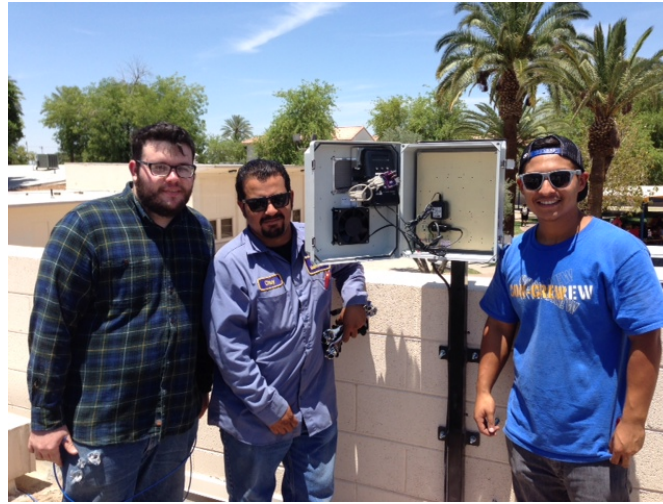# Use of Health Indices for Evaluation of Community Health Benefits from Emission Reductions Related to AB 617

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Goal/Assumptions

- Goal: Assess how to relate improvements in community health associated with AB 617 emissions reduction programs

- Assumption: Increased community monitoring is designed to identify sources for emission reduction or opportunities for exposure reduction
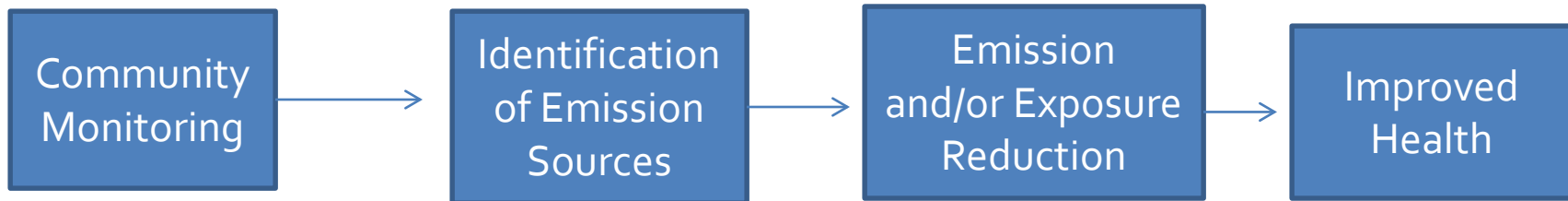
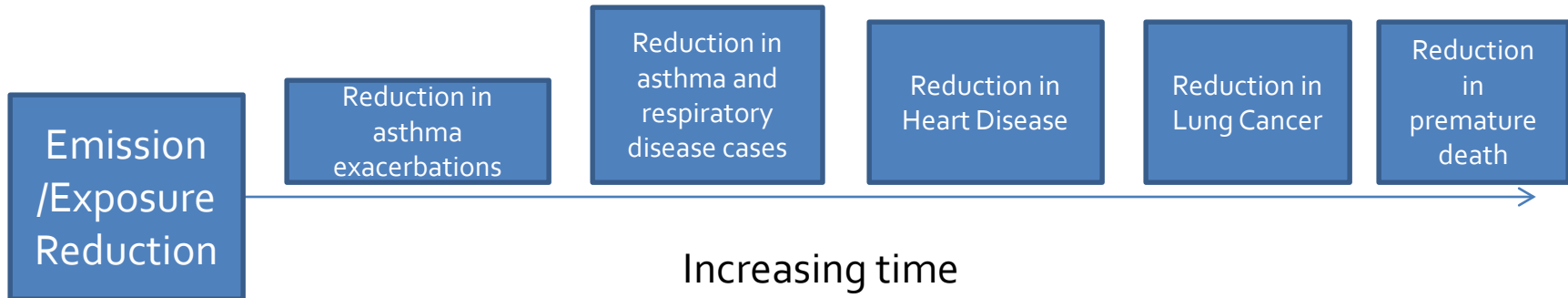Community Monitoring → Identification of Emission Sources → Emission and/or Exposure Reduction → Improved Health

- How can we use community air monitoring to support health studies?

- What is your reaction/recommendations for approaches for health improvement evaluation?

1) Proximal: : Ideal index should be proximal in time to air pollution reduction.

Emission /Exposure Reduction → Reduction in asthma exacerbations → Reduction in asthma and respiratory disease cases → Reduction in Heart Disease → Reduction in Lung Cancer → Reduction in premature death

Increasing time

Criteria for Health Indices

2) <u>Sensitivity</u>: Ideal index would be sensitive to changes in emissions/exposure

3) <u>Timely</u>: Data needs to be available on a timely basis to be able evaluate the effects of pollution/exposure reductions

4) <u>Scale</u>: Data needs to be available at a small scale (ideally census tract) for tracking of neighborhood impacts

5) <u>Completeness/Representativeness</u>: Ideal index should be statewide and representative of CA residents' health.

6) <u>Use of existing data/tools</u>: There are a number of statewide screening tools, such as calenviroscreen and the CA healthy places index which could be considered rather than creating new indices.

Characterizing Emission reductions

- Communities where fenceline monitoring is occurring at facilities of concern via AB 617 can document emission reductions; other sources of timely information may include the CA GGE inventory, regulatory monitoring if pollutants of concern are being measured and are sensitive to changes at sources of concern, and CARB toxic air monitoring (in urban areas, again if sensitive to changes in pollutants of concern at sources).
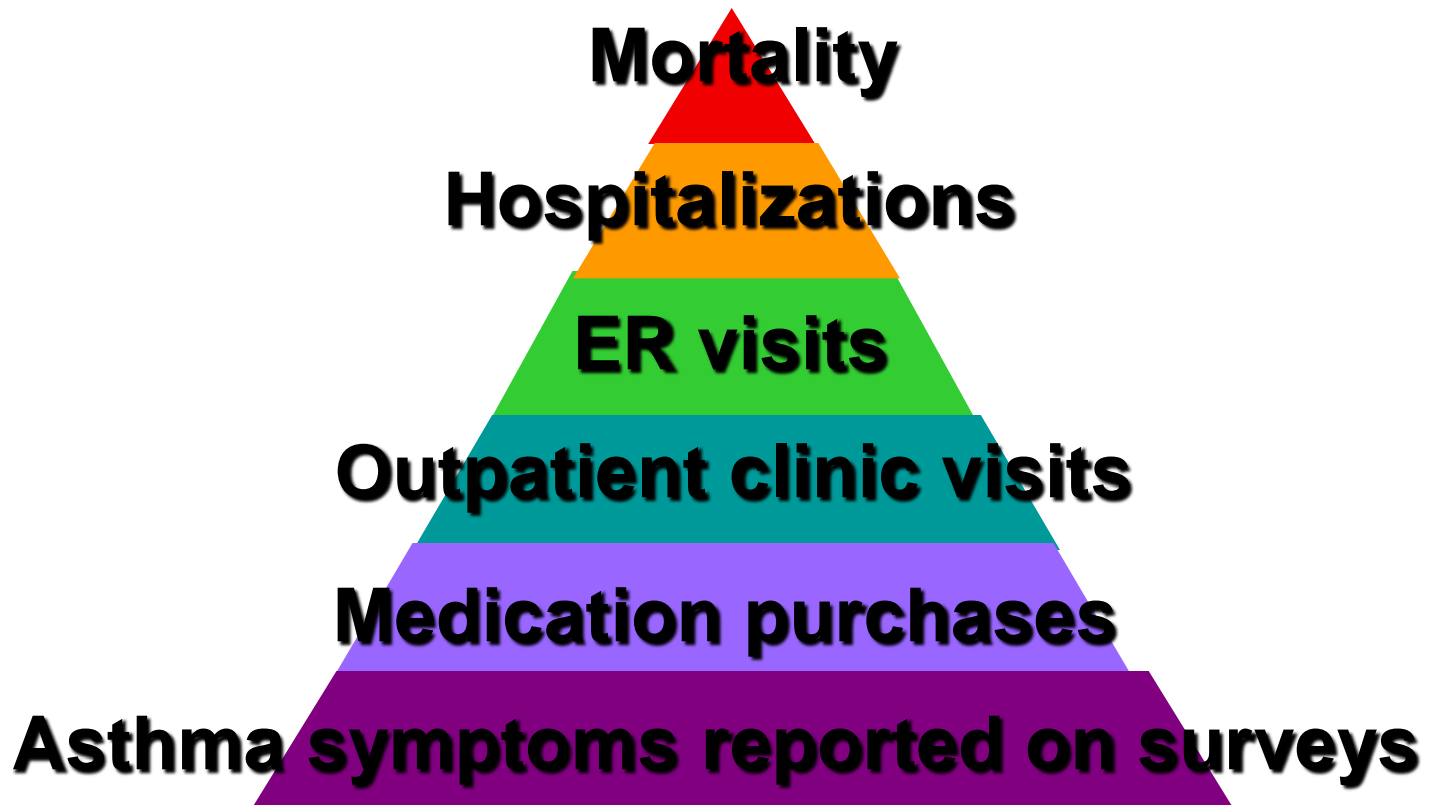
Health Surveys

- Overall health surveys of a community may be helpful, but are costly, not timely, and also may include health outcome data which is not proximal or sensitive to emission reductions.

Availability of data:

- The CA Office of Statewide Health Planning and Development (OHSPD) collects data statewide on emergency room visits and hospitalizations, for example asthma hospitalizations. However, there is approximately a two year lag time to obtain the data and the data are only available at the ZIP code level.

Asthma Indicators

Mortality

Hospitalizations

ER visits

Outpatient clinic visits

Medication purchases

Asthma symptoms reported on surveys

1) OHSPD Asthma ER and Hosp data and CA Health Interview Survey Data on children (1-17) ever diagnosed with asthma

Pros: Data is available; fairly proximal to exposure; sensitive

Cons: May not be representative (does not capture those without access to care or those who only have symptoms); not timely, available only at ZIP level

2) Asthma cohort

: Follow a cohort of asthmatic children who live in the vicinity of pollution sources of concern (examining frequency/severity of symptoms, medication usuage, etc)

Pros: Proximal to exposure; highly sensitive, timely

Cons: Only captures population at highest risk; high cost

3) Syndromic Surveillance

: Analysis of respiratory symptoms on a real-time basis from a sentinel hospital in each location.

Pros: Proximal to exposure; highly sensitive, timely

Cons: Requires systems and agreements to be set up with hospitals; surveillance software and infrastructure to be set up ; high cost

3) Respiratory Symptom/Medication Surveys

: Before emission/exposure reduction and after

Community/Household symptom/medication surveys

Pros: Proximal to exposure; sensitive

Cons: Need time to set up and pilot test; high cost

4) Analysis of Medication Usuage

: Before emission/exposure reduction and after

Analysis of pharmacy data of relevant medication use (e.g preventative and rescue asthma meds)

Pros: Proximal to exposure; timely

Cons: Sensitivity unknown; Requires systems and agreements to be set up with pharmacies/HMOs; surveillance software and infrastructure to be set up ; likely high cost

5) Biomonitoring

: Measurement of biomarkers of effect (e.g. inflammation, oxidative stress) using human tissues (e.g. blood, urine, etc)

Pros: Proximal to exposure; shows actual effects of exposure

Cons: May lack sensitivity (i.e. changes detected may be due to other factors); takes a long time to set up; need lab analysis, very high cost

Candidate Indices

Candidate	Proximal	Sensitive	Timely	Scale	Complete	Represen-tative	Cost
Hosp/ER Data; CHIS Survey	High	High	Low	Low to Moderate	High	Low	Low
Asthma Cohort	High	High	High	High	N/A	Only of pop at high risk	High
Syndromic Surveillance	High	High	High	High	High	Moderate	High
Resp Symptoms/ Medication Surveys	High	High	High	High	High	High	High
Analysis of Pharmacy data	High	UK	High	High	High	Partial	High
Biomonitoring	High	UK	High	High	Depends on participation	Depends on participation	High

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