

# **QALYs as an Effectiveness Metric for Air Pollution Regulations**

Prepared for OPEI conference  
on Cost-Effectiveness  
Analysis for Multiple Benefits



## What we are proposing...

- Supplement current cost-benefit approach with a CEA based on QALYs
- Focus will be on mortality and chronic morbidity
- Will account for acute health effects in two ways
  - Assign QALY values and aggregate with mortality and chronic morbidity
  - Assign \$ value and net from the cost numerator
- Will account for non health benefits by assigning a \$ value and netting from the cost numerator

# Important Issues (1)

- What happens when non-health benefits exceed costs? How to discriminate between cost-saving programs?
- QALY assessments for acute symptoms have many problems (people can't trade off a day with a cold for lost life expectancy)
- Assessment of baseline life expectancy and quality of life weights
  - little data on life expectancy losses for many chronic diseases
  - QALY weights not available for some conditions
  - Missing data on the distribution of causes of death from air pollution and underlying health status of those dying from air pollution exposure

## Important Issues (2)

- Assessment of loss in quality adjusted life years from mortality and morbidity due to air pollution
  - Have to make sure we don't put populations in "double jeopardy" by ignoring correlated morbidity and mortality outcomes
  - Air pollution causes people to contract chronic illness (reducing quality of life and potentially reducing life expectancy) – "injury"
  - Air pollution causes premature death in people with chronic illness – "insult"
  - Under QALY approach, the premature death will be associated with fewer lost QALY (lower value) because of shorter life expectancy and reduced quality of life – adds insult to injury
- Relative to cost-benefit analysis, QALYs explicitly give higher weight to actions that reduce chronic morbidity for younger individuals relative to actions that result in increases in life expectancy for older individuals

# Early Findings

- QALY approach results in lower benefits accruing to extensions of life for older populations with lower quality of life.
- QALYs are more sensitive to age, and thus age composition of the population affects the relative comparability of QALY and \$ valuation approaches
- QALYs enhance the importance of chronic disease relative to premature mortality, especially when the mortality impact is on older populations
- Even without netting out non-health benefits, recent air pollution regulations compare favorably with many other interventions.
  - For example, the Heavy Duty Engine rule had a cost/QALY of \$35,700, well under the \$50,000 cost/QALY ratio suggested as a cutoff by many QALY practitioners.
  - When non-health benefits are added in, the rule was cost-saving (net costs of \$-1.2 billion).