INDOOR AIR POLLUTION IN CALIFORNA

A report prepared pursuant to Health and Safety Code § 39930

Air Resources Board

March 17, 2005

California Environmental Protection Agency
Air Resources Board

Overview

- Many indoor sources of pollutants
- Significant health risks
- Substantial economic consequences

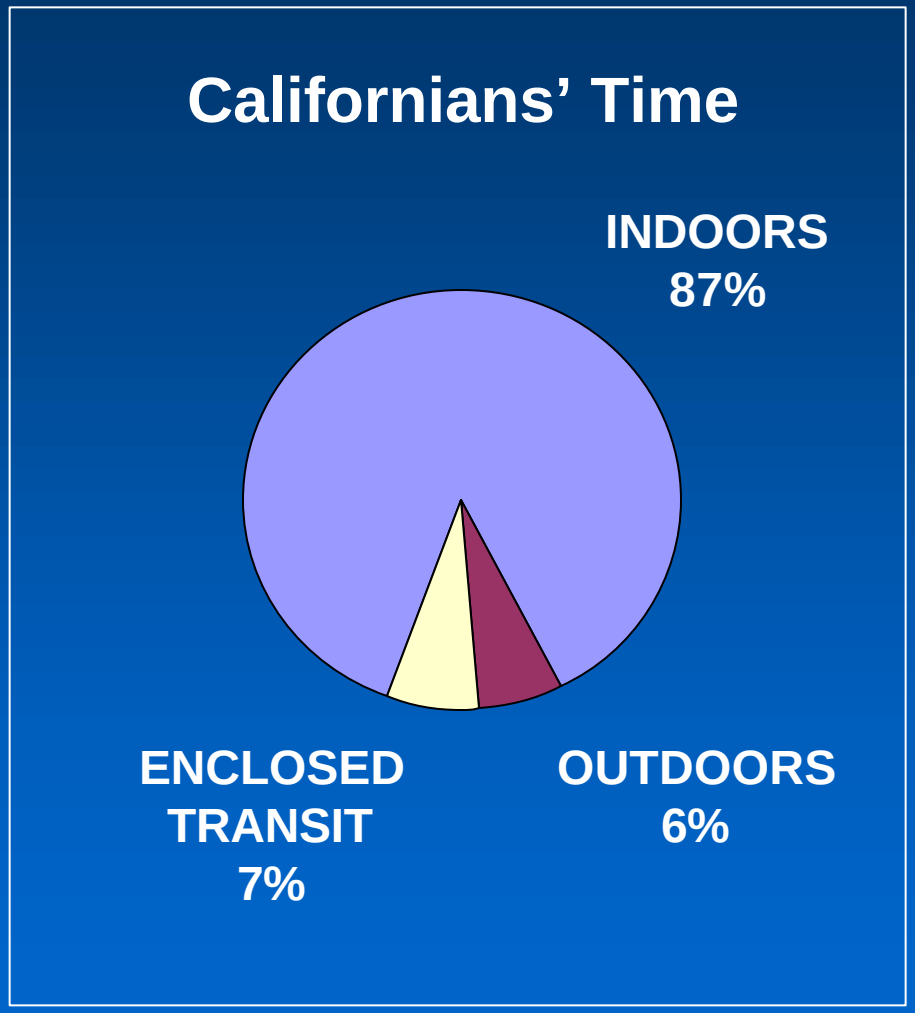
- Some easily implemented mitigation options
- Lack of regulatory authority and need for emission limitations in other areas

Many Indoor Pollutant Sources

- Air cleaners (ozone generators)
- Biological contaminants
- Building materials and furnishings
- Combustion appliances
- Environmental tobacco smoke
- Soil, water (radon, chlorinated solvents)
- Architectural coatings
- Consumer products
- Household and office equipment
- Pesticide products

Significance of Indoor Exposures

- Majority of time spent indoors
- Building shell traps pollutants
- Activities put people in close proximity to sources
- Rule of 1000 – indoor pollutants 1000 X more likely to be inhaled



Health Effects Are Significant

- Asthma, allergies
- Cancer
- Premature death
- Increased respiratory and heart disease
- Irritant and other effects

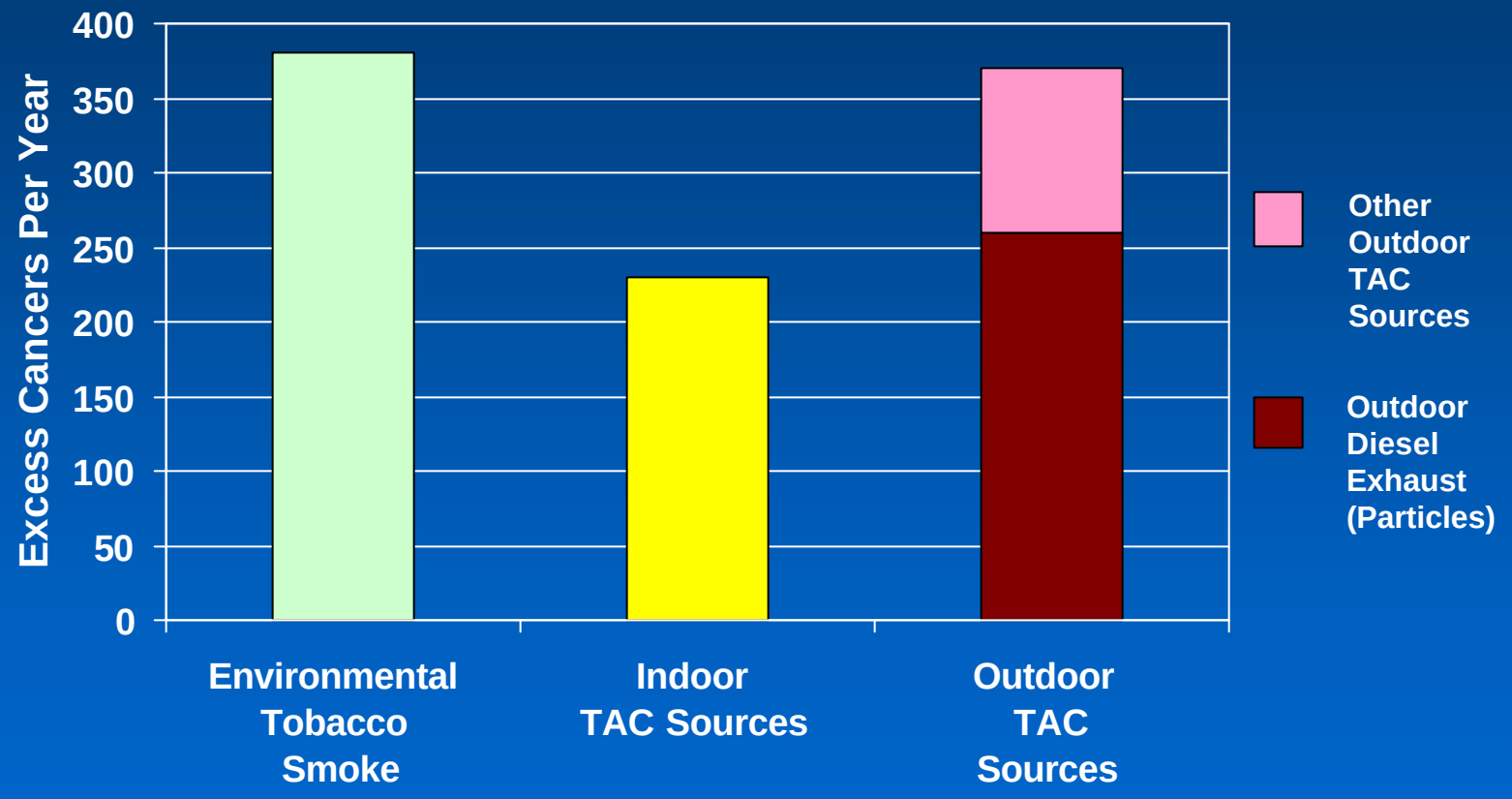
Asthmatic child testing lung function

Indoor Exposures and Asthma

- NAS Institute of Medicine (2000) report
  - confirmed known indoor triggers
  - new triggers: ETS, high levels of NO_2
  - possible triggers: formaldehyde, fragrances

- Recent studies – VOCs, formaldehyde, workplace cleaning products may be associated

Estimated Potential Cancer Burden from Air Toxics in California by Source



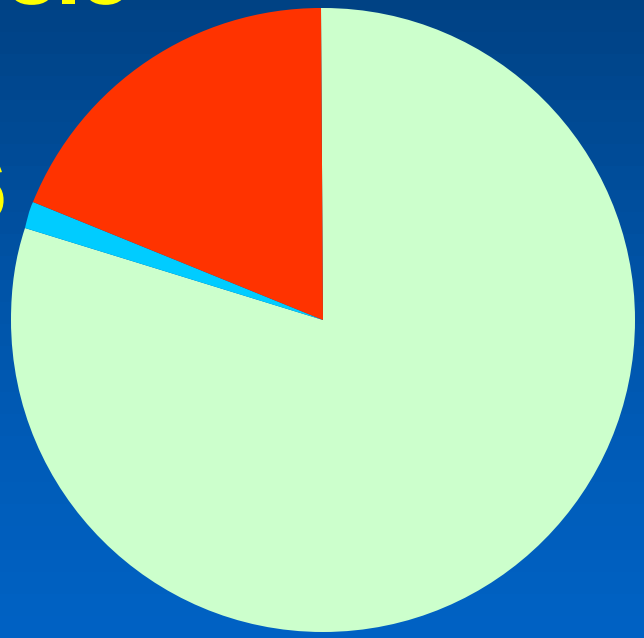
Death, Disease, Irritant Effects

- PM - respiratory and cardiovascular effects
- Carbon monoxide - death, flu-like symptoms
- NO_2, ozone - lung damage, respiratory disease
- Communicable diseases
- Irritant effects
- Sick Building Syndrome

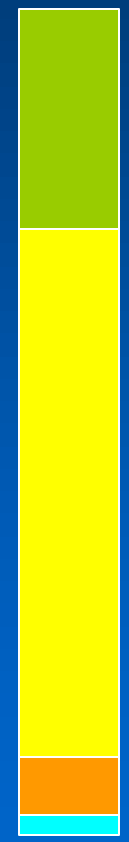
Estimated Costs of Indoor Pollution in California
($ 45 Billion / Year Total)

Lost Worker Productivity 8.5

Medical Costs* 0.6



36 Premature Deaths*



- Radon: cancer
- ETS: heart disease
- ETS: cancer
- CO, VOC, Mold

* PM not included.

Principles of Indoor Air Quality Improvement

- Source control
- Ventilation
- Proper building operation and maintenance
- Professional training, public education
- Air cleaning devices

Existing Regulations and Guidelines

Regulations

- Workplace standards (Cal/OSHA)
- Ventilation requirements (CEC)
- Smoke-free workplace law (AB 13)
- Consumer Products (CPSC and ARB)
- *No limitations on most indoor sources*

Voluntary guidelines

- Government agencies
- Industry and professional groups

High Priority Source Categories for Mitigation

- Air cleaners (ozone-generating)
- Biological contaminants
- Building materials & furnishings
- Combustion appliances
- Environmental tobacco smoke
- Radon

Medium Priority Source Categories for Mitigation

- Architectural coatings
- Consumer products, personal care products
- Household and office equipment and appliances
- Pesticides

Ozone Generator Mitigation Plan

- Request submitted to Attorney General
- Develop public and professional guidance materials, and outreach program.
- Work with air cleaner manufacturers
- Develop test protocols for air cleaners
- Emission limits needed

General Mitigation Options

- Create IAQ management system
- Establish emission limits
- Require emissions testing
- Make children's health top priority
- Develop IAQ guidelines
- Amend building codes
- Fund outreach & education program
- Conduct more research
- Fund innovative technology for IAQ

School Mitigation Options

Implement all 16 Recommendations from the California Portable Classrooms Study

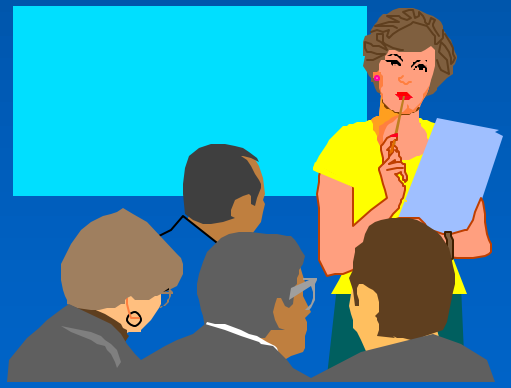
- **Direct / assist schools to comply with state regulations**
- **Promote "Best Practices"**
- **Improve funding for facilities and training for staff**
- **Establish guidelines and standards for schools to protect children's health**

Proven Benefits of Improving IAQ

- **Healthy Home Program:**
  - **Reduced asthma medical costs by $1,300 - $1,800 per child over 4 years**
- **Elementary Schools:**
  - **Students' inhaler use dropped by 50%**
  - **Attendance improved by 5%**
- **Offices:**
  - **Improved worker performance**
  - **Estimated 2 year payback**

Stakeholder Review

- Held two public workshops
- Two previous public comment periods (received 65 and 28 sets of comments)
- Reviewed by UC scientific review panel
- Substantial input from state agencies



Comments

- Public comments
  - Quantitative prioritization
  - More on biologicals
  - More costs, e.g. radon, biologicals, lead
  - Corrections and additions
- Scientific review committee
  - Generally supportive
  - Tiered approach, some changes longer term
  - Improve methods section, other clean-up
  - Add non-industrial workplace information, other references, other information

Summary

- Many unmitigated indoor sources
- Significant health impacts
- Costs Californians > $45 billion / year
- Efforts to reduce indoor pollution not commensurate with risk
- Some easily implemented mitigation options
- Other areas lack authority
- Focus on children is needed