PI: Frank Gilliland

Grant Number:
P01ES009581

Grant Title: Children’s Environmental Health Center

Background/Context:
At the inception of our Center in 1996, the issue of air pollution from the ports and goods movement was not a high priority for regulatory agencies, scientists, or even many community residents in Southern California. Over the course of the current grant cycle, issues around ports and goods movement in the region began to surface widely, as the volume of cargo containers handled at the Ports of Los Angeles and Long Beach has doubled since our Center's founding.

Center investigators became aware of the emerging situation in 2001 by listening to residents of port communities at our first NIEHS Town Meeting. In response to local and community concerns elsewhere, the Center has sponsored two other large national conferences on this topic (in 2005 and 2007, with more than 900 attendees total)

COEC has become the leading academic and outreach organization in the country knowledgeable about EH impacts of international trade, ports and goods movement. The Center hosted a conference, "Moving Forward Together: A Conference on Global Trade, Heath and the Environment" on October 2010.

Key Translational Milestones

- Initial observations that levels of ambient air pollution in Southern California may be associated with effects on schoolchildren’s respiratory morbidity
- Specific effects observed for lung function, asthma, and bronchitic symptoms
  - Exposure to air pollution is associated with lung function impairment in children
  - Exposure to air pollution is associated with increased risk of asthma
  - Exposure to air pollution is associated with increased bronchitic symptoms among children with asthma
- Adverse effects of air pollution on the lungs in childhood can potentially have long-term effects on general health: lung function lower than the predicted value for a healthy adult is associated with an increased risk of cardiovascular disease and increased mortality rate
- Bronchitis and bronchitic symptoms are associated with health issues for children with asthma
- New California-based policies enacted, partly in response to accumulating observed health effects
  - California rules that particulate matter is a toxic air contaminant in the Report on Diesel Exhaust
  - Ports of LA and Long Beach approve new law to improve health risks: Clean Air Action Plan
  - Executive order on freight setting targets for zero emissions technologies and strategies
  - Emission control strategies in California have achieved dramatic reductions in ambient NO2, O3, PM2.5, and PM10.
- Positive effects on health (lung function and bronchitic symptoms) as air quality improves in southern California
  - Improved air quality in southern California is associated with statistically and clinically significant improvements in childhood lung-function growth
  - Decreases in air pollution levels were associated with reductions in bronchitic symptoms among kids with and without asthma
- EPA finalized new national ambient air quality standards for ozone, reducing primary and secondary ozone standard levels to 0.070 parts per million (ppm), down from 0.075 from 2008-2015 and a high of .12 from 1979 to 1993
Starting Point Description:
• Initial observations that levels of ambient air pollution in Southern California may be associated with effects on schoolchildren’s respiratory morbidity.

Fundamental Science Interactions Ring:
   Driver: Observation
   Experimental Setting: Population
   Organism: Human

Timeframe: Mid 1980s to Late 1990s

Collaborators:
• Department of Preventive Medicine, University of Southern California School of Medicine

Citations:

TRANSLATIONAL MILESTONE 1

Translational Research Description:
- Specific effects observed for lung function, asthma, and bronchitic symptoms
  - Exposure to air pollution is associated with lung function impairment in children
  - Exposure to air pollution is associated with increased risk of asthma
  - Exposure to air pollution is associated with increased bronchitic symptoms among children with asthma

Fundamental Science Interactions Ring:
- Driver: Observation
- Experimental Setting: Population
- Organism: Human

Timeframe: 2006-2008

Collaborators:
- Department of Preventive Medicine, University of Southern California School of Medicine
- Department of Environmental Health, Harvard School of Public Health
- Department of Environmental Health, Biomedical Research Center, School of Medicine, University of Coahuila, Torreón, Coahuila, Mexico

Citations:


http://www.ncbi.nlm.nih.gov/pubmed/?cmd=historysearch&querykey=1

TRANSLATIONAL MILESTONE 2

Translational Research Description:
- Adverse effects of air pollution on the lungs in childhood can potentially have long-term effects: lung function lower than the predicted value for a healthy adult is associated with an increased risk of cardiovascular disease and increased mortality rate.

Fundamental Science Interactions Ring:
- **Driver**: Observation
- **Experimental Setting**: Population
- **Organism**: Human

Timeframe: Late 1990s to 2011

Collaborators:
- Department of Medicine, Emory University
- Department of Medicine, Respiratory Division, University of British Columbia
- The James Hogg iCAPTURE Center for Cardiovascular and Pulmonary Research, St. Paul’s Hospital, Vancouver, BC
- West Australia Sleep Disorders Research Institute, Queen Elizabeth II Medical Centre, School of Medicine and Pharmacology
- University of Western Australia Centre for Medical Research, University of Western Australia
- Laboratory for Genetic Epidemiology, Western Australian Institute for Medical Research
- Department of Respiratory Medicine, Sir Charles Gairdner Hospital, Nedlands, Australia

Citations:


TRANSLATIONAL MILESTONE 3

- Bronchitis and bronchitic symptoms are associated with health issues for children with asthma

Fundamental Science Interactions Ring:

Driver: Identification
Experimental Setting: Population
Organism: Human

Timeframe: Late 1980s to mid 2000s

Collaborators:
- Department of Preventive Medicine, University of Southern California School of Medicine
- Department of Environmental Health, Harvard School of Public Health
- Lots of International Departments of Health and Environmental Science

Citations:


TRANSLATIONAL MILESTONE 4

Translational Research Description:
- Levels of ambient air pollution in Southern California may be associated with effects on schoolchildren’s respiratory morbidity

Fundamental Science Interactions Ring:
- **Driver**: Observation
- **Experimental Setting**: Population
- **Organism**: Human

**Timeframe**: Mid 1980s to Late 1990s

**Collaborators**:
- Department of Preventive Medicine, University of Southern California School of Medicine

**Citations**:


NIEHS Draft Translational Research Framework: USC Air Pollution
TRANSLATIONAL MILESTONE 5

Translational Research Description:
- New California-based policies enacted, partly in response to accumulating observed health effects
  - California rules that particulate matter is a toxic air contaminant in the Report on Diesel Exhaust
  - Ports of LA and Long Beach approve new law to improve health risks: Clean Air Action Plan
  - Executive order on freight setting targets for zero emissions technologies and strategies

Practice Ring: State and Regional Policy

Timeframe: 1998-2015

Collaborators:
- California EPA Air Resources Board
- Port of Los Angeles and Long Beach
- USC COEC (Note: USC COEC was a key stakeholder responsible for implementation of the Clean Trucks Program at the Ports, which has significantly reduced diesel truck emissions.)
- State of California

Source:
http://www.arb.ca.gov/toxics/dieseltac/de-fnds.htm
http://www.cleanairactionplan.org/

Translational Narrative:
What led to the next step?
How did the idea evolve?
Who was involved?
What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?
How did you know what to do next?
TRANSLATIONAL MILESTONE 6

Translational Research Description:

- Positive effects on health (lung function and bronchitic symptoms) as air quality improves in southern California
  - Improved air quality in southern California is associated with statistically and clinically significant improvements in childhood lung-function growth
  - Decreases in air pollution levels were associated with reductions in bronchitic symptoms among kids with and without asthma
  - Emission control strategies in California have achieved dramatic reductions in ambient NO₂, O₃, PM₂.₅, and PM₁₀.

Health Impact Ring:
Change in Environmental Exposures
Change in Population Health Outcomes

Timeframe: 1993-2012

Collaborators:
- Department of Preventive Medicine, University of Southern California, Los Angeles, California
- Sonoma Technology Inc

Source:


http://usceh.blogspot.com/2015/04/most-effective-air-quality-policies.html
http://usceh.blogspot.com/p/infographic.html
http://www.tandfonline.com/doi/full/10.1080/10962247.2014.991856
TRANSLATIONAL MILESTONE 7

Translational Research Description:
- EPA finalized new national ambient air quality standards for ozone, reducing primary and secondary ozone standard levels to 0.070 parts per million (ppm), down from 0.075 from 2008-2015 and a high of .12 from 1979 to 1993, and reducing pm2.5 annual average standard from 15 to 12 micrograms/m3 in 2012.

Practice Ring: Federal Policy

Timeframe: 2015

Collaborators:
- US EPA (376 references were cited in the regulation. ARIA was able to analyze 100. Of these, 43 cited an NIH grant and 39 of these were NIEHS grants.

Source: