

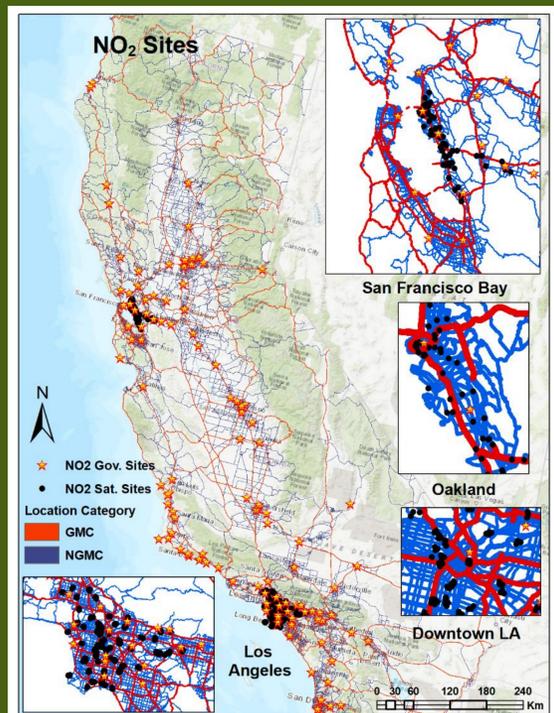
# Goods Movement Actions and Improvements in Air Quality and Health Outcomes among California Medicaid Enrollees

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## Introduction

This project aims to examine the impact of the “Emissions Reduction Plan for Ports and Goods Movement” by the California Air Resources Board (CARB) implemented since 2006 on reductions in ambient air pollution and subsequent improvements in health outcomes among Medicaid fee-for-service (FFS) beneficiaries in 10 counties in California.

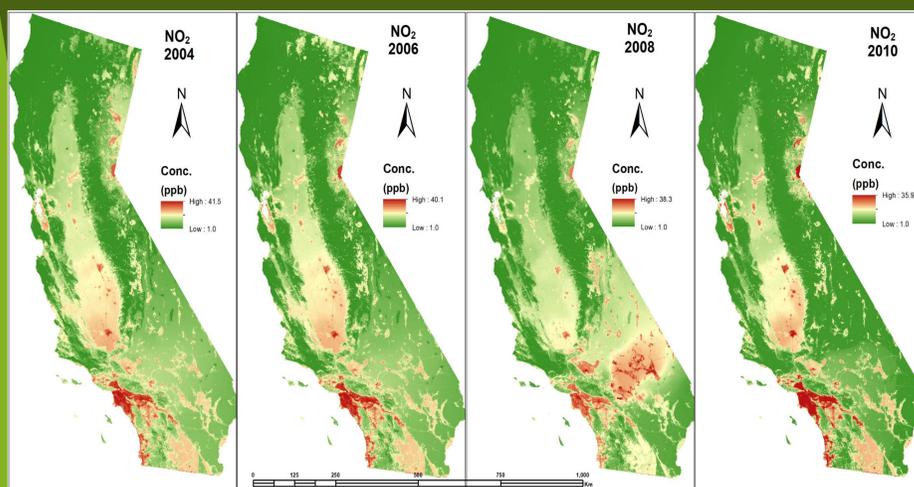
**Figure 1. Locations of NO<sub>2</sub> Monitoring**



The study areas are:

- Goods movement corridors (GMCs): Areas within 500 m of truck-permitted freeways and ports;
- Non-goods movement corridors (NGMCs): areas within 500 m of truck-prohibited freeways or 300 m of a connecting roadway,
- Controls (CTRLs): areas outside of the GMCs and NGMCs.

**Figure 2. NO<sub>2</sub> improvements from 2004 to 2010 by 3.33 ppb with 2004 statewide mean of 8.49 ppb (39%)**

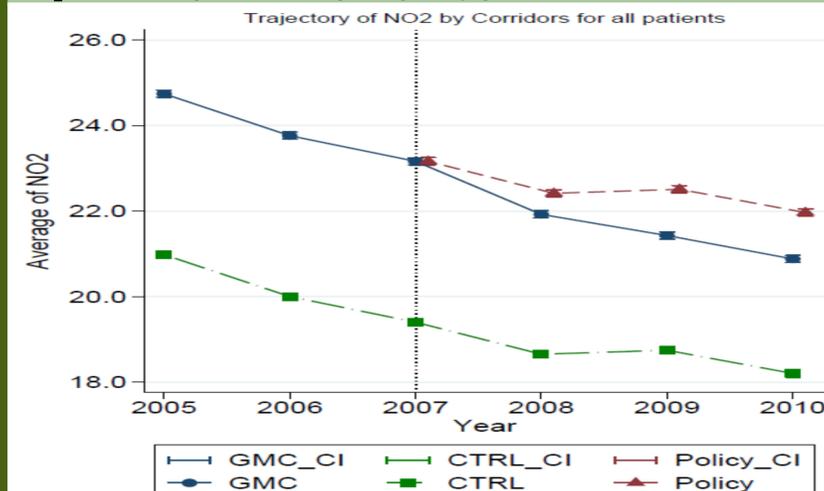


## Summary

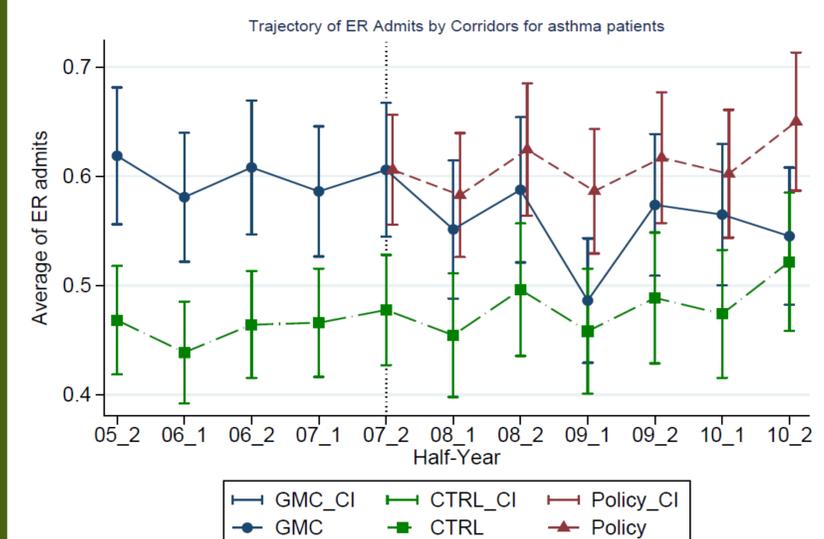
The study used a retrospective cohort of 23,000 adults with six years of continuous enrollment (September 1, 2004 to August 31, 2010). In Phase II, exposure surfaces were assigned to enrollees' home addresses.

We analyzed data using a multilevel negative binomial regression with random intercepts for enrollees. We estimated the predicted outcomes for enrollees in GMC pre- and post-policy (after 2008) by using the control group as the counterfactual. To facilitate interpretation, we fit a generalized difference-in-differences (DiD) model to estimate effects of policy on health in the first-, second-, and third-year after the policy intervention.

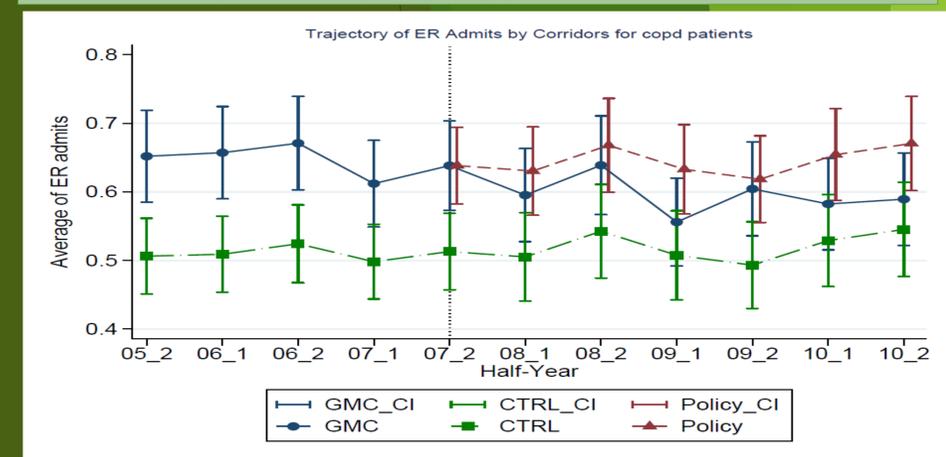
**Figure 3. Enrollees in GMCs experienced greater reduction of NO<sub>2</sub> from the pre- to the post-policy periods**



**Figure 4. Enrollees with Asthma in GMCs experienced reductions in ED Visits from the pre- to the post-policy periods**



**Figure 5. Enrollees with COPD in GMCs experienced reductions in ED Visits from the pre- to the post-policy periods**



**Table 1. D-in-D Tests for ED Visits using Parallel Assumptions**

Parallel DiD	All		Asthma		COPD	
	DiD Estimates	P Value	DiD Estimates	P Value	DiD Estimates	P Value
GMC vs CONTRL: 2010 to baseline	-0.01	0.68	-0.16	0.01	-0.17	0.01
GMC vs CONTRL: 2009 to baseline	-0.04	0.17	-0.18	0.00	-0.13	0.03
GMC vs CONTRL: 2008 to baseline	-0.01	0.68	-0.10	0.10	-0.08	0.22

Covariates include: Age, gender, race/ethnicity, English speaking, county of residence; comorbidities, depression, smoking status, disease severity (CDPS scale); and contextual level variables (Census tract level socioeconomic status based on 2000 and 2010 Census data).

## Conclusions

The policy led to greater reductions in NO<sub>2</sub> exposures and the number of ED visits among enrollees with COPD and asthma living in GMCs than those living in CTRLs in post-policy years. Signs of reductions in hospitalizations and ED visits for those with other diseases were also shown, but not statistically significant.

Our study results add to empirical evidence that air pollution control actions benefit people with chronic conditions through pollution exposure reductions and health outcome improvements.

Our investigation also contributes to scientific knowledge regarding how to conduct accountability studies for longer-term, large scale, and complex regulatory actions using routinely collected medical claims data.