FRESNO STATE
Central Valley Health Policy Institute

Place and Health: Preventable Hospitalizations for Adults in the Central Valley of California

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BACKGROUND

Rates of hospitalizations measure the burden of disease. Older adults have been viewed as a population that is vulnerable to environmental factors.

DATA AND METHODS

- Hospital admissions were collected from OSHPD including the years 2009-2011. AHRQ guidelines of Prevention Quality Indicators were used to identify primary diagnoses as preventable in adults over 65 years of age.

- US Census Bureau data were used to estimate population percentages.

- The pollution burden score was computed by the EPA in CalEnviroScreen version 1.0.

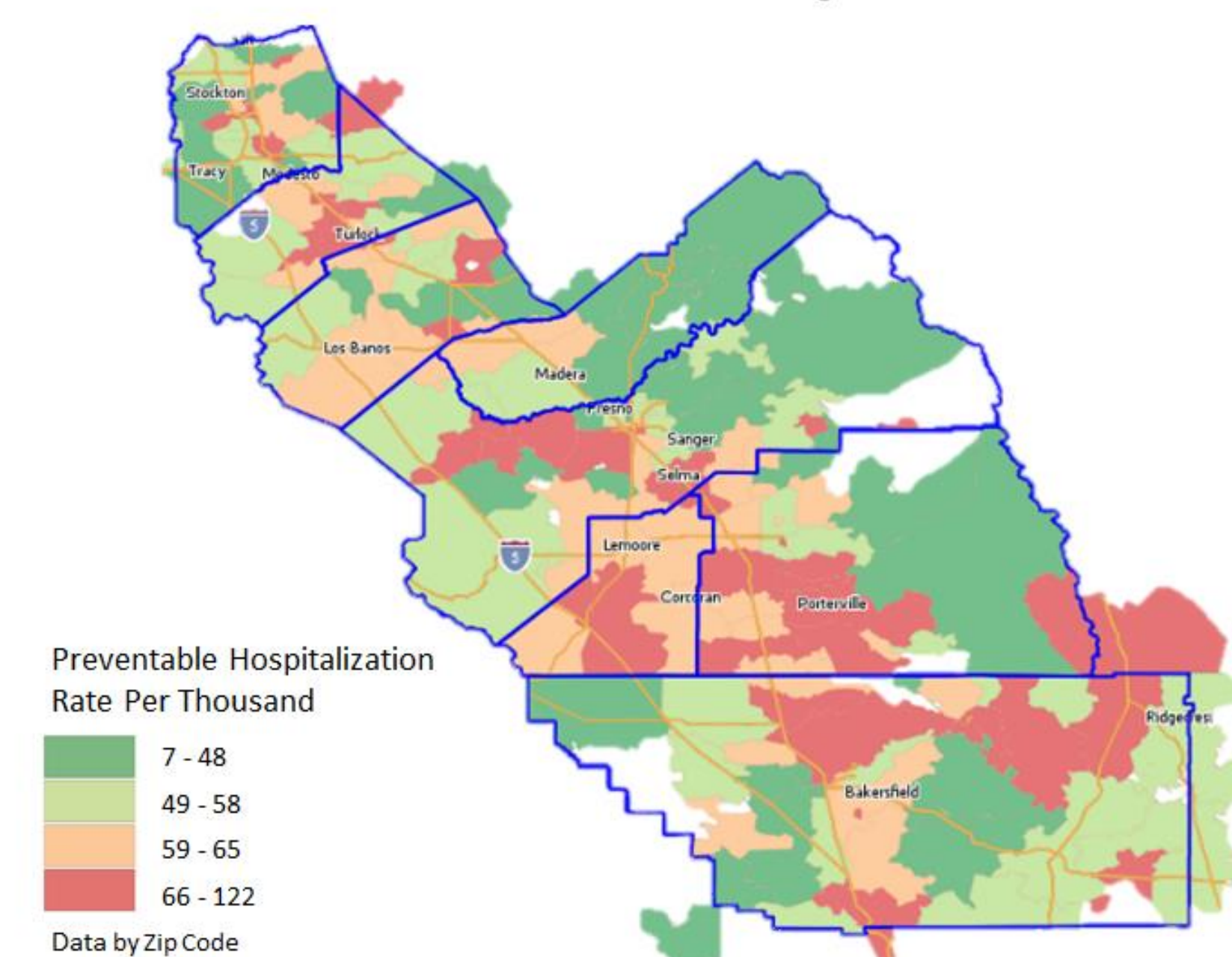## DESCRIPTIVE STATISTICS

LEVEL ONE

VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
PREVENTABLE HOSPITAL ADMISSIONS	2049	33.11	41.54	0	334
MALE	2049	0.49	0.50	0	1
NONWHITE	2049	0.47	0.50	0	1
AGE 75 TO 84	2049	0.35	0.48	0	1
AGE 85+	2049	0.29	0.45	0	1
POPULATION AT RISK	2049	575.95	750.61	3	5184

LEVEL TWO

VARIABLE NAME	N	MEAN	SD	MINIMUM	MAXIMUM
GINI INDEX	205	0.42	0.05	0.28	0.69
PERCENT LIVING IN POVERTY	205	29.16	15.20	0	69
POLLUTION BURDEN SCORE	205	4.90	1.58	1.10	7.80

GEOGRAPHY

Preventable Hospitalizations

Preventable Hospitalization Rate Per Thousand
- 7 - 48
- 49 - 58
- 59 - 65
- 66 - 122

Data by Zip Code

Percent Living in Poverty

Percent Living Below 125% FPL
- 0.0 – 17.3
- 17.4 – 27.9
- 28.0 – 38.8
- 38.9 – 69.5

Data by Zip Code

Gini Coefficient

Gini Coefficient
- .28 – .38
- .39 – .42
- .43 – .44
- .45 – .69

Data by Zip Code

Pollution Burden Score

Pollution Burden Score
- 1.1 – 4.0
- 4.1 – 4.9
- 5.0 – 6.1
- 6.2 – 7.8

Data by Zip Code
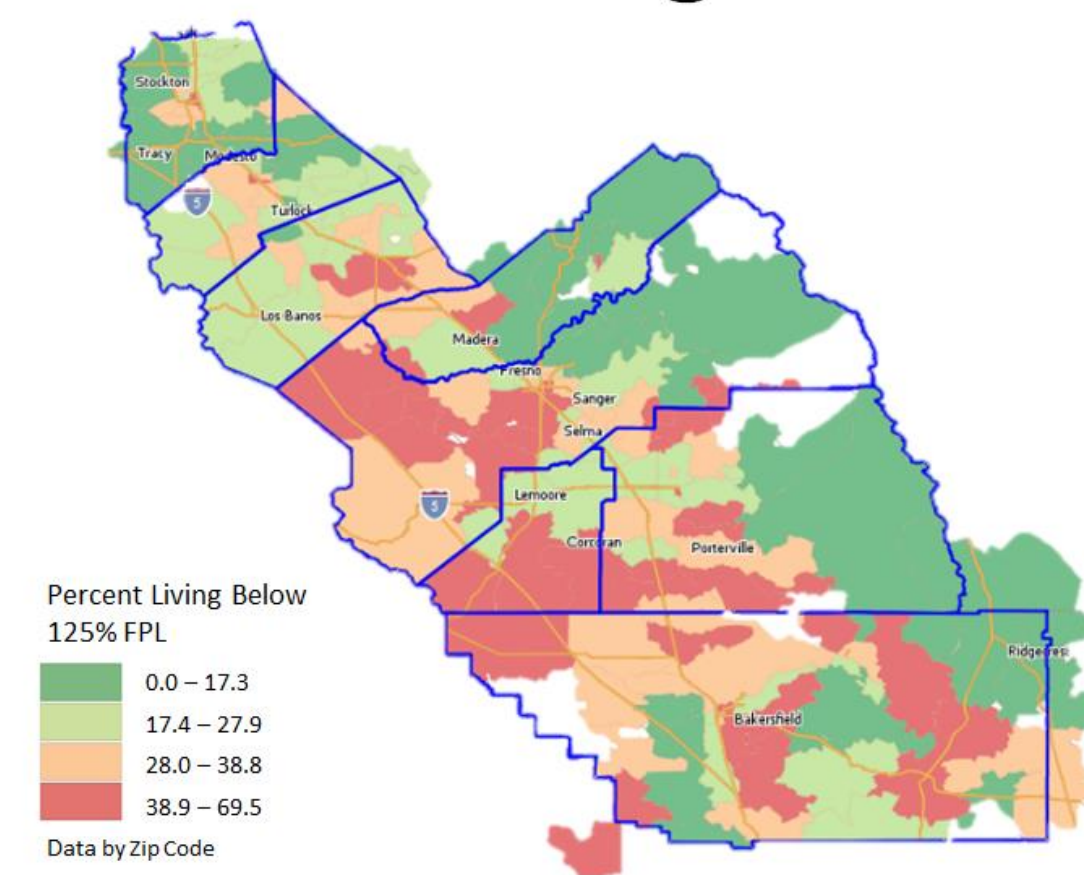
Percent Non-white
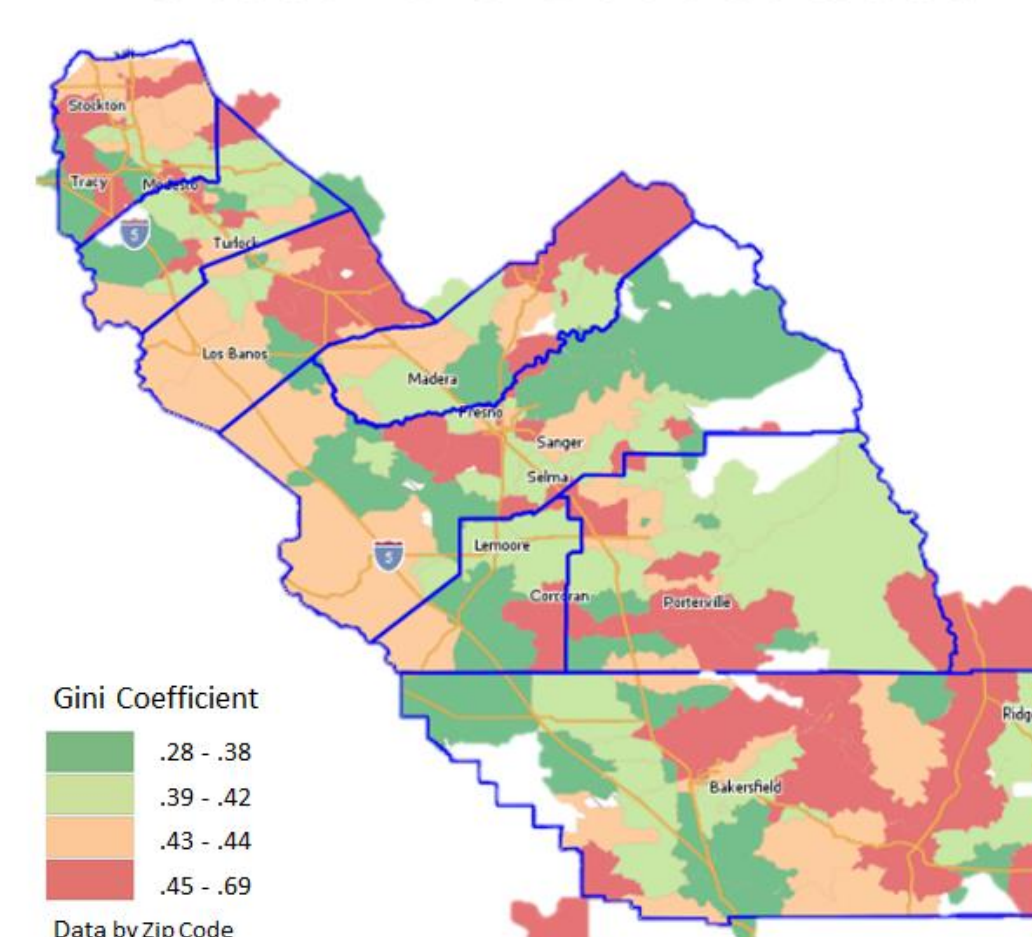
Percent Non-white
- 5.2 – 29.3
- 29.4 – 45.3
- 45.4 – 53.7
- 53.8 – 80.4
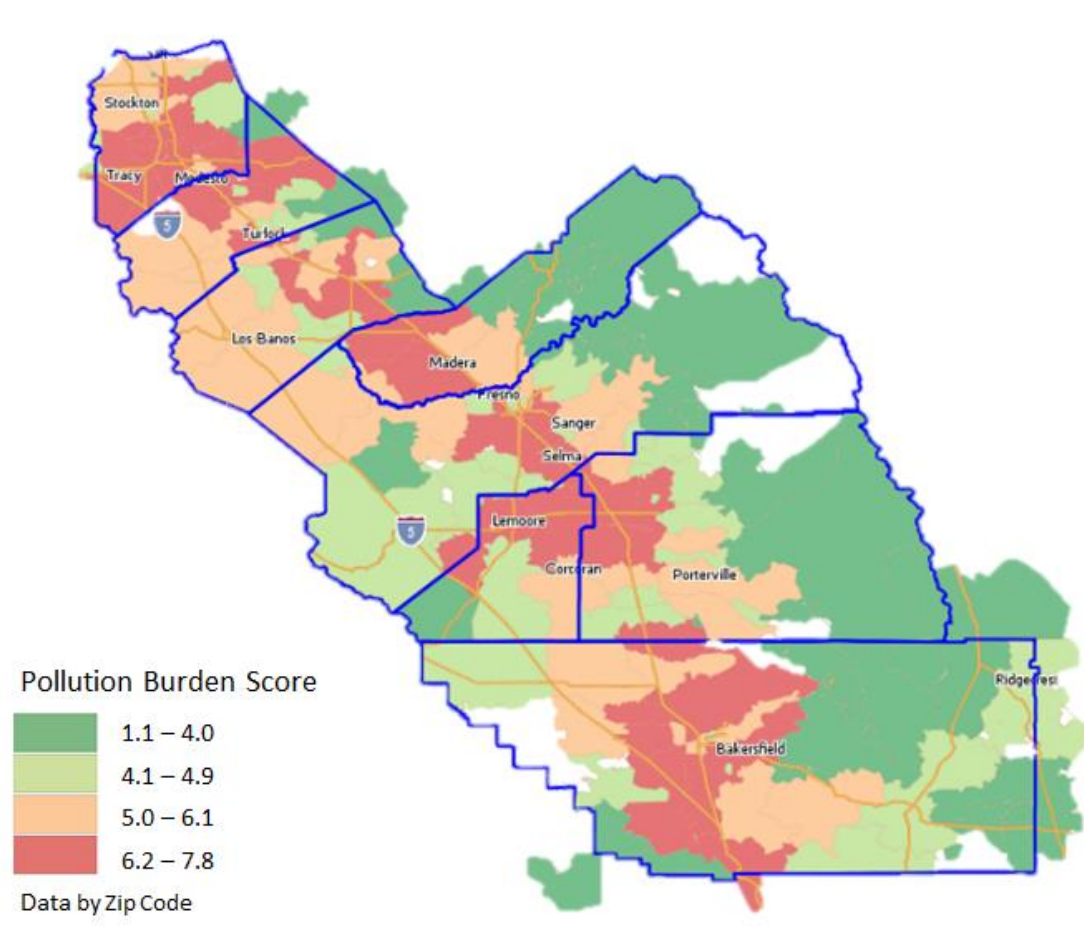
Data by Zip Code
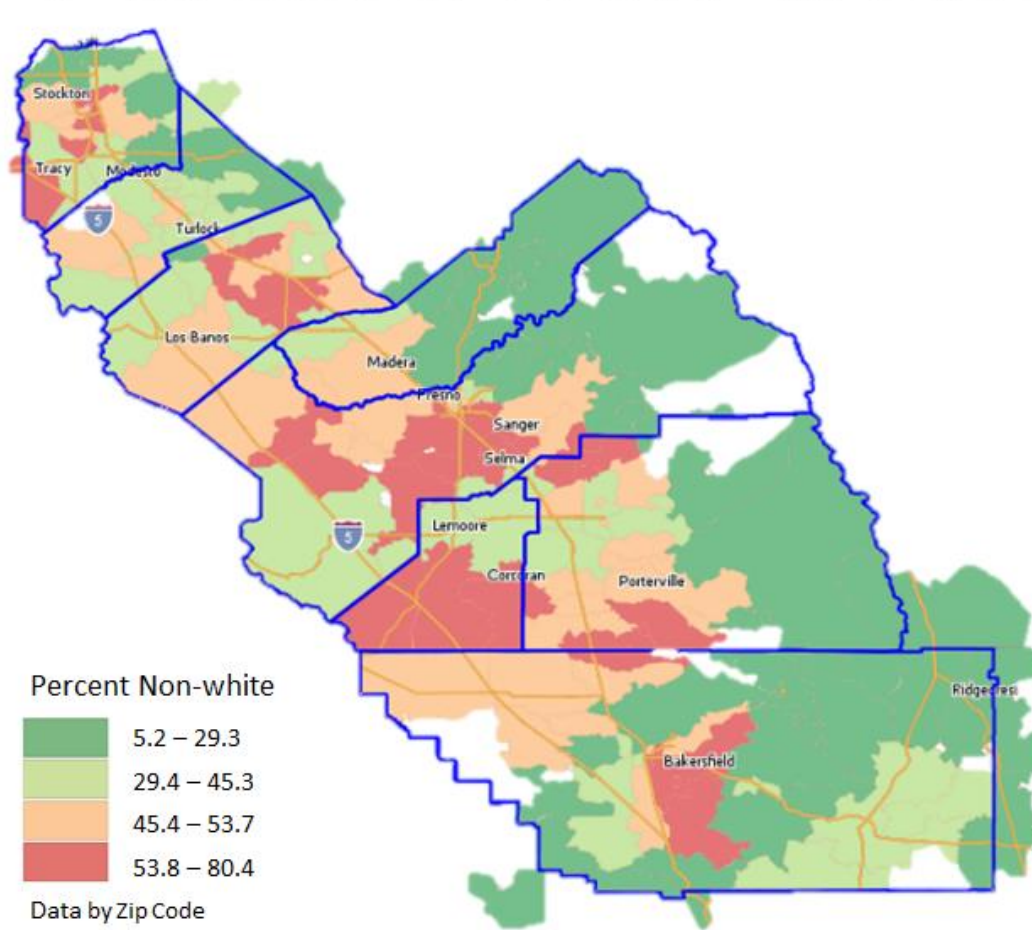
RESULTS

Table 1. Level One Poisson Estimates with Variable Exposure (Population)

Fixed Effect	Coefficient	SE	t-ratio	df	p-value
For INTRCPT1, β0					
INTRCPT2, γ00	-3.301	0.033	-99.8	197	<0.001
For MALE slope, β1					
INTRCPT2, γ10	-0.031	0.016	-1.9	1809	0.052
For NONWHITE slope, β2					
INTRCPT2, γ20	-0.112	0.034	-3.3	1809	<0.001
For AGE75TO84 slope, β3					
INTRCPT2, γ30	0.683	0.025	27.1	1809	<0.001
For AGE85 slope, β4					
INTRCPT2, γ40	1.240	0.037	33.2	1809	<0.001

- Level one results indicate a higher hospitalization admission rates for women, whites, and older age groups, compared to men, non-whites, and the age group 65 to 74, respectively.

Table 2. Level Two Poisson Estimates with Variable Exposure (Population)

Fixed Effect	Coefficient	SE	t-ratio	df	p-value
For INTRCPT1, β0					
INTRCPT2, γ00	-3.777	0.253	-14.9	194	<0.001
Gini, γ01	-0.707	0.602	-1.2	194	0.242
Percent in Poverty, γ02	0.021	0.002	9.3	194	<0.001
Pollution Burden Score, γ03	0.041	0.013	3.1	194	0.002
For MALE slope, β1					
INTRCPT2, γ10	-0.029	0.016	-1.8	1804	0.072
For NONWHITE slope, β2					
INTRCPT2, γ20	-0.711	0.325	-2.2	1804	0.029
Gini, γ21	1.762	0.781	2.3	1804	0.024
Percent in Poverty, γ22	-0.006	0.002	-2.6	1804	0.009
For AGE75TO84 slope, β3					
INTRCPT2, γ30	1.397	0.258	5.4	1804	<0.001
Gini, γ31	-1.251	0.636	-2.0	1804	0.049
Percent in Poverty, γ32	-0.006	0.002	-3.2	1804	0.001
For AGE85 slope, β4					
INTRCPT2, γ40	1.762	0.077	23.0	1804	<0.001
Percent in Poverty, γ41	-0.019	0.003	-7.3	1804	<0.001

- The level two predictors account for 38.8% of the variance in preventable hospitalizations between zip codes.

- Neighborhood measures of poverty (γ02) and pollution (γ03) are positively associated with an increase in preventable hospital admission rates.

- Results indicate a cross-level interaction between neighborhood income inequality (γ21) and individual race/ethnicity (γ20) where increasing inequality strengthens the effect of race/ethnicity (γ20) on hospital admissions, controlling for percent in poverty (γ22).

- Also, increasing levels of income inequality (γ31) reduces the impact of age (γ30) has on hospitalization rates. On average, older adults living in neighborhoods with income equality have higher rates of hospital use than older adults in neighborhoods with income inequality.

CONCLUSION

Environmental factors play a significant role in health outcomes beyond characteristics of the individual. Due to shorter life expectancies and lower access to care, non-whites have lower rates of admission than their white counterpart. Income inequality, percent living in poverty, and pollution are contextual variables that increase the racial/ethnic disparity in hospitalization rates.

STRENGTHS AND LIMITATIONS

- HLM allows for the investigation of both composition and contextual variables.
- Hospital records were de-identified so there was no way to detect multiple admissions of a single person.
- Postal codes were created to facilitate mail delivery.

For additional information:

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