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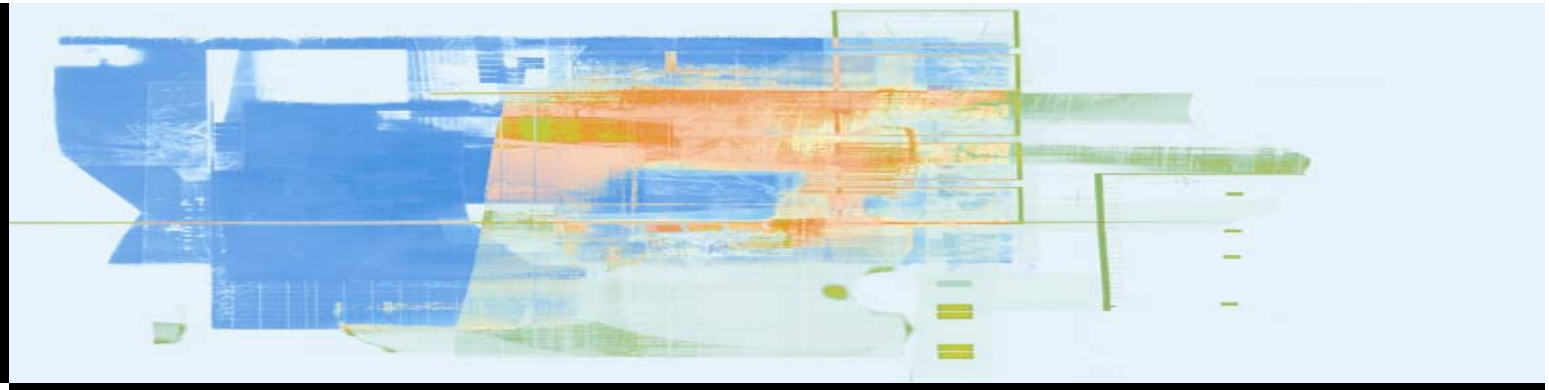

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Disparities in process and outcome measures among adults with persistent asthma

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Advancing Knowledge to Improve Health

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Background

- Asthma affects over 20 million American adults and accounts for substantial morbidity and lost productivity
- Factors explaining disparities in asthma care are not well understood
- Studying disparities in asthma care is important since regular use of controller medications can prevent exacerbations in populations with persistent asthma

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Study Objectives

- Examine the association of race/ethnicity with asthma-specific outcome measures
- Determine whether the following characteristics explain possible differences in asthma outcomes
  - Demographics
  - Socio-economic status (SES)
  - Severity of illness
  - Access to care

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Study Population: Persistent Asthma within Kaiser Permanente (KP)

- Systemwide, about 150,000 KP adults have persistent asthma
- Patients identified via electronic medical record data
- Total prevalence of persistent asthma within KP about 3-5%

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Overview of KP's Care Management Institute (CMI)

Mission:

- Improve quality and efficacy of care delivered to members with specific health conditions, including asthma and diabetes.

Goals:

- Ensure that care processes known to be effective are uniformly delivered to KP members
- Improve knowledge inside and outside of KP about effective healthcare delivery, including new approaches to physician and staff learning
- Advance understanding of how patient-provider interactions impact quality of care and outcomes
  - Collect health-related quality of life (HRQOL) information on patients with chronic conditions

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Methods

- Mail/telephone survey of 1,100 adults with persistent asthma completed in fall 2000
- Survey sample identified from “HEDIS-like” cohort (identified in 1999)
  - 4 or more asthma dispensings
  - 1 or more asthma-related hospitalizations
  - 4 outpatient visits + 2 asthma dispensings
  - 1 or more asthma-related ED visits
- Respondents receiving care from a large staff model HMO in the western United States
  - California and Oregon
- Medication and resource utilization identified in calendar year 2001 via electronic medical record
  - Prior ED utilization measured in 2000

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Methods: Overview of Survey

- Survey measured the following:
  - Race/ethnicity
  - Demographics
  - SES
  - Asthma-specific quality of life
  - Smoking status
  - Satisfaction with access to health care
- Response rate =70%

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Independent Variable: Race/Ethnicity

- Race/ethnicity: self-reported on survey
  - White
  - African-American
  - Hispanic
  - Other
  - Unknown
- Unknown race/ethnicity dropped from analysis

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Outcome Variables

- Asthma-specific process measures
  - 2001 controller medication use (use. vs. non-use)
  - 2001 ratio of controller medications to rescue medications
- Asthma-specific outcome measures
  - Mini Asthma Quality of Life Questionnaire (AQLQ)
    - 1= lowest quality of life, 7=highest quality of life
  - 2001 asthma-specific hospitalization and/or ED visit
    - $\geq$ 1 visits vs no visits

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Covariate Measures

- Demographics
  - Age (continuous)
  - Gender
- SES
  - Education (continuous)
  - Income (continuous)
- Smoking status (current vs. past/never)
- Severity
  - 2000 hospitalization and/or ED use (use vs. non-use)
  - 2000 beta agonist overuse ($\geq$ 14 canisters vs. < 14 canisters)
  - 2000 oral steroid use (use vs. non-use)
- Satisfaction with Access
  - FACCT Instrument (0=lowest satisfaction, 100=highest satisfaction)

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Analysis

- Descriptive statistics

- Logistic and OLS regression models constructed to assess independent association of race/ethnicity with outcome measures
  - Model 1: unadjusted
  - Model 2: add demographics (age, gender)
  - Model 3: add SES (education, income) and smoking status
  - Model 4: add severity adjustment (prior ED use, rescue medication overuse and oral steroid use)
  - Model 5: add satisfaction with access

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Descriptive Statistics

Sample Characteristic	Total Sample (N = 1100)
Mean Age +/- S.D.	43.1 +/- 9.3
Female (%)	68.2
Race/Ethnicity (%)	
White	66.5
African-American	8.5
Hispanic	8.1
Other Race	11.6
Unknown/Declined to Answer	5.2
Educational Attainment (%)	
Less than High School	4.6
High School/Tech School Graduate	16.2
Some College	32.7
College Grad +	34.5
Unknown	12.0
Income	
≤ $24,999	10.2
≥ $25,000-49,999	23.0
≥ $50,000	47.7
Unknown	19.1
Smoking Status	
Never	58.0
Past/Current	40.0

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Descriptive Statistics: Outcome and Covariate Measures

Asthma-specific Process Measures	
Use of controller medications (%)	81.8
Medication ratio ≥ 0.5[1]	64.4
Asthma-specific Outcome Measures	
AQLQ Score (Mean +/- SD, Min=1, Max=7) Low AQLQ (< 3.9, %)	4.18 +/- 1.3 31.6
1 or more hospitalization and/or ED visits (2001) (%)	11.4
Covariate Measures	
2000 hospitalization and/or ED use (%)	11.1
2000 beta-agonist overuse (≥ 14 canisters, %)	17.1
2000 oral steroid use (%)	17.7
2000 Satisfaction with Access Score (Mean +/- SD; lowest score=0, maximum score=100)	60.8 +/- 26.5

[1] Medication Ratio = $\frac{\text{Sum (beta-agonist medications + controller medications)}}{\text{Sum of controller medications}}$

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Bivariate Results: Race/Ethnicity with Outcome Measures

Outcome Measure	2001 Use of Controller Meds (%)	2001 Medication Ratio ≥ 0.5 (%)	2001 ED/Hospitalization (%)	Mean +/- SD AQLQ
White	80.5	60.0	7.4	4.9 +/- 1.2
African-American	76.8	47.6	30.0	4.7 +/- 1.4
Hispanic	70.6	47.3	17.1	4.5 +/- 1.4
Other	80.8	61.5	17.3	4.9 +/- 1.3
P-value	.002	<.0001	<.0001	<.0001

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Sequential Logistic Regression Models: Relationship of Race/Ethnicity with use of Controller Medications

Outcome Measure	White (Ref Group)		African-American		Hispanic		Other Race	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Unadjusted	1.00	NA	0.80	0.58-1.1	0.59	0.45-0.78	1.1	0.75-1.5
Add Demographics[1]	1.00	NA	0.95	0.68-1.3	0.69	0.52-0.92	1.1	0.75-1.5
Add SES and Smoking Status[2]	1.00	NA	1.1	0.74-1.6	0.75	0.54-1.1	1.0	0.68-1.5
Add Severity of Illness Measures[3]	1.00	NA	1.0	0.71-1.5	0.72	0.52-1.1	1.0	0.68-1.5
Add Satisfaction with Access[4]	1.00	NA	0.99	0.62-1.6	0.76	0.48-1.2	1.4	0.78-2.4

1= Models adjusted for age and gender

[2] = Add education, income and smoking status

[3] = Add 2000 hospitalization and/or ED use, rescue medication overuse and oral steroid use

[4] = Add satisfaction with access measure

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Sequential Logistic Regression Models: Relationship of Race/Ethnicity with medication ratio ≥ 0.5

Outcome Measure	White (Ref Group)		African-American		Hispanic		Other Race	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Unadjusted	1.00	NA	0.64	0.49-0.84	0.65	0.50-0.83	1.1	0.86-1.5
Add Demographics[1]	1.00	NA	0.71	0.53-0.94	0.74	0.57-0.96	1.2	0.89-1.6
Add SES and Smoking Status[2]	1.00	NA	0.73	0.53-0.99	0.80	0.59-1.1	1.2	0.83-1.6
Add Severity of Illness Measures[3]	1.00	NA	0.76	0.55-1.1	0.78	0.57-1.1	1.2	0.85-1.7
Add Satisfaction with Access[4]	1.00	NA	0.70	0.47-1.1	0.85	0.57-1.3	1.2	0.77-1.9

1= Models adjusted for age and gender

[2] = Add education, income and smoking status

[3] = Add 2000 hospitalization and/or ED use, rescue medication overuse and oral steroid use

[4] = Add satisfaction with access measure

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Sequential OLS Regression Models: Relationship of Race/Ethnicity with AQLQ Score

Outcome Measure	White (Ref Group)		African-American		Hispanic		Other Race	
	Beta	Std Err	Beta	Std Err	Beta	Std Err	Beta	Std Err
Unadjusted	NA	NA	-0.26	.004	-0.42	.012	-0.17	.002
Add Demographics[1]	NA	NA	-0.26	.004	-0.41	.012	-0.18	.002
Add SES and Smoking Status[2]	NA	NA	-0.18	.002	-0.25	.005	-0.16	.002
Add Severity of Illness Measures[3]	NA	NA	-0.11	.001	-0.32	.008	-0.27	.005
Add Satisfaction with Access[4]	NA	NA	-0.17	.002	-0.48	.018	-0.30	.006

1= Models adjusted for age and gender

[2] = Add education, income and smoking status

[3] = Add 2000 hospitalization and/or ED use, rescue medication overuse and oral steroid use

[4] = Add satisfaction with access measure

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Sequential Logistic Regression Models: Relationship of Race/Ethnicity with ED/Hospitalization Utilization

Outcome Measure	White (Ref Group)		African-American		Hispanic		Other Race	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Unadjusted	1.00	NA	4.7	2.9-7.8	2.2	1.2-4.0	2.1	1.3-3.6
Add Demographics[1]	1.00	NA	4.3	2.5-7.4	1.8	0.93-3.5	2.2	1.3-3.7
Add SES and Smoking Status[2]	1.00	NA	4.1	2.2-7.6	1.2	0.42-2.5	2.2	1.2-4.0
Add Severity of Illness Measures[3]	1.00	NA	4.6	2.3-8.9	1.2	0.43-3.1	1.9	0.99-3.7
Add Satisfaction with Access[4]	1.00	NA	3.7	1.6-8.5	1.5	0.43-5.2	1.7	0.75-4.0

1= Models adjusted for age and gender

[2] = Add education, income and smoking status

[3] = Add 2000 hospitalization and/or ED use, rescue medication overuse and oral steroid use

[4] = Add satisfaction with access measure

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Conclusions: Asthma-Specific Process Measures

- After adjusting for demographics, SES, and smoking status, compared to Whites:
  - African-Americans were less likely to report medication ratios $\geq$ 0.5
  - Had no difference in controller medication use
- Differences in medication ratio finding partly explained by severity of illness measures
  - Compared to whites, in 2000 African-Americans reported higher:
    - Hospitalization and/or ED utilization
    - Rescue medication overuse
    - Oral steroid use

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Conclusions: Asthma-Specific Outcome Measures

- After adjusting for demographics, SES, and smoking status, severity of illness and satisfaction with access:
  - Significantly LOWER AQLQ scores among Hispanics and those of Other Race compared to Whites
  - Significantly HIGHER likelihood of asthma-specific hospitalization and/or ED use among African-Americans compared to Whites
- Differences in AQLQ and hospitalization/ED findings not explained by study variables

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Study Limitations

- Sample included few participants with low education and income levels
- Results cannot be generalized beyond staff model HMO setting
- No health behavior measures collected (e.g. self-efficacy, patient activation)

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Implications for Policy and Future Research

- Future research is needed to understand:
  - The impact of health behaviors on AQLQ scores and asthma-specific hospitalization and/or ED utilization
  - If findings can be generalized to lower income and uninsured populations
- Larger-scale efforts are needed to determined which interventions are most effective in reducing disparities in asthma-specific outcome measures

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