The National Ambient Air Quality Standards (NAAQS) Review Process – Consideration for Disproportionately Impacted Populations

Dr Zachary Pekar
Ambient Standards Group
(Office of Air Quality Planning and Standards)
US EPA

Overview

- NAAQS Review Process
  - Statutory Mandate
  - Focus: Primary Standards
  - Key Steps
- Consideration of Evidence and Risk/Exposure Assessment
- Consideration of Potentially Disproportionately Impacted Populations in Recent/Ongoing NAAQS Reviews
  - Pb, NO_2, Ozone and PM

NAAQS: Statutory Mandate
Clean Air Act - Section 108

Directs Administrator to:

- Identify and list "air pollutants" that "in his judgment,
  - may reasonably be anticipated to endanger public health and welfare" and
  - whose "presence… in the ambient air results from numerous or diverse mobile or stationary sources"

- Issue air quality criteria to "accurately reflect the latest scientific knowledge useful in indicating the kind and extent of identifiable effects on public health or welfare which may be expected from the presence of [a] pollutant in ambient air…"

NAAQS: Statutory Mandate
Clean Air Act – Section 109

Directs Administrator to:

- Propose and promulgate standards
  - Primary (health-based) and Secondary (welfare-based) standards
  - Periodically review (5 year intervals) and, if appropriate, revise NAAQS

- Establish independent scientific review committee
  - Review air quality criteria
  - Recommend to the Administrator any new standards and revision of existing criteria and standards as may be appropriate
  - Since the early 1980's, this independent review function has been performed by the Clean Air Scientific Advisory Committee (CASAC)

Focus: Primary (Health-based) Standards

- Based on air quality criteria

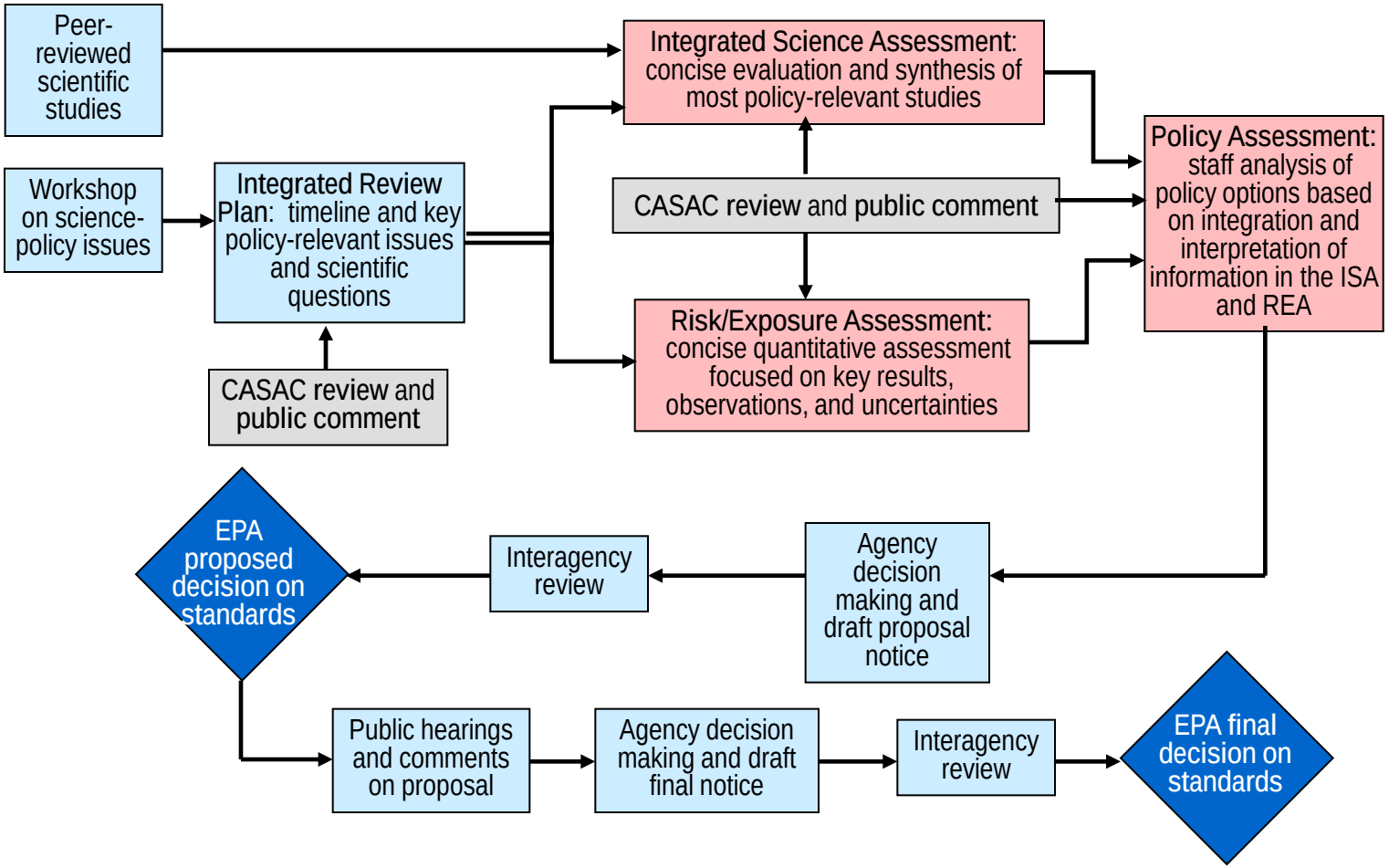
- In the "judgment of the Administrator" are "requisite" to protect public health with an "adequate margin of safety" (CAA §109)
  - "Requisite" – sufficient but not more than necessary
  - "Adequate margin of safety" – intended to address uncertainties associated with inconclusive evidence, and to provide a reasonable degree of protection against hazards that research has not yet identified

Focus: Primary (Health-based) Standards (cont.)

- In addressing the margin of safety requirement, EPA has consistently based its judgments on the science, taking into consideration:
  - Nature of health effects
  - Size of populations at risk and degree of exposure
  - Degree of scientific uncertainty that such effects will occur

- Public health protection intended for:
  - Adverse health effects, not all identifiable effects
  - Susceptible populations (but not most impacted person)
    - Representative sample of persons comprising an susceptible group rather than to a single person in such a group

NAAQS Process – Key Steps



Consideration of Evidence and Risk/Exposure Assessment

- Integrated Science Assessment (ISA):
  - Concise evaluation and synthesis of the most policy-relevant science
  - Emphasis on clearly characterizing strengths and uncertainties of available scientific evidence
  - Scientific foundation to inform:
    - Design and development of Risk/Exposure Assessment
    - Evidence-based considerations discussed in Policy Assessment
      - Newly available evidence of associations
      - Impacts on susceptible populations
      - Air quality data from epidemiological studies

- Risk/Exposure Assessment (REA):
  - *Characterize nature, magnitude, and uncertainties* of estimated risks for selected health endpoints:
    - Recent air quality conditions
    - Simulation of just meeting current NAAQS
    - Simulation of alternative NAAQS standards under consideration

Policy Assessment

- Integration of evidence- and risk/exposure-based considerations:
  - Based on scientific and technical information assessed and presented in ISA and REAs
- Presentation of a wide range of policy options for standard setting
  - Alternative standards considering basic elements of NAAQS
    - Indicator
    - Averaging Time
    - Level and Form
  - Description of underlying interpretation of the scientific evidence and risk/exposure information that might support each option

Recent NAAQS Decisions: Pb and NO_2

- Pb – review completed in Oct 2008
  - Focused on children as a susceptible population
  - Demonstrated greatest benefit in terms of reduced risk associated with ambient Pb may occur in children with moderate blood Pb levels
    - High blood Pb children likely dominated by non-ambient air Pb pathways of exposure
- NO_2 – review completed in Jan 2010
  - Determined health benchmark levels of concern based on airway responsiveness in asthmatics and conducted exposure assessment using those benchmarks
  - Required subset of NO_2 monitors to focus specifically on potentially at-risk communities, including those located near large roadways, or other important sources of NOx emissions, where populations may be exposed to elevated NO_2 concentrations

Ongoing NAAQS Reviews: Ozone and PM

- Ozone – ongoing review - reconsideration of 2008 decision
  - Considering potential for asthmatics to have greater response than the healthy individuals
    - Benchmark levels of concern identified for decreased lung function and respiratory symptoms based on evidence from controlled human exposure studies

- PM – ongoing review
  - Considering impacts on a number of populations experiencing potentially greater risk relative to the general population
    - Children
    - Older adults
    - Persons with pre-existing heart and lung disease
    - Lower SES

Additional Information on Current and Past NAAQS Reviews

- See http://www.epa.gov/ttn/naaqs/