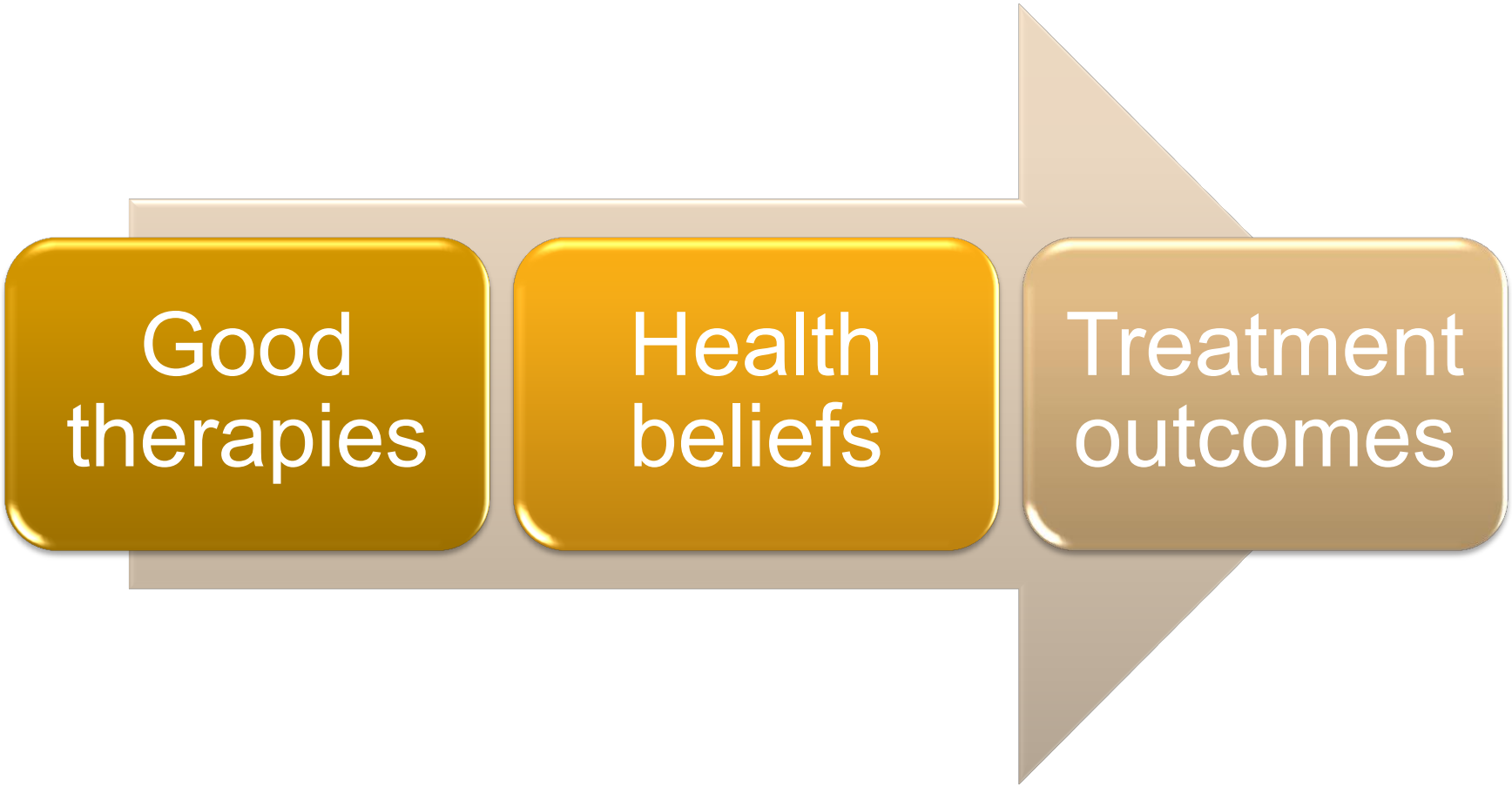
Apter, Boston, George et al Journal of Allergy and Clinical Immunology 111. 6; 2003,1219-1226

TABLE V. Comparing modifiable predictors of adherence by race-ethnicity*

Modifiable predictor	African American	Non–African American	*P* value†
Attitude	28.5 ± 3.6	30.5 ± 3.4	.01
Knowledge	29.2 ± 4.6	33.6 ± 3.8	<.001
Depression	14.3 ± 11.5	7.2 ± 6.6	.004
Social support	75.7 ± 15.2	81.1 ± 13.4	.10
Communication	37.4 ± 3.0	36.5 ± 3.4	.26
Self-efficacy	56.8 ± 7.5	58.1 ± 7.2	.43

*The range of the Attitude Scale is 7 to 35, 8 to 40 for the Knowledge scale, 0 to 60 for the CES-D Depression Scale, 19 to 95 for the MOS Social Support Survey, 8 to 40 for the Communication scale, and 6 to 72 for the Self-Efficacy Scale.

†Rank sum test.


Good therapies
Health beliefs
Treatment outcomes

Themes from focus groups

- Knowledge is necessary but not sufficient
  - Systems
    - Not giving you the medicine
  - Psychosocial
    - If I get distracted
    - I thought it was too late
  - Beliefs
    - It can give you cancer and everything
    - I don’t need it everyday

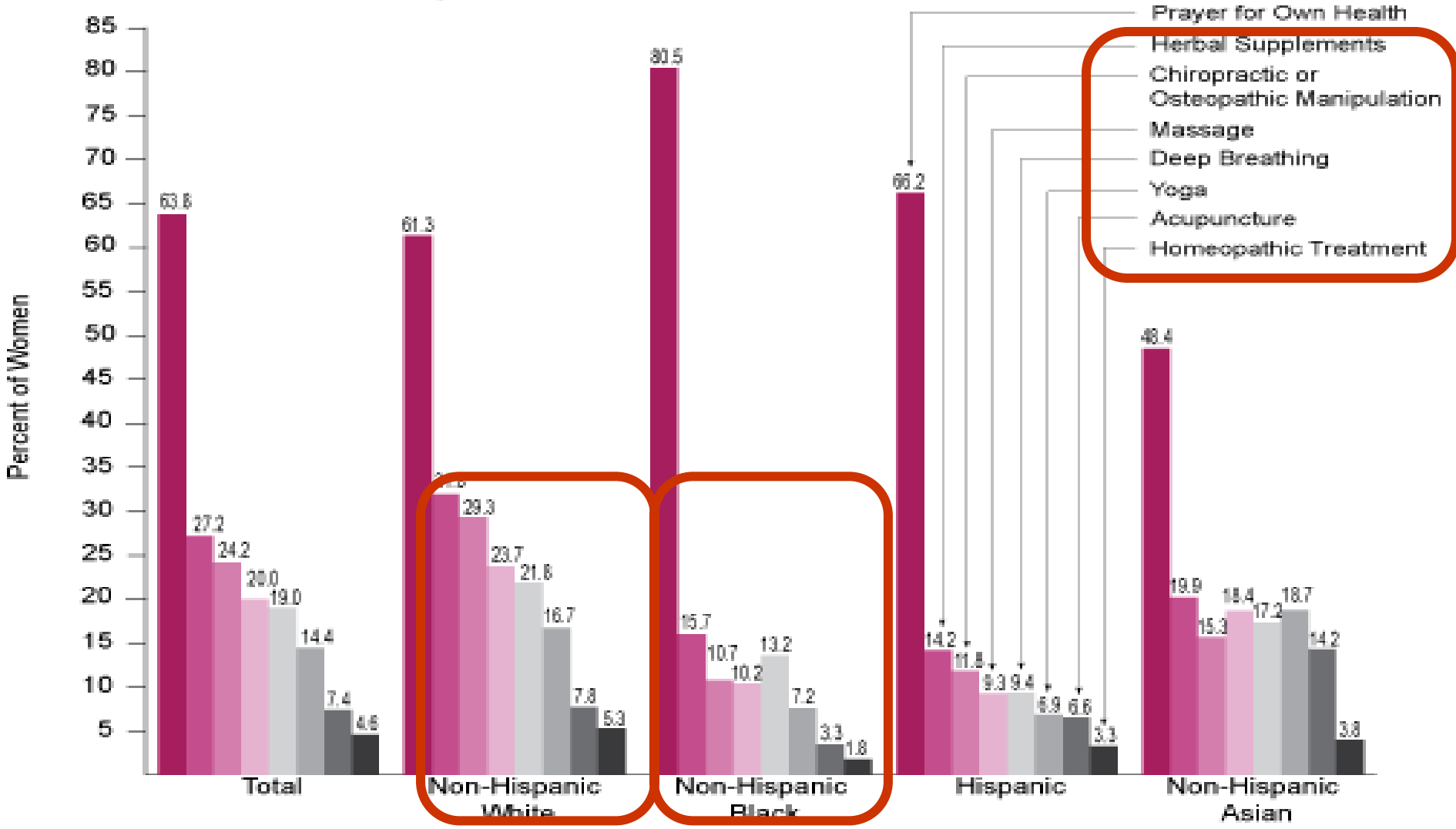
George et al Journal of Allergy and Clinical Immunology (2003) 111, I5; 967-973

- What personal health beliefs influence self-care decision-making?

- Integrative medicine (IM)/complementary and alternative medicine (CAM)
  - a group of diverse medical and healthcare systems, practices, and products that are not generally considered to be part of conventional medicine
- Folk care
  - remedies including prayer, healing touch or laying on of hands, charms, herbal teas or tinctures, magic rituals

Selected Complementary and Alternative Medicines Ever Used by Women Aged 18 and Older, by Race/Ethnicity* and Treatment Type, 2007

Source II.1: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey



The sample of Native Hawaiian/Pacific Islanders, American Indian/Alaska Natives, persons of more than one race, and persons of all other and unspecified races was too small to produce reliable results. Data are not age-adjusted.

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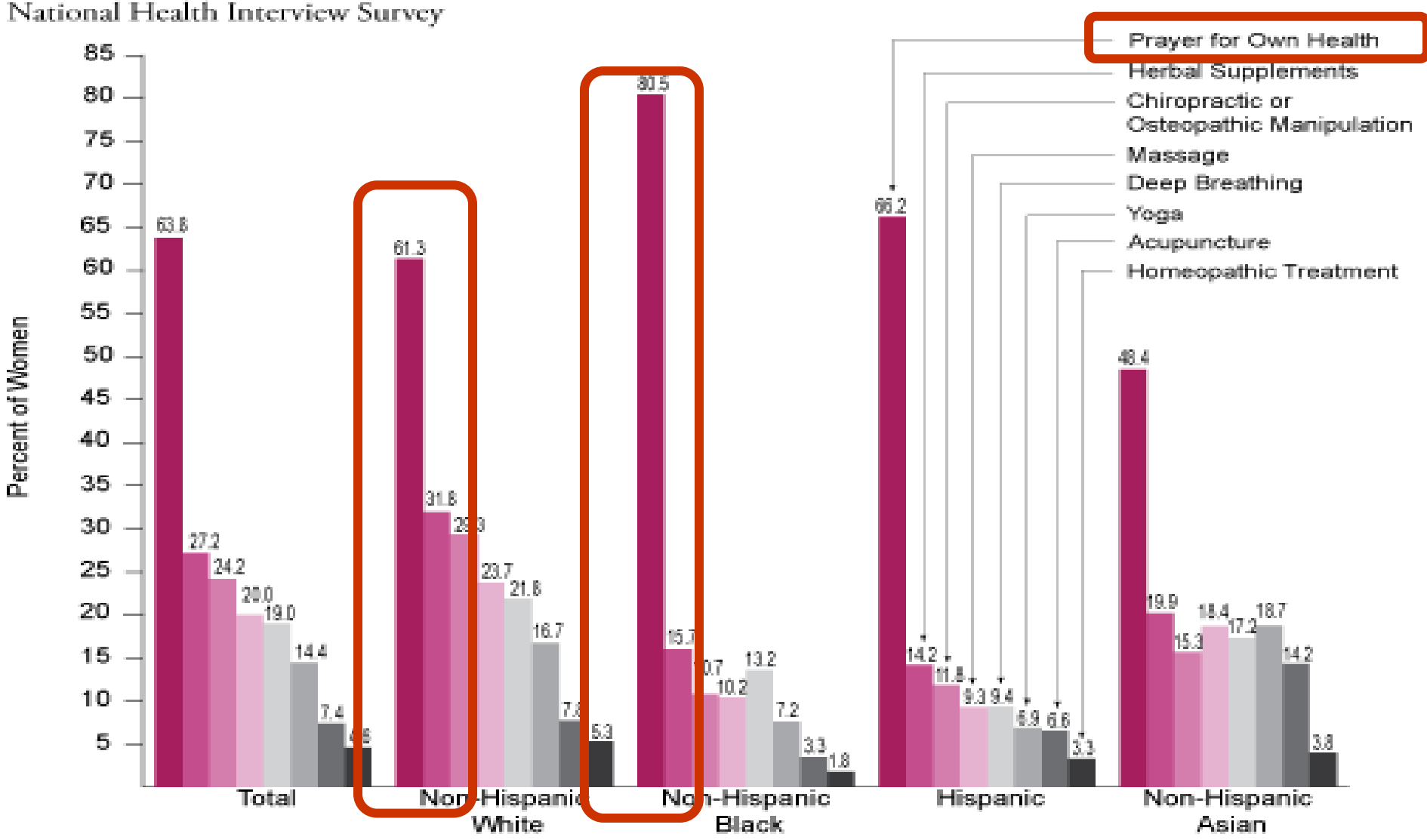

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Qualitative interviews

- 100% use of CAM/home remedy; 63% reported ICS non-adherence
- 52% used CAM before Rx for acute asthma at home
- Themes
  - Speed
  - Safety
  - Strength of integrating approaches
  - Allowed for tailored treatment

George et al. (2006). *Journal of General Internal Medicine, 21*, 1317-1324
George et al (2009) *Journal of Asthma 46,* 618-624

- What personal health beliefs influence clinical outcomes?

TABLE II. CAM-A* instrument items (n = 304)

Item	Item domain	Positive response, no. (%)
(Insert BRAND NAME ICS) controls my asthma	Positive ICS belief	250 (82)
Having air movement from a fan, air conditioner or open window helps my asthma	CAM endorsement	202 (66)
I need my (insert BRAND NAME ICS) every day	Positive ICS belief	227 (75)
It is important to me that I find a natural way to treat my asthma	CAM endorsement	128 (42)
Drinking water helps my asthma	CAM endorsement	128 (42)
I am the best judge of whether I need to take my (Insert BRAND NAME ICS)	Negative ICS belief	127 (42)
Steam or warm things on my chest helps my asthma	CAM endorsement	116 (38)
Praying, or having someone pray for me, helps my asthma	CAM endorsement	114 (37)
My asthma can get worse if I go out with a wet head	CAM endorsement	109 (36)
I make decisions about whether I need my (Insert BRAND NAME ICS) on a day-by-day dose-by-dose basis	Negative ICS belief	106 (35)
Drinking tea (herbal or regular) helps my asthma	CAM endorsement	99 (32)
I am afraid that I will build up a tolerance to (Insert BRAND NAME ICS)	Negative ICS belief	71 (23)
Drinking coffee helps my asthma	CAM endorsement	61 (20)
Using Vicks VapoRub helps my asthma	CAM endorsement	53 (17)
Doctors compensated for writing ICS prescriptions	Negative ICS belief	39 (13)
ICS causes cancer or organ damage	Negative ICS belief	35 (11)
ICS causes side effects	Negative ICS belief	33 (11)

George et al (2014).*Journal of Allergy and Clinical Immunology*,134, 252–59

TABLE III. Bivariate comparisons and multivariate logistic regression of factors associated with asthma control

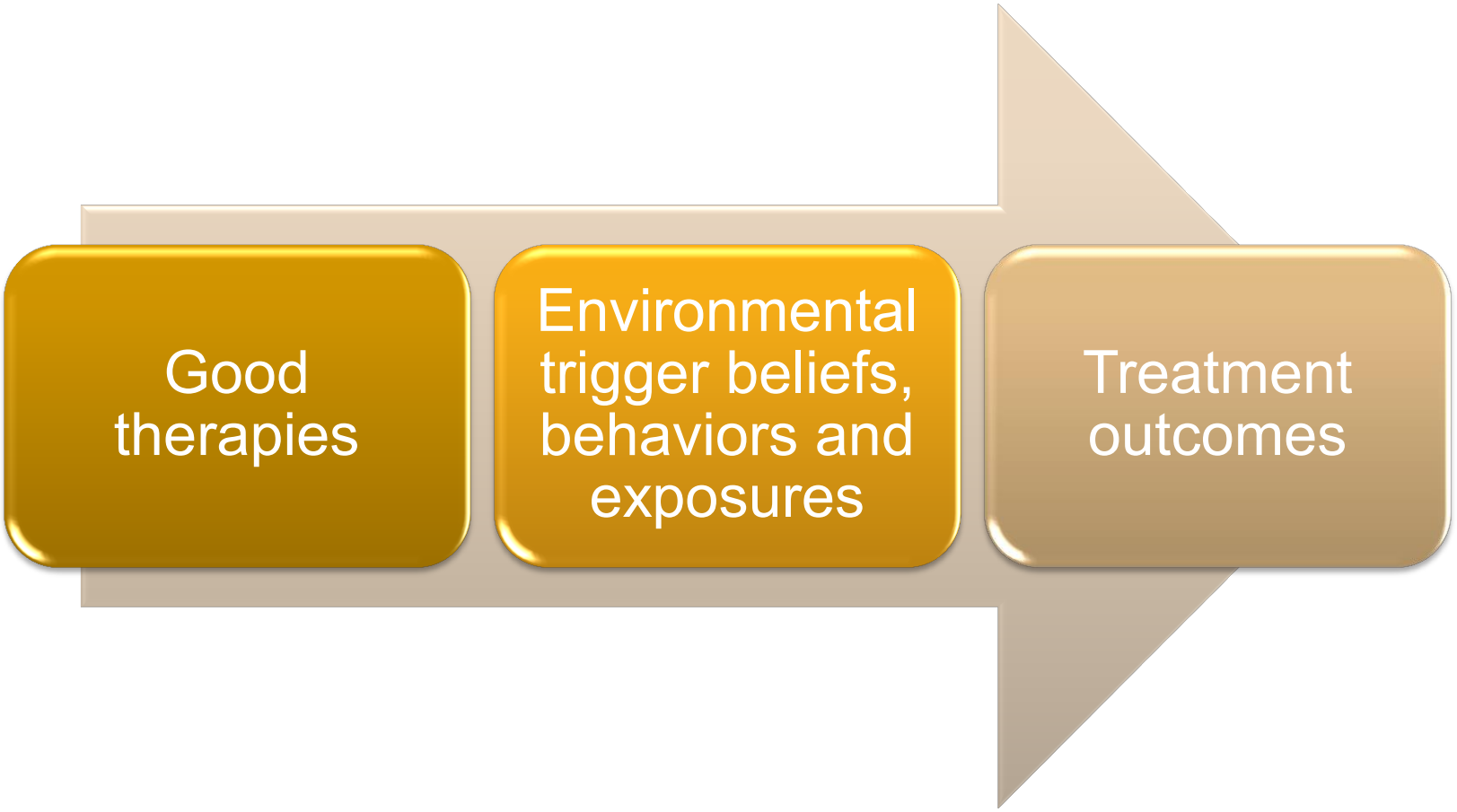
Characteristics	Bivariate comparison			Logistic regression†
	Controlled asthma (n = 97)	Uncontrolled asthma (n = 207)	*P* value	OR (95% CI), *P* value
Level of CAM endorsement, mean (SD)	2.9 (2.1)	3.5 (0.15)	**.032**	1.41 (1.1-2.31), **.04**
Level of ICS negative belief endorsement, mean (SD)	1.12 (1.19)	1.5 (1.33)	**.035**	1.4 (0.94-2.1), .099
Age (y), mean (SD)	48.1 (1.53)	50.5 (0.87)	.15	
Sex			.29	
Male	26 (27%)	44 (21%)		
Female	71 (73%)	163 (79%)		
Race			**.001**	.56
White	28 (29%)	20 (10%)		Referent
Black/African American	63 (65%)	174 (84%)		1.6 (0.55-4.63), .39
Other*	6 (6%)	13 (6%)		2.37 (0.43-12.9), .32
Marital status			.33	
Single	36 (37%)	99 (49%)		
Married	32 (34%)	50 (25%)		
Divorced/separated	19 (21%)	43 (21%)		
Widowed	8 (8%)	11 (5%)		
Occupation			.06	
Unemployed	30 (31%)	99 (49%)		
Manual/service	11 (11%)	27 (13%)		
Skilled professional	35 (36%)	36 (18%)		
Student	4 (4%)	6 (3%)		
Retired	12 (13%)	22 (11%)		
Other (chef, EMS, on disability)	5 (5%)	11 (6%)		
Highest educational level			**.001**	.011
Some high school	7 (7%)	46 (22%)		Referent
Completed high school/obtained GED/vocational training	31 (32%)	87 (42%)		0.44 (0.15-1.34), .17
Some college	23 (24%)	52 (25%)		0.32 (0.1-1.1), .07
College graduate/postgraduate	36 (37%)	22 (11%)		0.09 (0.02-0.38), **.048**

Transcripts showed CAM-A changed conversation

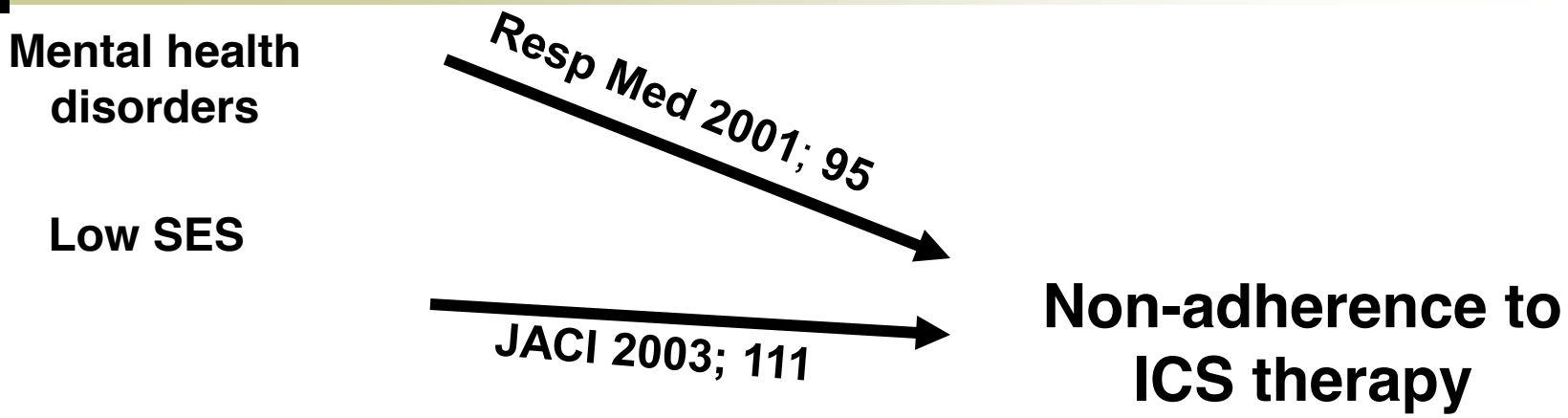
TABLE IV. Description of clinic visits (n = 32*)

	Saw CAM-A results		Did not see CAM-A results		
	Mean (SD)	Range	Mean (SD)	Range	*P* value (*t* test)
Length of visit	23.05 (9.14)	12.53-50.04	23.36 (9.04)	9.23-38.23	.93
Time when provider is talking	9.29 (3.57)	4.03-12.3	9.33 (3.57)	3.21-16.56	.97
Time when patient is talking	7.63 (3.94)	3.08-17.47	7.69 (3.9)	1.45-14.18	.96
Time of silence	6.87 (8.26)	1.3-29.08	5.14 (3.19)	0.25-12.04	.43
No. of interruptions made by provider	8.21 (8.15)	0-30	7.72 (5.89)	1-23	.84
No. of interruptions made by patient	7.71 (7.48)	0-23	7.89 (6.82)	0-24	.95

*The recording of 1 primary care visit was corrupted and not included in the interview analysis.

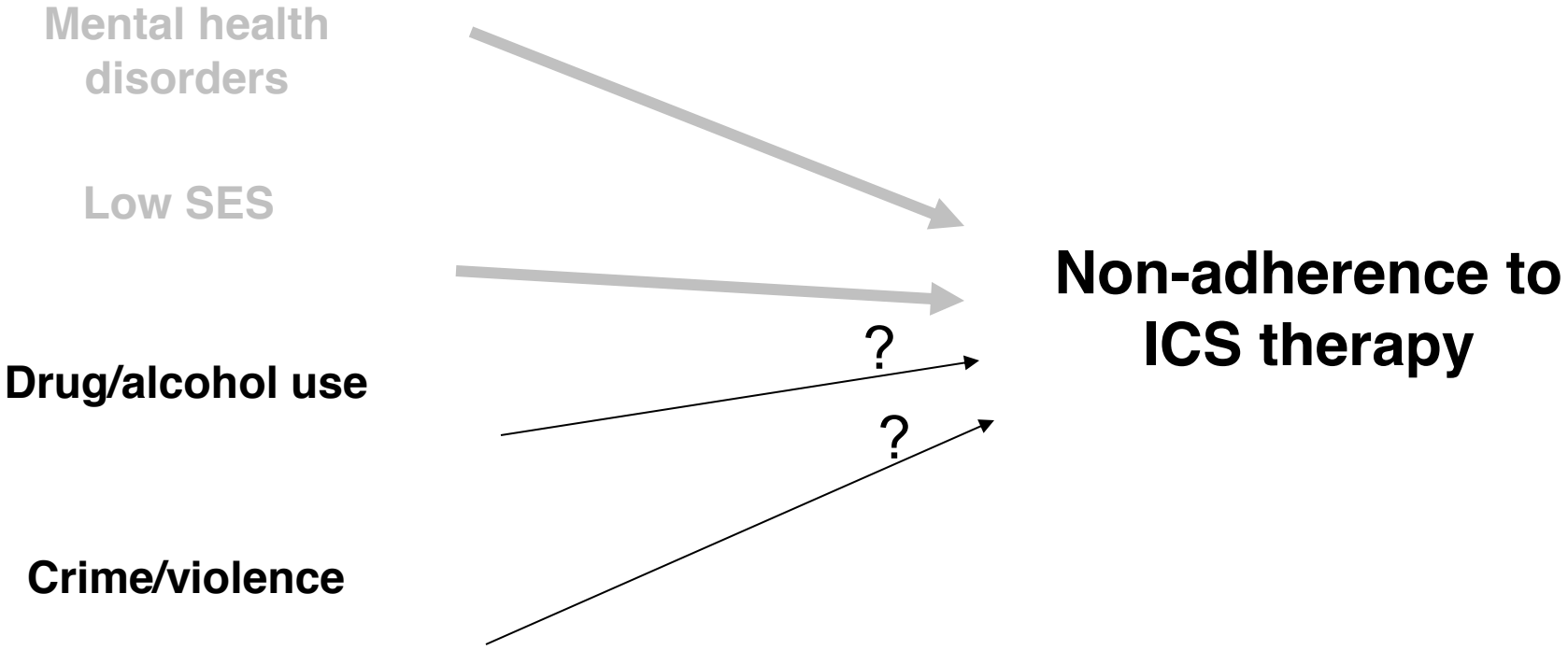

Good therapies
Environmental trigger beliefs, behaviors and exposures
Treatment outcomes

Conceptual Model



M George, A Bilderback, CS Rand, KA Riekert, SJ Bartlett, JA Krishnan
Oral abstract ATS 2006

Conceptual Model



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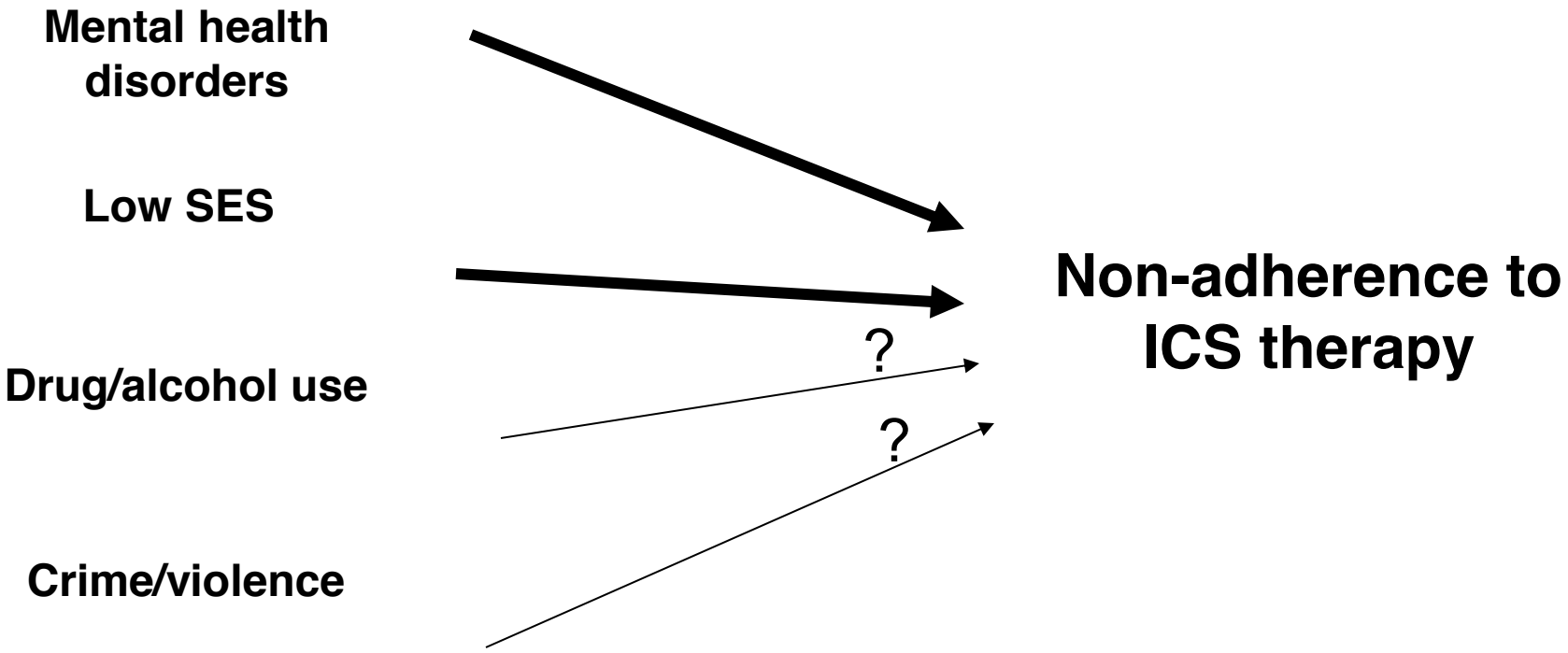


<u>Hypothesis:</u> Presence of one or more of these stressors increase the risk of non-adherence to ICS therapy

Prospective cohort study

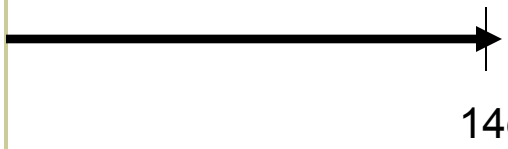
Adults hospitalized for asthma

Baseline visit on day of discharge

Questionnaire to assess psychosocial stressors

Free ICS via MDI
2 puffs BID
Equipped with electronic monitor

1-on-1 education to confirm understanding and appropriate inhaler technique



Follow-up visit

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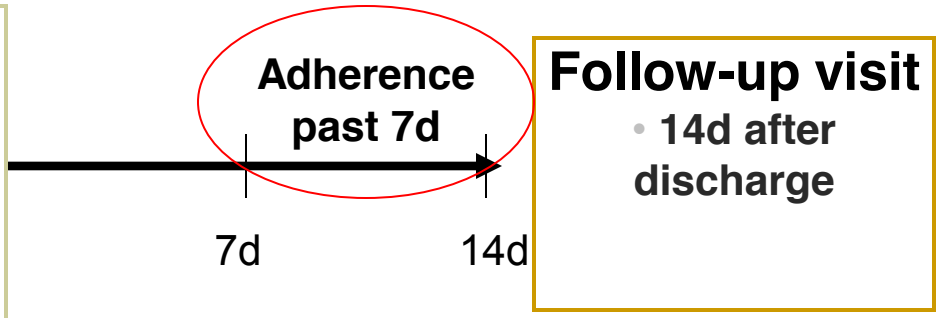
Prospective cohort study

Adults hospitalized for asthma

- **Baseline visit on day of discharge**
  - **Questionnaire to assess psychosocial stressors**
  - **Free ICS via MDI**
    - **2 puffs BID**
      - **Equipped with electronic monitor**
  - **1-on-1 education to confirm understanding and appropriate inhaler technique**



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Eligibility criteria

Inclusion

- Age ≥ 18 years
- Physician diagnosis of asthma exacerbation

Exclusion

- Another chronic respiratory disorder
- Contraindication to ICS
- Previous participant

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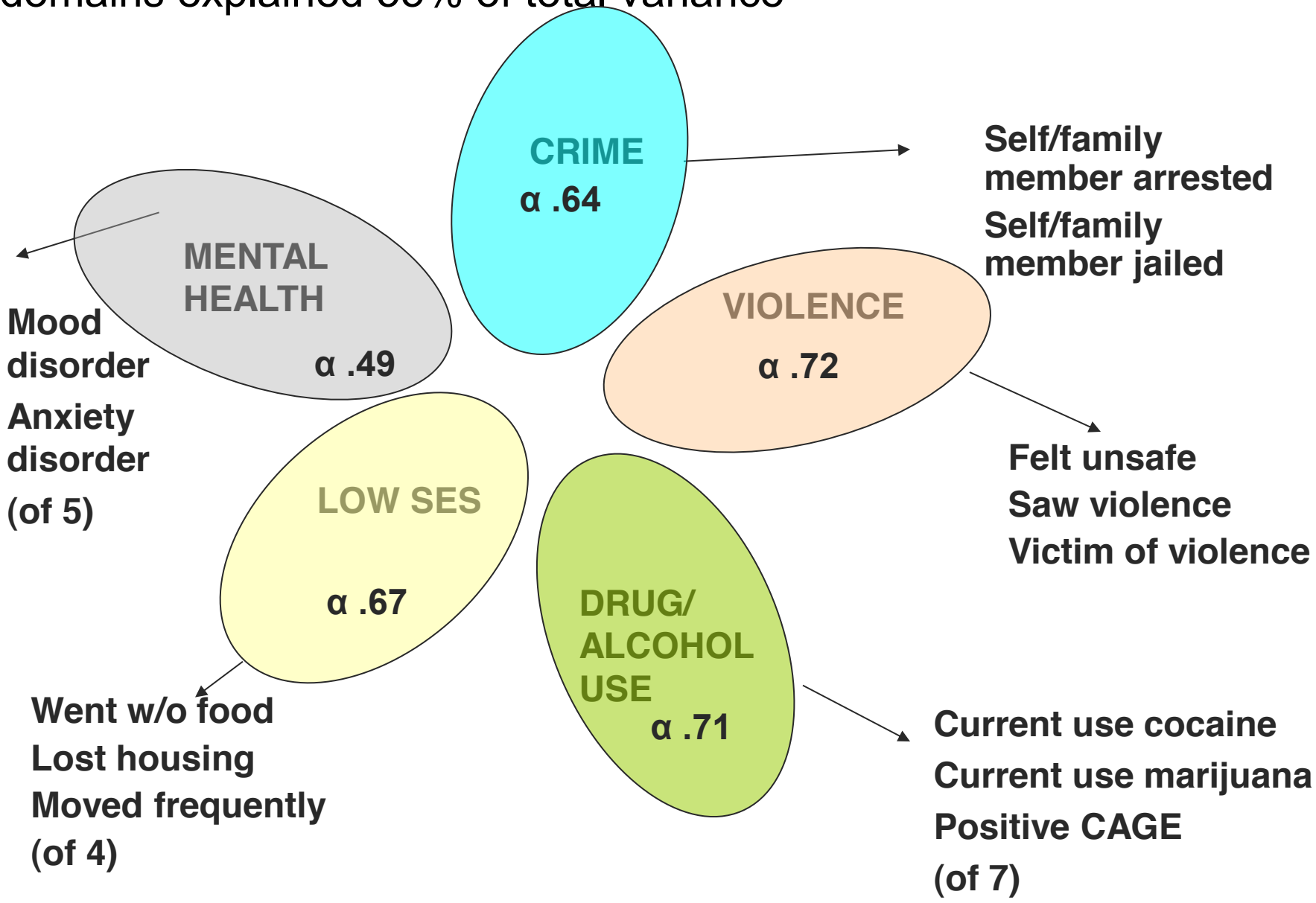
Psychosocial stressors (N=21)

- **Mental health disorders (N=5 items)**
  - Mood disorder
  - Anxiety disorder
  - Schizophrenia or psychosis
  - ADHD/ADD/hyperreactivity
  - Other
- **Low SES (N=4 items)**
  - Went w/o food
  - Phone/electric/gas turned off
  - Lost housing
  - Moved frequently
- **Drug/alcohol use (N=7 items)**
  - Current use cocaine
  - Current use heroin
  - Current use marijuana
  - CAGE
    - Cut down on alcohol
    - Annoyed by criticism
    - Guilty
    - Eye-opener
- **Crime/violence (N=5 items)**
  - Felt unsafe
  - Saw violence
  - Victim of violence
  - Self/family member arrested
  - Self/family member jailed

Factor analysis

5 domains explained 55% of total variance



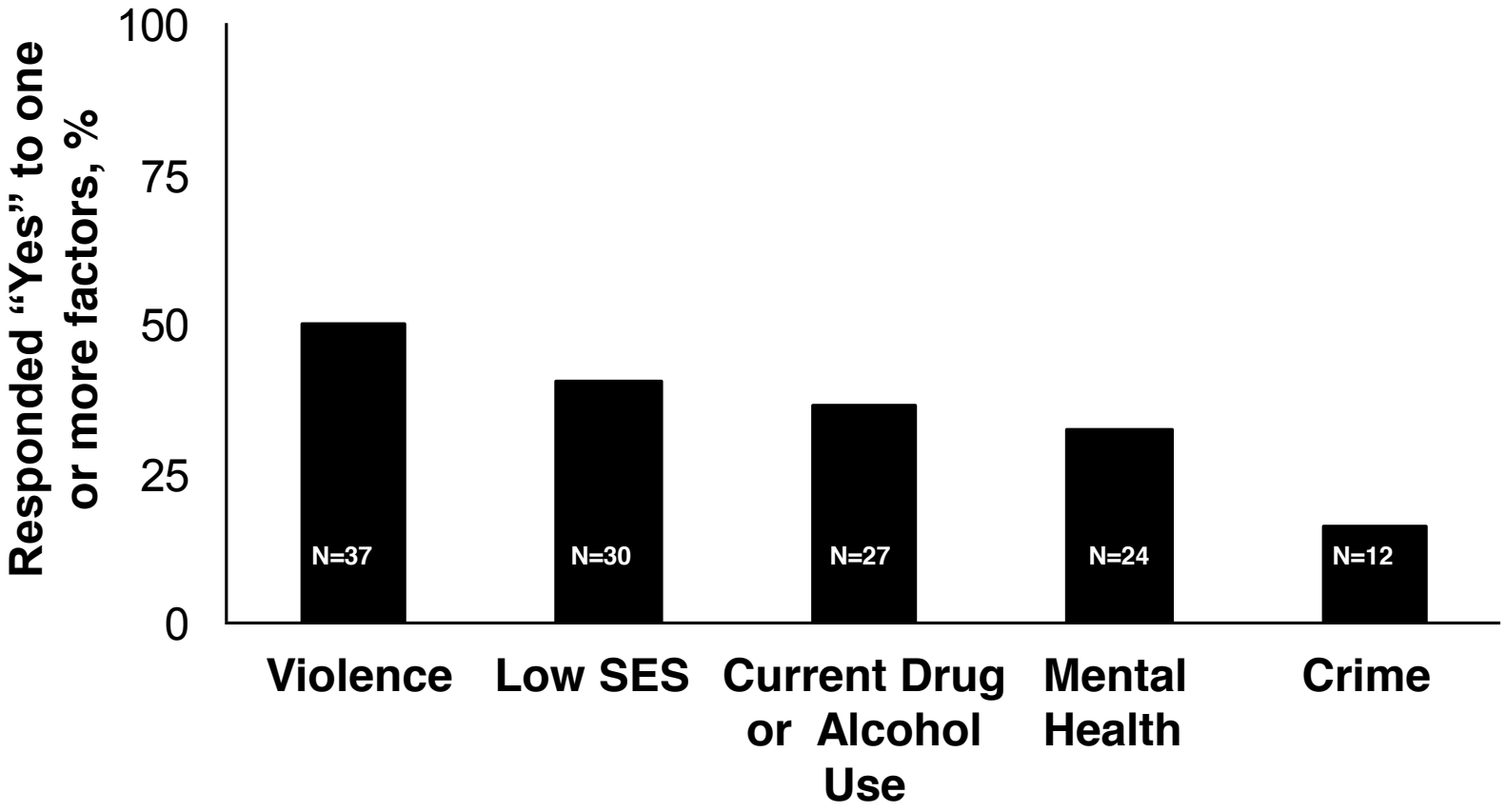
Mean adherence past 7 days

- Measures
  - **Self-report number of ICS uses each day**
  - **Doser™**
- Mean adherence
  - **Truncated use each day to 4 puffs (100% adherence)**
  - **Use each day/4 X 100%**
    - **Mean over past 7 days**
- Non-adherence
  - **Adherence < 50% past 7d**
    - **Associated with worsening asthma symptom control**
    - **(AJRCCM 2004; 170:1281-5)**

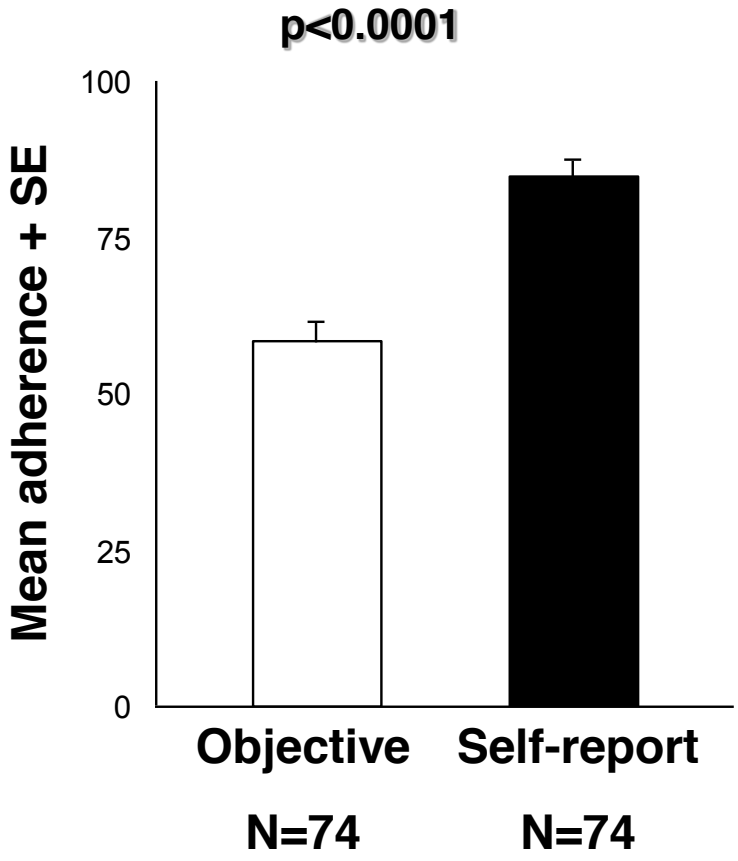
Baseline characteristics, N = 74

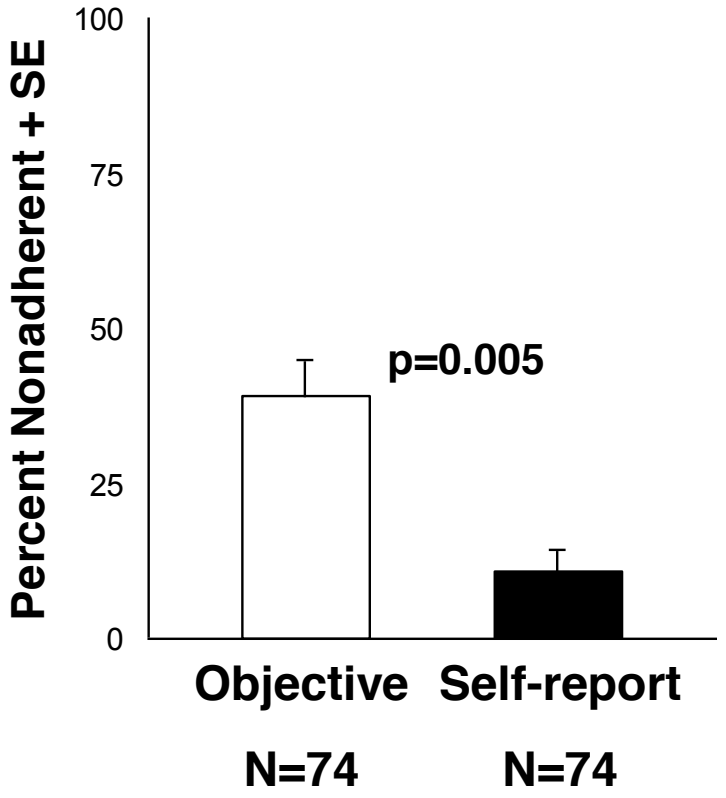
Age (yrs), mean (SD)	45 (11)
Women, n (%)	45 (65)
Race/ethnicity, n (%)	
African-American	57 (77)
White	15 (20)
Exacerbations past 12 mo, n (%)	
Hospitalization	41 (62)
Intubation ever	30 (40)

Psychosocial stressors

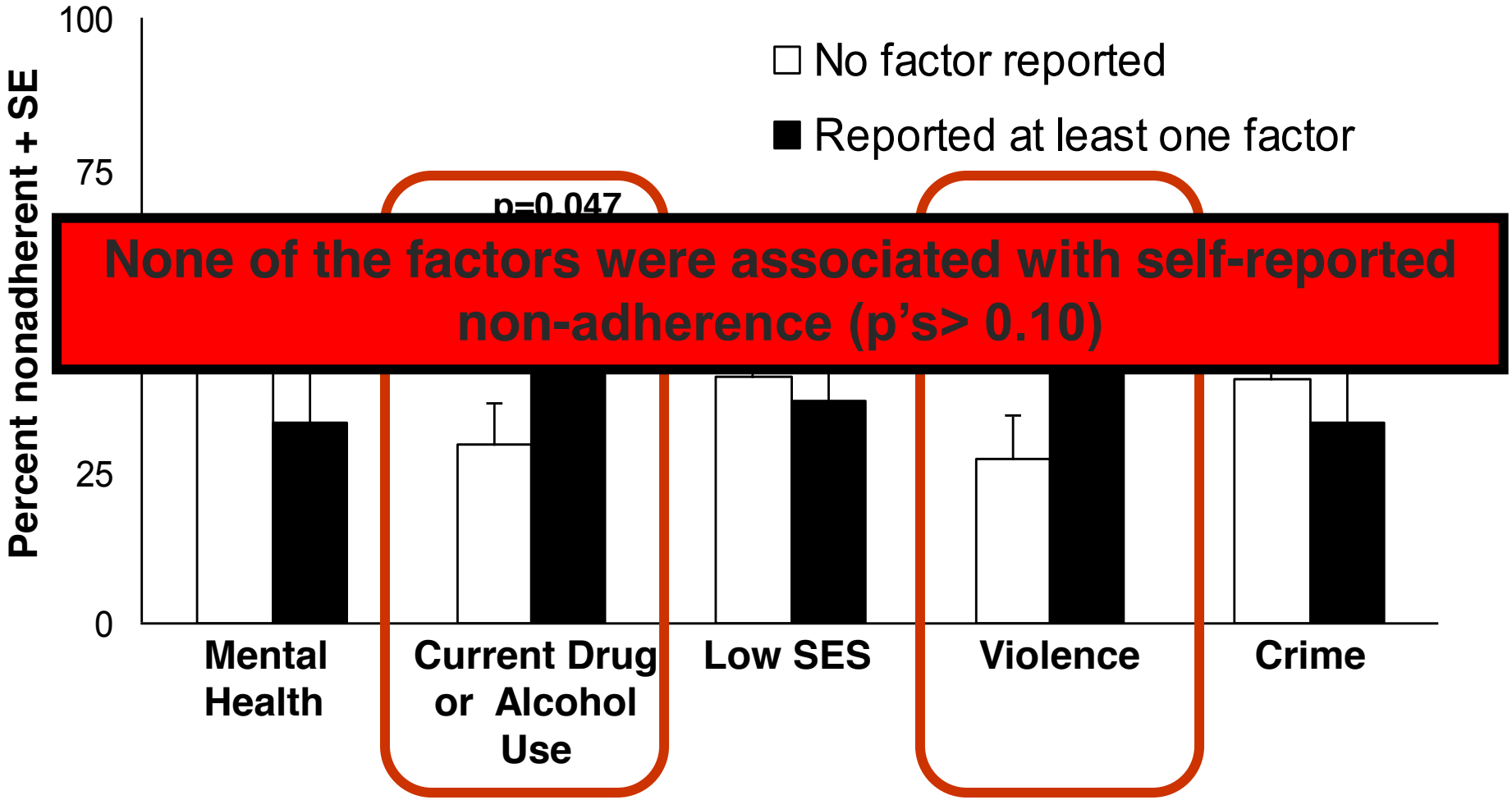


Adherence to ICS past 7d

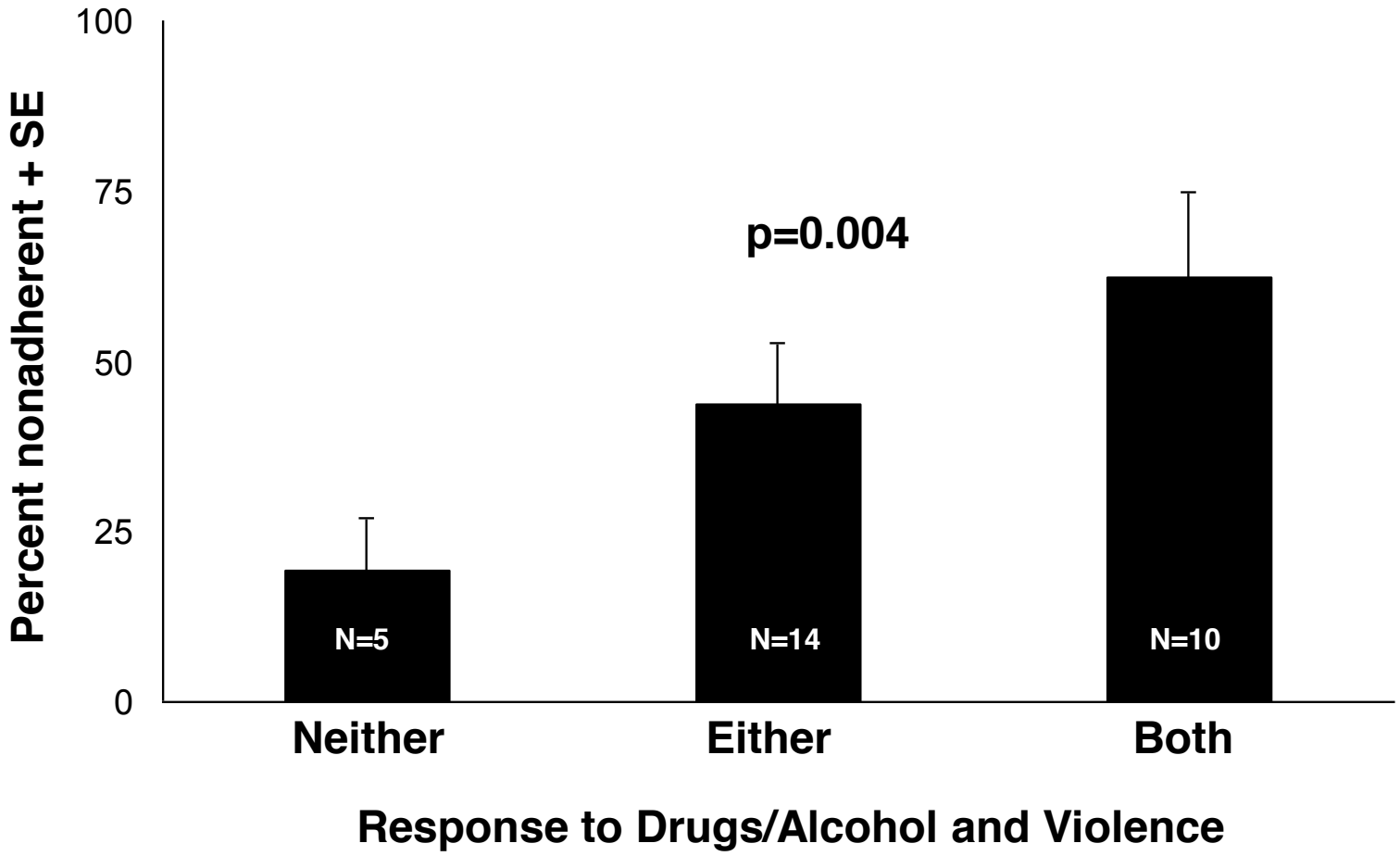




Psychosocial stressors and objectively measured non-adherence



Drug/alcohol use and/or violence



Conclusion

- Current drug/alcohol use identifies subset at high risk for non-adherence to ICS therapy after hospital discharge
  - Violence may identify separate subgroup

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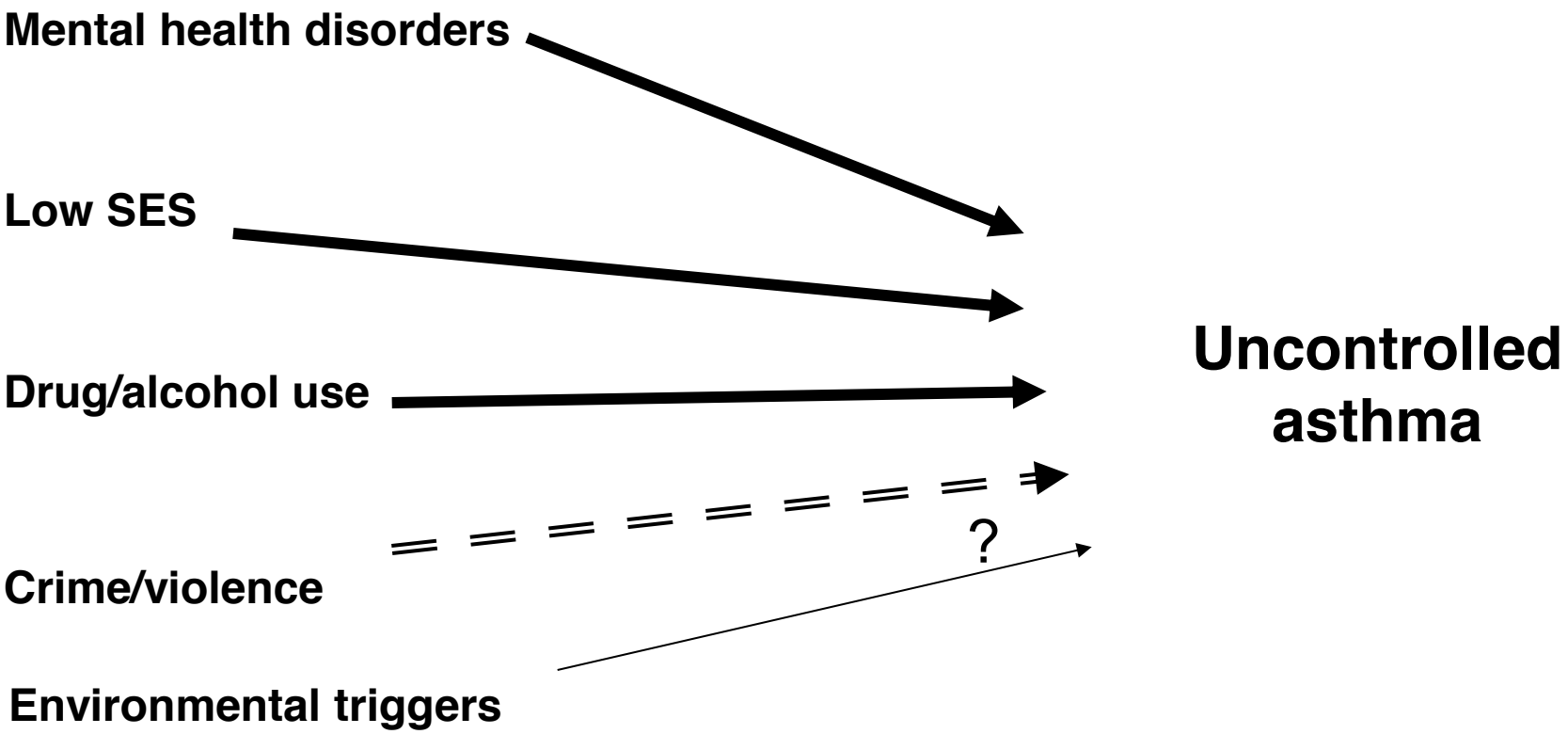
Oral abstract ATS 2006

Conceptual Model



QI project

- To evaluate the effectiveness of one-on-one tailored education and low literacy remediation resources we examined caregiver's recall of their child's skin test results and the accuracy of planned remediation at the first visit after their child's skin testing was performed
- A modified Q-sort was used to determine the knowledge of the recommended remediation

Townsend, Corry, Quigley & George J Asthma 2012, 49; 83-89

TABLE 1.—Characteristics of the caregivers ($N = 5$).

Mean age (range)	33.6 (30–38)
Gender (%)	
Female	100
Racial/ethnicity (%)	
African American	100
Educational attainment (%)	
Some high school	1 (20)
High school or GED	1 (20)
Some college	1 (20)
College graduate	1 (20)
Post-graduate	1 (20)
Insurance (%)	
Medicaid	4 (80)
Health maintenance organization	1 (20)
Household income (%)	
Disability	1 (20)
<$10,000	2 (40)
$20,000–29,000	1 (20)
>$100,000	1 (20)
Number of individuals in household (mean)[a]	3
Marital status (%)	
Single	4 (80)
Separated	1 (20)
Pack years (mean)	0.2

Recall accuracy

Allergen	Type	Caregiver report	Chart report
Subject 1			
Animal dander			
	Unspecified	☑	
	Cat		☑
	Dog		
Cockroach			
Rodent pests			
Dust mites		☑	☑
Mold		☑	
Pollens			
	Unspecified	☑	
	Tree	☑	☑
	Weed		☑
	Grass	☑	☑
Subject 2			

Recall accuracy

Subject 2		Caregiver report	Chart report
Animal dander			
	Unspecified		
	Cat		
	Dog		
Cockroach			
Rodent pests			
Dust mites			☑
Mold		☑	N/T
Pollens			
	Unspecified		
	Tree		
	Weed		
	Grass		

Modified Q-sort

- 52 cards
  - 23 for dust mites
  - 10 for mold
  - 7 for rodents
  - 6 for cockroaches
  - 4 for pets with fur or feathers
  - 3 each for cat and dog
  - 10 for indoor irritants
- Unlike conventional Q-sorts, we used picture cards
- Pictures reflected remediation recommendations per EPR-3

Q-sort pilot

- Card-sorting activity
  - Cards are created and sorted into 3 piles, ranked/scored

TABLE 4.—Q-card sort summary.

	Not very important to controlling my child's allergic asthma	Unsure if important to controlling my child's allergic asthma	Very important to controlling my child's allergic asthma
Subject 1	17	3	32
Subject 2	9	5	38
Subject 3	12	3	37
Subject 4	8	9	35
Subject 5	13	2	37

Modified Q-sort

Modified Q sort

- No caregiver's recall of skin test results was concordant with the actual results for type or number of allergens
  - 33–100% for cat dander
  - 40–70% for molds
  - 70–87% for dust mites
  - 100% for the one dog allergic child

Townsend, Corry, Quigley & George J Asthma 49; 2012,83-89

Recall accuracy and Q-sort pilot

- Having a single positive test did not translate to having increased accuracy
  - Subjects with a single + skin test demonstrated 66–70% overall accuracy
  - Subjects with multiple allergens had an overall accuracy of 77–90%
- This was NOT a criticism of the caregivers but of the asthma education they received

Allergic asthma education

- 4-page handout on remediation (6.5 grade level)
- 4-page brochure on asthma (8.2 grade level)
- 6-page allergic rhinitis pamphlet (9.2 grade level)
  - The caregivers described these materials as overwhelming in length and content
  - No caregiver read all the materials or recalled having received one-on-one tailored education on test results or remediation

Allergic asthma education

- 1-on-1 with the office nurse after the physician review of the skin test results
  - 4-page handout on remediation (6.5 grade level)
  - 4-page brochure on asthma (8.2 grade level)
  - 6-page allergic rhinitis pamphlet (9.2 grade level)

Qualitative interviews

- The caregivers described these materials as overwhelming in length and content
- No caregiver read all the materials or recalled having received one-on-one tailored education on test results or remediation

Qualitative interviews-cont.

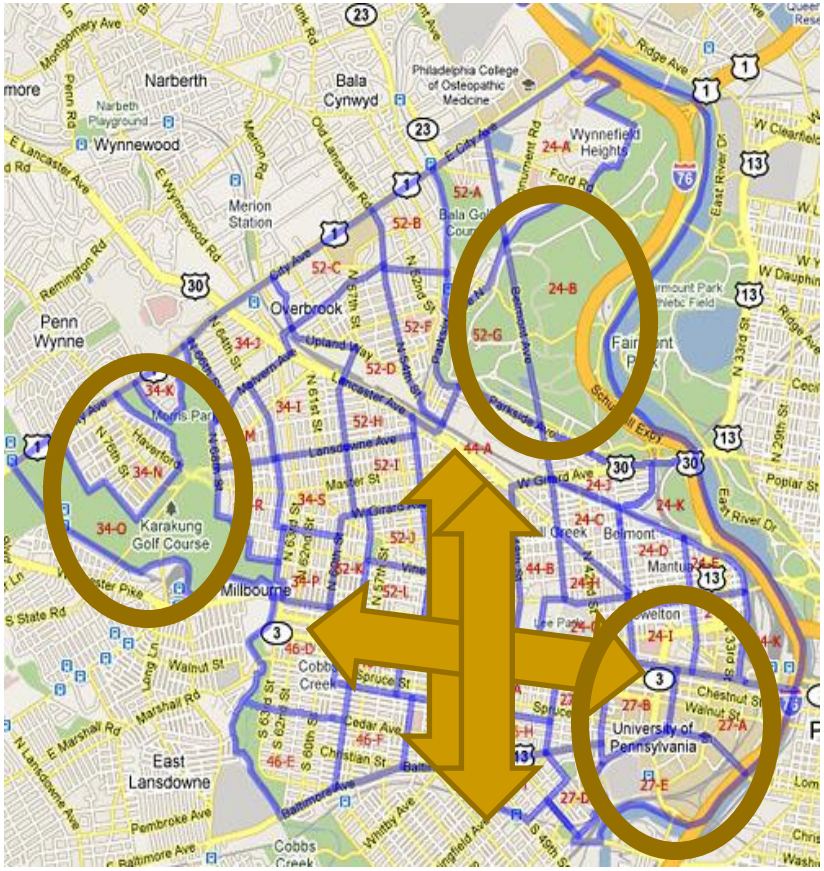
- Identified barriers to remediation
  - Cost
  - Inability to implement interventions at relatives' homes
  - Rodent infestation after cat removal
  - A preference for area rugs over hardwood floors
  - Lack of responsiveness from landlords
    - wall-to-wall carpeting that was never cleaned
    - chronic plumbing leaks
    - indoor mold so severe that mushrooms sprouted from the carpeting in an unused bedroom
    - tenants' association denied request for removal of wall-to-wall

Mixed methods project

- 35 adults with persistent asthma
- Residing in the 5 Philadelphia zip codes with highest asthma prevalence, morbidity and mortality
- Three phases
  - Qualitative
  - Freelisting and salience scores
  - GIS mapping

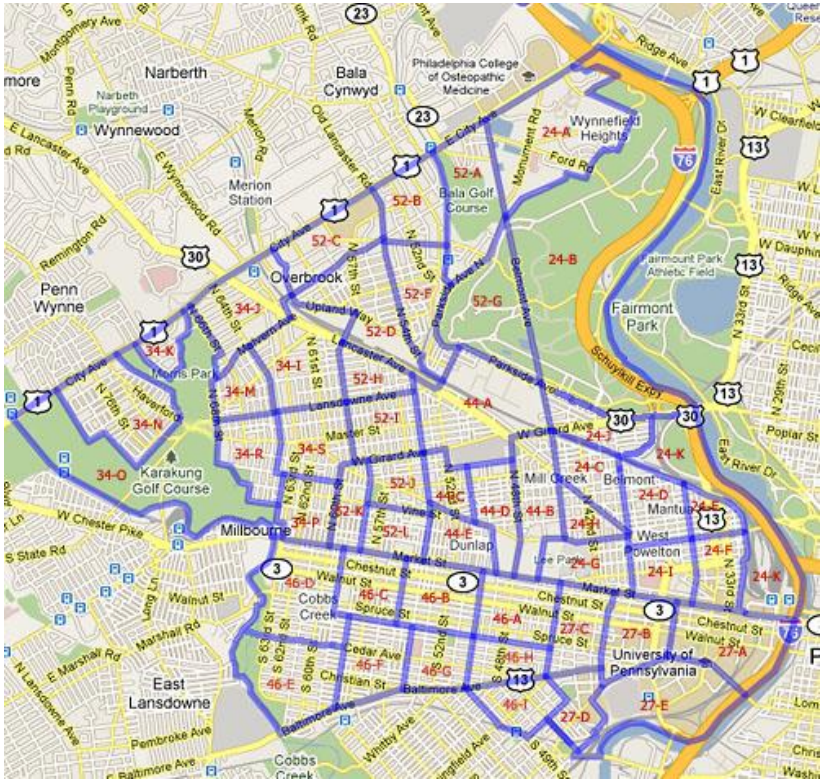
George et al., (2014). *Journal of Asthma*, *52*, 98-104

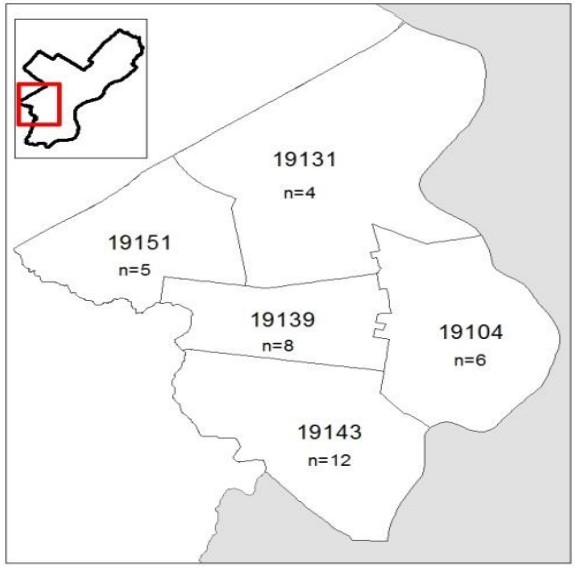
West Philadelphia



- Two main corridors
- South western quadrant is more developed and has lower crime rates
- The north western and north eastern portions, also low risk, are large urban parks containing no residences
- The 52nd Street corridor is a dividing line; along this line and west of this line neighborhoods have higher crime rates and poorer housing stock

West Philadelphia





West Philadelphia

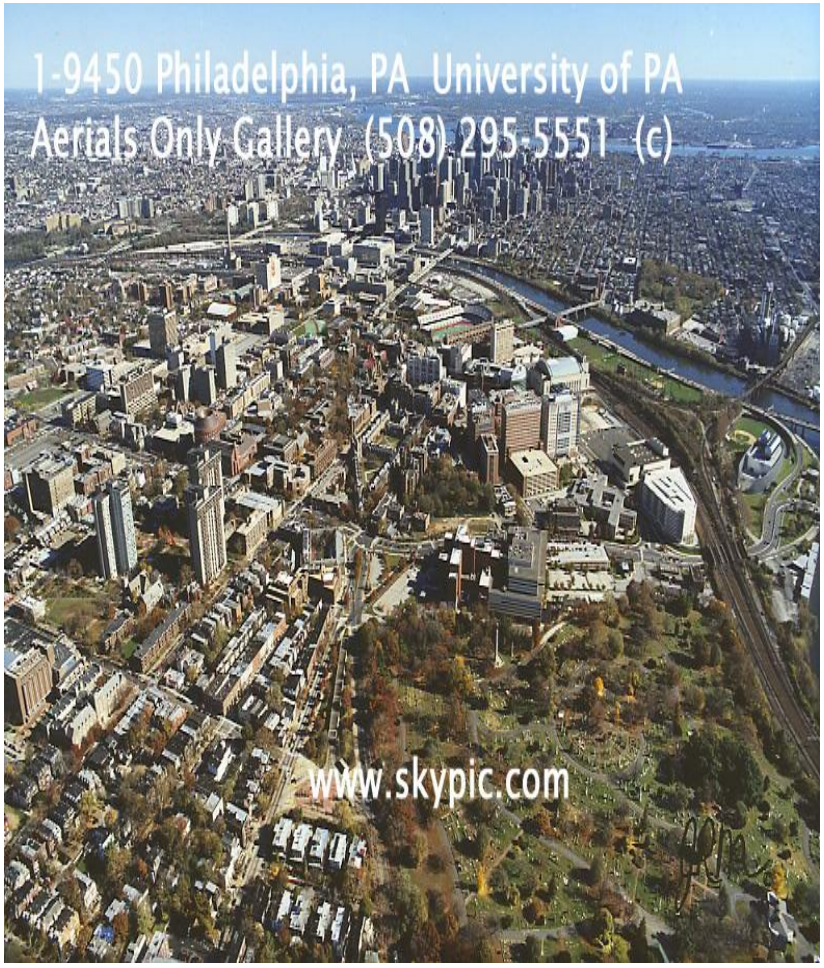


Table 2. Subject characteristics.

Characteristics	$N = 35$	Controlled $n = 10$	Uncontrolled $n = 25$
Age mean (SD)	55 (11)	61 (15)	53 (8)
Gender			
Male	10	2	8
Female	25	8	17
Race			
Black/African American	33	9	23
White[a]	2	1	2
Highest educational level			
< High school	7	1	6
Completed high school	11	3	8
Some college	11	4	7
College/post graduate	6	2	4
Insurance			
Medicaid	14	2	12
Medicare/SSI	7	4	3
Medicaid & Medicare	8	3	5
Commercial	6	1	5
BMI			
Normal weight	6	1	5
Overweight	7	5	2
Obese	22	4	18

[a]One subject reported her race as White/Native American.

George, Keddem, Barg, Greene, Cavanaugh, & Glanz. (2014) *Journal of Asthma*, *52*, 98-104.

Qualitative interviews

- Compared to participants with controlled asthma, uncontrolled participants reported
  - overusing SABAs,
  - underusing ICS,
  - rejecting medical and trigger remediation advice,
  - having more negative experiences with primary care providers,
  - and preferring more unconventional strategies to prevent or manage asthma symptoms

George et al . (2014). *Journal of Asthma, 52*, 98-104.

Table 3. Alternative symptom management.

CAM-A items	Controlled	Uncontrolled
Relaxation/stress reduction exercises	✓	✓
Deep breathing	✓	✓
Adequate rest	✓	✓
Limit activity/avoid exercise	✓	✓
Prayer/church attendance	✓	✓
Fresh air/air movement from fan or air conditioner	✓	✓
Water	✓	✓
Coffee	✓	✓
Use air cleaners	✓	
Move above tree canopy	✓	
Use HEPA filters		✓
Hyperventilate		✓
Healthy diet		✓
Use large ''party'' tent to keep leaves and pollens from settling in backyard		✓
Use ceiling fan or in-window fan to reduce pollen levels in the home		✓
Distraction		✓
Use facemask		✓
Shower		✓
Hall's lozenges		✓
Avoid spicy foods		✓
Cold compresses/cold from freezer		✓
Steam		✓
Houseplants to enrich oxygen		✓
Use ''green'' household products		✓

George et al . (2014). *Journal of Asthma, 52*, 98-104

Conflict with remediation advice

I could get rid of this cat that's here for the mice, because I'm allergic to cat and dog dander, but I need a cat because we have mice.

They're in the corner house, and you know there's all these little holes somewhere and they do get in here, I ain't even gonna' lie.

And this cat has to be here and we just got this cat. I came home from the hospital- there was a cat here.

So if we didn't have to have a cat that would be a lot better as well.

He's starting to grow on me.

Unconventional beliefs about exposure

But I love my dog, she's my baby.

I have a cat too…the reason why I have the cat is because my youngest granddaughter has asthma – the one that lives in the house with me has asthma – and they have to be – I don't know what it is with them, when there's not an animal in the house their asthma is worse. It triggers.

I guess because the dog, they're always – the dog is always licking them in the face. I don't know.

But long as the dog is there she's okay…

Freelisting

- Semi-structured interviewing technique
- Each respondent is asked to list all the words they would use to describe a specific construct
- These responses are combined across all participants in the group to identify all the salient constructs
- Responses are transcribed, cleaned, and then analyzed using Anthropac after combining synonyms and standardizing categories of responses
- Anthropac sorts the lists by item frequency and generates a salience index (Smith's S)
  - $S = ((S\ (L2R_j + 1))/L)/N$ where L is the length of each list, R_j is the rank of item J in the list, and N is the number of lists in the sample

Freelisting

- What makes your asthma act up?
- What makes it hard to care for your asthma?
- What makes it difficult to control your asthma?
- What do you do to keep healthy?
- What do you do to control your asthma?

Table 1. Freelisting responses for all participants, sorted by salience score

Asthma Act Up	S	Hard to Care For	S	Difficult to Keep Healthy	S	Keep Healthy	S	To Control Asthma	S
dirt/dust	0.344	not having medicine	0.378	emotions	0.289	right diet	0.53	medicine	0.671
weather	0.235	stress	0.163	making the right food choices	0.243	physical activity	0.444	medical care	0.201
animals	0.221	weather	0.162	not active	0.221	take medicine	0.293	family	0.179
pollen	0.207	physical ailments	0.132	smoking	0.167	drink water	0.183	diet	0.176
foods	0.174	dirt/dust	0.115	dirt	0.112	sleep/rest	0.089	watch the people I'm around	0.126
emotions	0.163	not following directions	0.114	not taking medicine	0.095	doctor	0.081	plenty of water	0.116
scents/smells	0.162	not enough physical exercise	0.11	environmental triggers	0.083	faith	0.068	exercise/physical activity	0.108
perfume	0.129	environmental triggers	0.085	scents	0.076	avoid triggers	0.06	avoid triggers	0.093
grass	0.125	forgetting medicine	0.085	alcohol	0.073	keep house and yard clean	0.06	reduce stress	0.085
chemicals	0.116	not using medicine	0.066	weather/temperature	0.07	don't overexert	0.058	not overexerting	0.084
smoking	0.112	too much physical exercise	0.06	mental discipline	0.069	hobbies	0.056	avoid animals	0.076
temperatures	0.099	right diet	0.055	animals	0.054	avoid animals	0.054	clean air	0.069
physical activity	0.092	animals	0.053	poor sleep/fatigue	0.053	avoid environmental triggers	0.052	avoid scents	0.053
allergies	0.088	smells	0.05	physical exertion	0.04	no smoking	0.046	happiness	0.053
colds	0.079	chores/daily life	0.048	weight	0.039	avoid dirt/dust	0.044	environment/surroundings	0.051
smoke/burning	0.076	job	0.042	obligations/work	0.034	avoid weather triggers	0.04	cleanliness	0.05
environment	0.045	money	0.034	being in public places	0.029	avoid smells	0.039	schedule	0.049
car exhaust	0.041	grass	0.029	shortness of breath	0.029	healthy weight	0.037	take care of general health	0.045
laying on back in bed	0.019	talking	0.028	back pain, spasm	0.02	avoid alcohol/drugs	0.036	friends	0.045
cleaning products	0.017	mental health	0.024	mental health/depression	0.013	be with family	0.031	physical situation	0.035
shortness of breath	0.017	barbecue/charcoal	0.015	not keeping doctors' appointments	0.01	take vitamins	0.026	knowledge	0.028
not taking medicine	0.01	get too bad	0.015	cold/fever	0.009	interact with people	0.023	control temperatures	0.025
lack of sleep	0.009	no water	0.015			good hygiene	0.023	faith	0.023
not having medicine	0.006	crowds	0.01			breathing exercises	0.017	going out	0.022
hypertension	0.005	dirty water	0.006			avoid stress	0.016	good hygiene	0.016
traveling	0.003	going to er	0.006			control asthma	0.016	do as much as I can	0.011
		heat	0.004			general cleanliness	0.015	volunteer work	0.01
		makeup	0.004			foot care	0.015	not thinking about asthma	0.006
		newspaper ink	0.002			keep busy	0.014	shoes	0.005
						take care of myself	0.009	phone	0.003

List of all the things you can think of that make it hard to take care of your asthma.

not having medicine

stress

weather

physical ailments

dirt/dust

not following directions

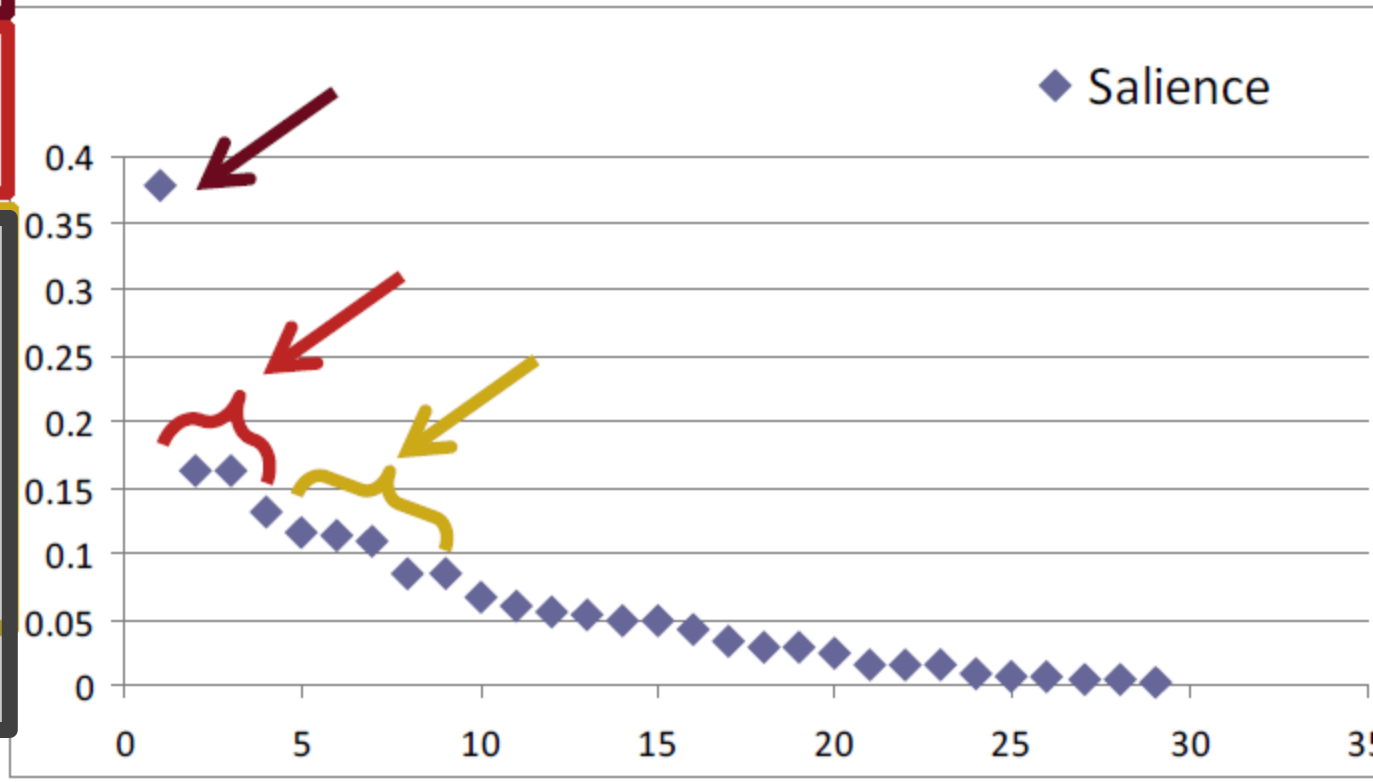
not enough physical exercise

environmental triggers

forgetting medicine

not using medicine

too much physical exercise



Keddem,. Barg, Glanz K. Jackson, Green,. & Ge

Freelisting

- Calculated in the total sample and by subgroup
  - Controlled vs. uncontrolled asthma
  - BMI
  - Age
  - Zip code
  - Education
  - Gender

Keddem,. Barg, Glanz K. Jackson, Green,. & George
Social Science & Medicine 2015 Under review

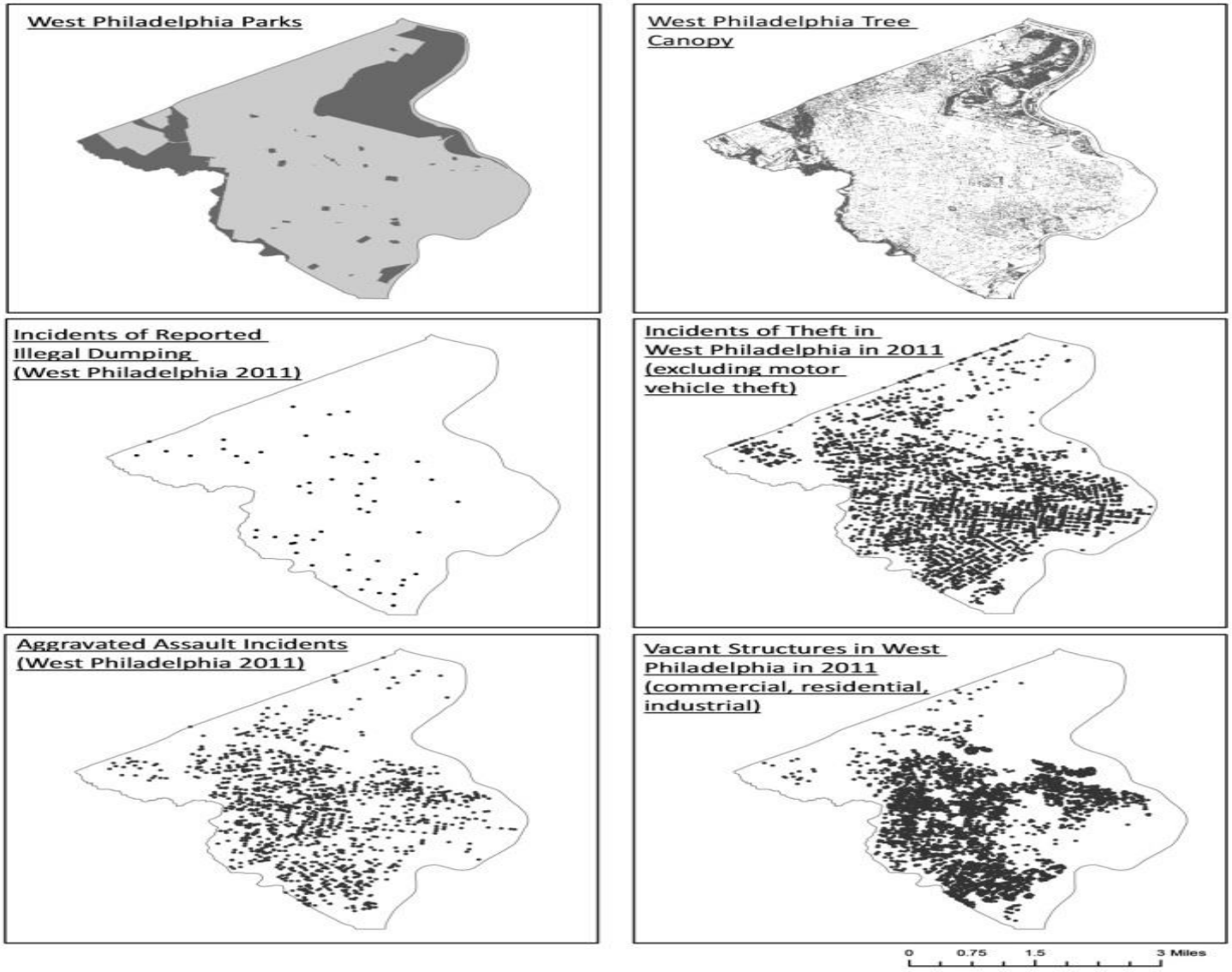
GIS mapping

- Vacant property and illegal dumping were selected as proxy measures of neighborhood irritants.
- Parks and tree canopy were chosen to represent the pollen and environmental allergens.
- To integrate participants' mention of stress as well as lack of physical activity, aggravated assault and theft were mapped as a proxy of neighborhood safety and walkability.

Keddem, Barg, Glanz Jackson, Green, George. (in press). *Social Science & Medicine*

Figure 1.

Selected Neighborhood Criteria Variables in West Philadelphia



Keddem, Barg, Glanz Jackson, Green, George. (2015-in press). *Social Science & Medicine*

Figure 2.

Kernel Density

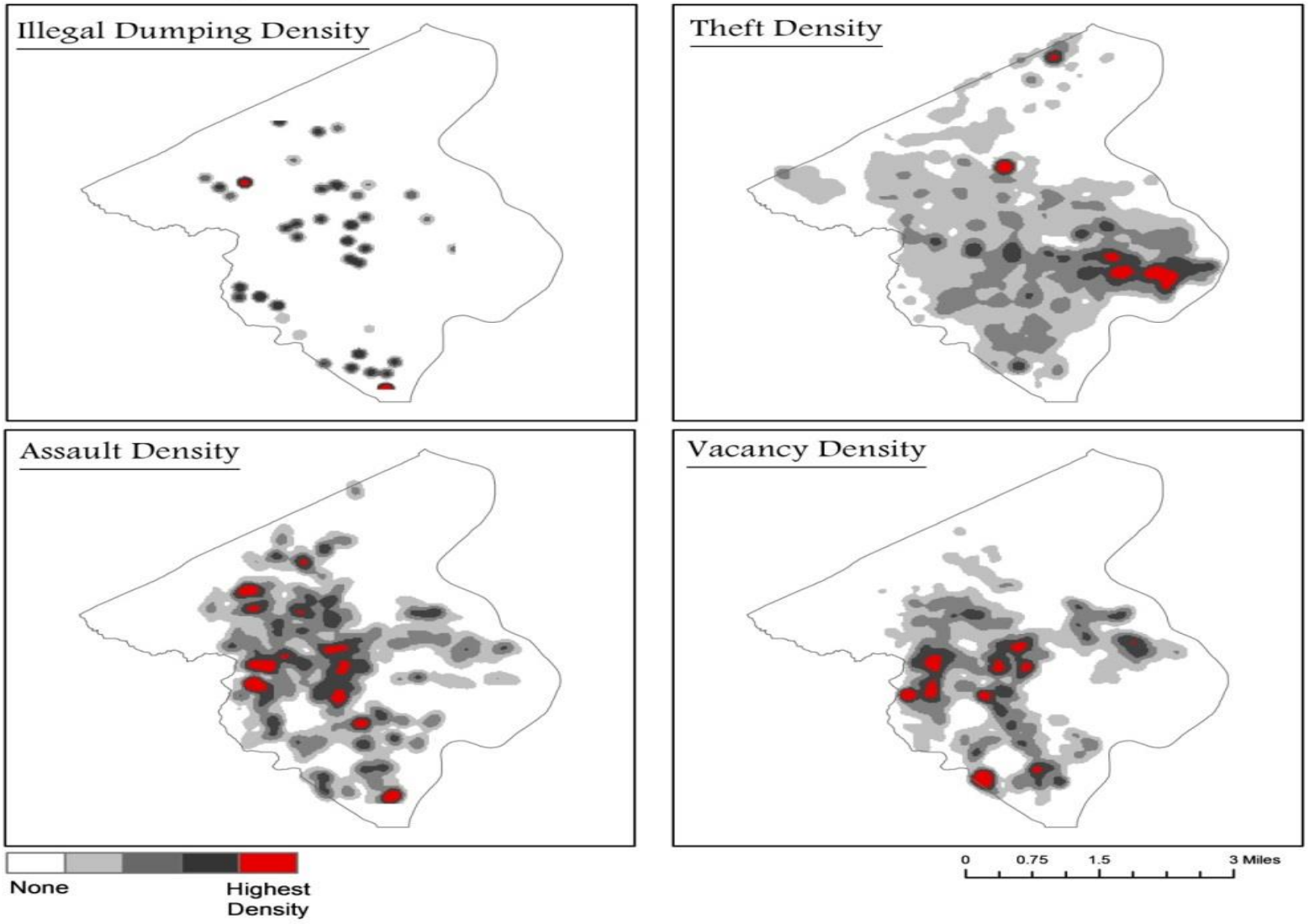
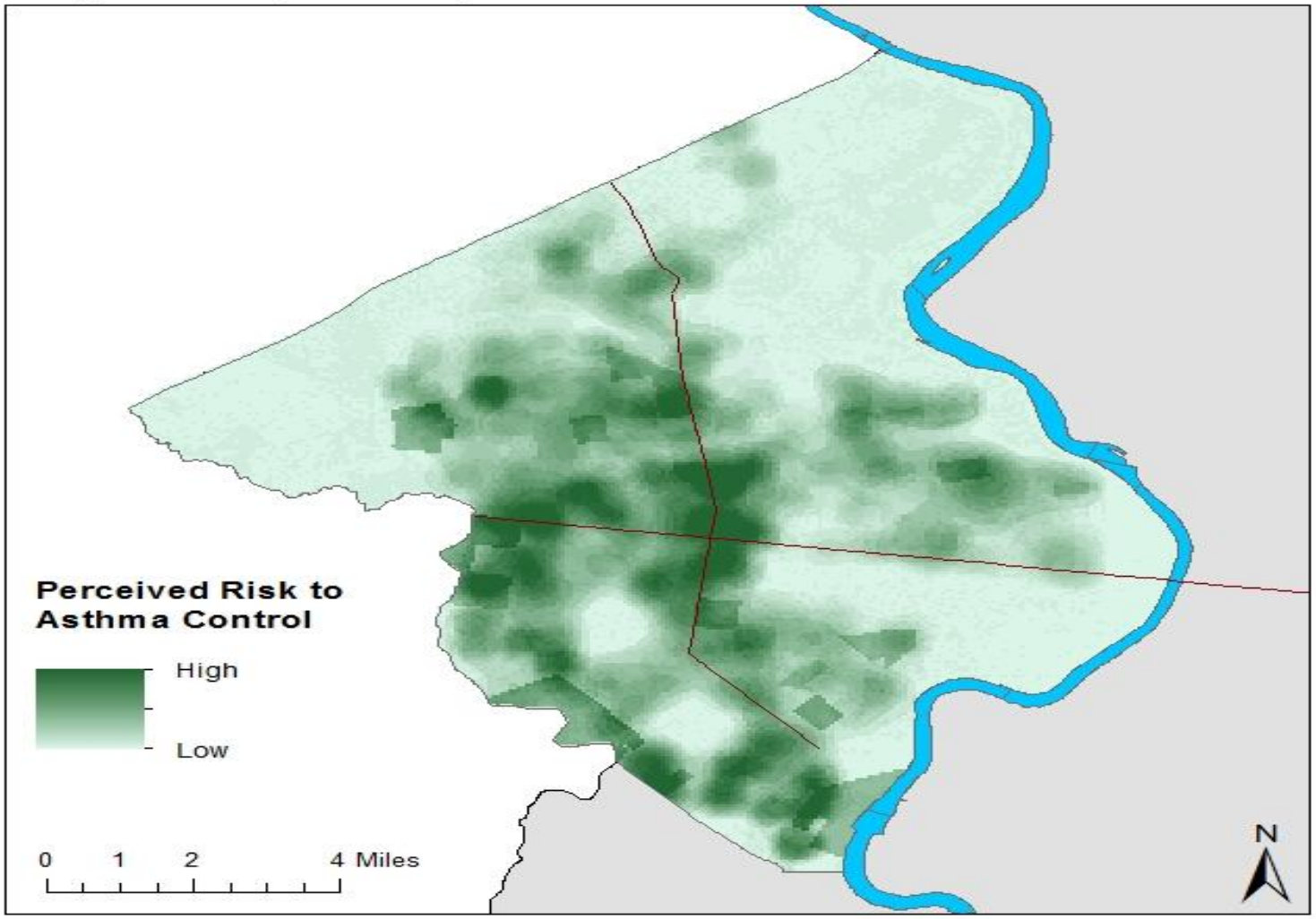


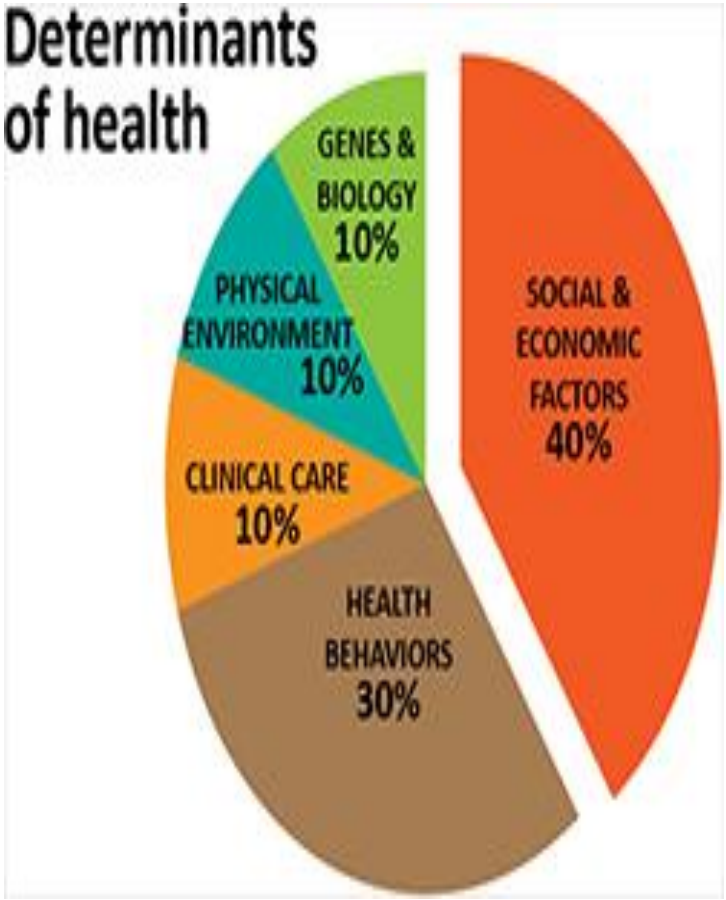
Table 2. Salience Scores Used to Weight Layers		
	Weight (Salience)	Map Layers
Dirt/Dust	0.344	Vacancy Illegal Dumping
Pollen	0.207	Parks Tree Canopy
Stress	0.163	Theft Assault

Figure 3.

Weighted Composite Map of Perceived Risk to Asthma Control



Summary



- Health behaviors are informed by knowledge, beliefs and perceptions
- Health is informed by features of the physical environment like vacant properties and illegal dumping
- Health is also influenced by low SES like exposure to crime and violence = STRESS and EMOTIONS

Goals of my program of research

Close the health inequities treatment gap in asthma by:

1) enhancing recognition of the influence of personal health beliefs on self-care decision-making
2) engaging patients and providers in shared decision-making to reconcile differences