

Impacts of Lead Pollution on Public Health

- Exposure to lead pollution is associated with a broad range of health effects, including damage to the central nervous system, cardiovascular system, kidneys, immune system and red blood cells.
- Children are more likely to be exposed to lead because they exhibit greater hand-to-mouth activity.
- Children are also the most vulnerable to damaging effects of lead because their bodies are developing rapidly.
- Effects in children include:
 - Effects on developing nervous system, including the brain
 - IQ loss
 - Poor academic achievement, permanent learning disabilities, increased risk of delinquent behavior
 - Effects generally persist into early adulthood; can affect lifetime education and achievement
 - Weakened immune system
- Adults can also experience effects of lead exposure such as:
 - Increased blood pressure
 - Cardiovascular disease
 - Decreased kidney function

Regulating Lead Pollution

- The Clean Air Act requires EPA to set two types of national ambient air quality standards (NAAQS) for 'criteria' air pollutants.
 - **Primary standards** to protect public health with an adequate margin of safety
 - **Secondary standards** to protect public welfare and the environment (visibility, wildlife, crops, vegetation, national monuments and buildings)
- EPA has set NAAQS for six common air pollutants:
 - **Lead**
 - Carbon monoxide
 - Nitrogen dioxide
 - Particulate matter
 - Ground-level ozone (smog)
 - Sulfur dioxide
- The law requires EPA to review the scientific information and the standards for each pollutant every five years, and to obtain advice from the Clean Air Scientific Advisory Committee (CASAC) on each review.
- Different considerations apply to setting NAAQS than to achieving them
 - Setting NAAQS: based on scientific evidence of health and environmental effects
 - Achieving NAAQS: account for cost, technical feasibility, time needed to attain
- EPA is revising the lead standards which have not been changed since 1978, when both the primary and secondary standards of lead were set at $1.5 \mu\text{g}/\text{m}^3$ of lead in TSP. The new standards are $0.15 \mu\text{g}/\text{m}^3$.

Revisions to the Lead Standards: Averaging Time and Form

- EPA revised the averaging time and form used to determine whether an area meets the standard.
- EPA will use a maximum (not-to-be-exceeded) rolling three-month average evaluated over a three-year period.
- Any three-month average exceeding $0.15 \mu\text{g}/\text{m}^3$ within a three-year period will be considered a violation of the NAAQS
- More scientifically appropriate than the previous averaging time of calendar quarter
 - Rolling average gives equal weight to all three-month periods
- More health protective than the previous averaging time of calendar quarter
 - Rolling average yields 12 three-month averages each year to be compared to the NAAQS (as opposed to four averages in each year for block calendar quarters).

Revisions to the Lead Standards: Averaging Time and Form

- Air agencies will determine whether an area is in compliance with the lead standards by following these steps:
 - Average three consecutive monthly averages together to get a three-month average (e.g. January-March, February-April, March-May, etc.)
 - For each three-year period, this will yield 36 three-month averages
 - Compare each three-month average to the NAAQS
 - To be in attainment, all 36 three-month averages must be below the $0.15 \mu\text{g}/\text{m}^3$
 - If one of these averages is above $0.15 \mu\text{g}/\text{m}^3$, the site will violate the standard
- EPA will still require a sampling frequency of 1 in 6 days.
 - Monitoring agencies must collect one 24-hour lead sample every six days

Revisions to the Lead Standards: Indicator

- EPA retains the current indicator based on measuring lead in the air using total suspended particles (TSP) monitors, reflecting evidence that lead particles of all sizes pose health risks.
- EPA will allow the use of lead-PM10 monitoring instead of lead-TSP monitoring in only certain limited circumstances
 - Lead-PM10 low-volume monitoring would be allowed where:
 - Lead is not expected to occur as large particles; and
 - A monitoring agency can demonstrate that lead concentrations are not expected to have three-month averages greater than or equal to $0.1 \mu\text{g}/\text{m}^3$
 - If a lead-PM10 monitor measures three-month levels greater than or equal to $0.1 \mu\text{g}/\text{m}^3$, then the monitoring agency would have to install and operate a lead-TSP monitor within six months
 - Lead- PM10 measurements greater than the NAAQS violate the standard.

Revisions to the Lead Monitoring Requirements

- EPA is expanding and redesigning the monitoring network for lead to ensure the public health protections provided by the 2008 lead standards.
- EPA is requiring:
 - Monitoring in areas near sources with lead emissions greater than or equal to 1 ton per year (tpy). According to EPA's 2002 emissions estimates, 135 sources meet this criterion.
 - This source-oriented monitoring requirement may be waived by the EPA Regional Administrator if the monitoring agency can demonstrate that the lead source will not contribute to maximum lead concentrations greater than 0.075 ug/m³ (50% of the NAAQS)
 - The operation of a lead monitor in every urban area with a population of 500,000 or more. The latest population estimates indicate there are 101 such areas.
- EPA estimates that 236 new or relocated monitoring sites will be necessary to satisfy these monitoring requirements
 - Approximately half of the new monitors will be required to be operational by January 1, 2010
 - The rest of the new monitors will be required to be operational by January 1, 2011

Sources Contributing to Lead Pollution

- Sources of lead emissions include:
 - Gasoline for piston-engine aircraft (not used in commercial passenger aircraft)
 - Metal industries
 - Lead smelting
 - Iron and steel foundries
 - Copper smelting
 - Metal mining
 - Manufacturing industries
 - Glass manufacturing
 - Cement manufacturing
 - Waste incinerators
 - Industrial/commercial/utility boilers
- Based on current information, more than 600 tons per year of lead are emitted due to use of aviation gasoline.
 - EPA received and is currently considering a petition to address lead in aviation gasoline.
 - For more information, see www.epa.gov/otaq/aviation.htm

Source Sectors of Lead Emissions in the U.S.

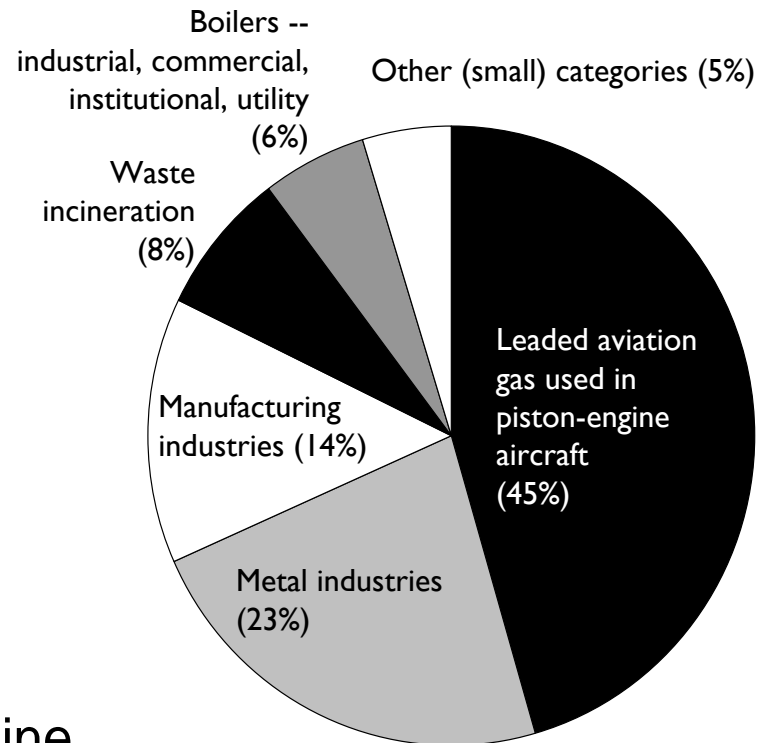


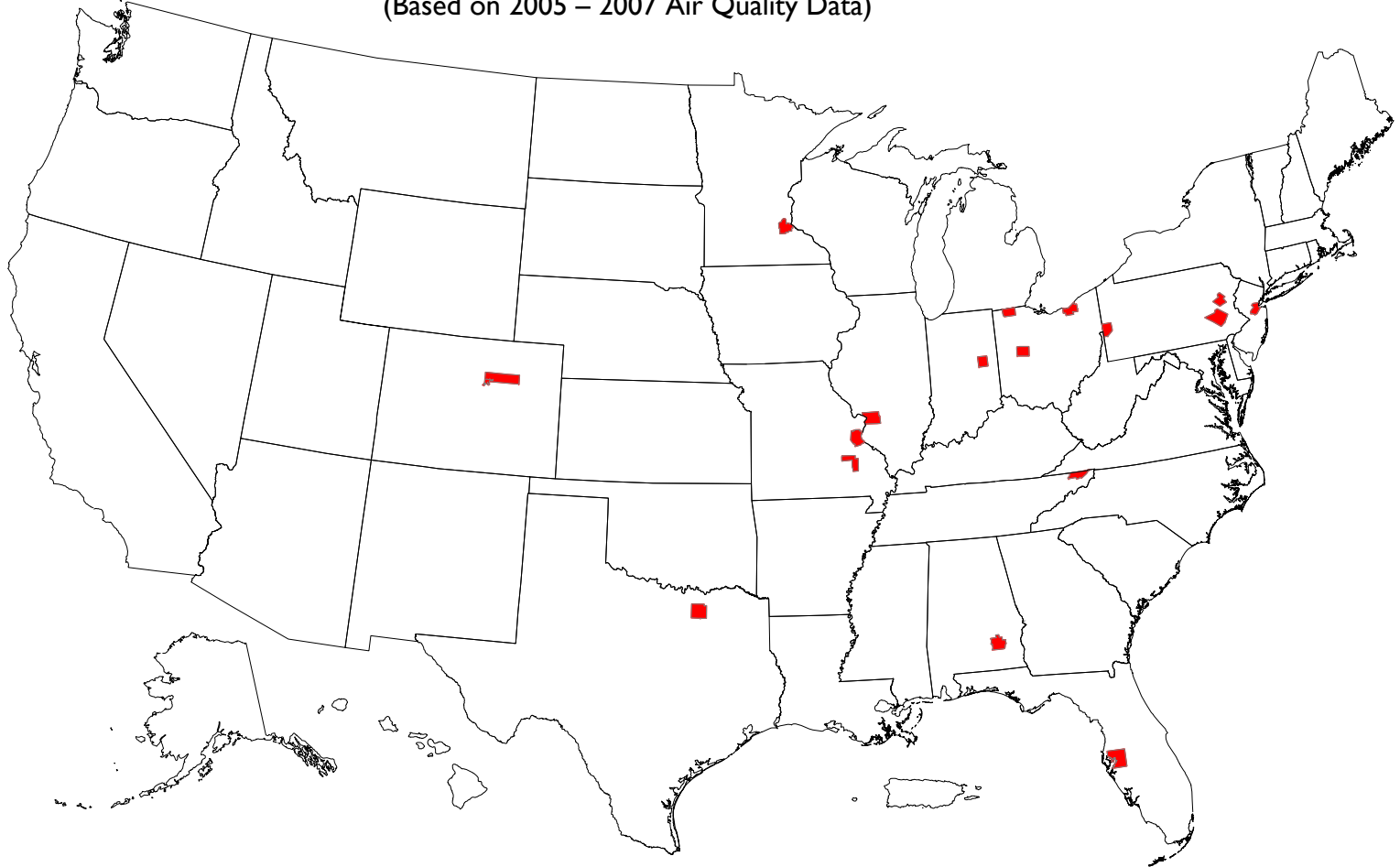
Chart based on EPA's 2002 National Emission Inventory (NEI) with modifications documented in Tom Pace's 05/01/08 memorandum and Marion Hoyer's 05/12/08 and 05/14/08 memoranda to the docket.

Timeline For Implementing Revised Lead NAAQS

Milestone	Date
Signature—Final Rule	Oct. 15, 2008
State Designation Recommendations to EPA	No later than October 2009 (based on existing network data)
Monitoring Network	At least half of required sites operational by Jan. 1, 2010 (additional required sites operational by Jan. 1, 2011)
Final Designations	No later than effective date Jan. 1, 2012* *Based on one-year deadline extension due to insufficient information; some areas are expected to be designated earlier based on existing data.
Transitional Strategy (Antibacksliding)	Revoke 1978 Pb NAAQS in pre-2009 attainment areas no later than October 2012
Attainment Demonstration SIPs Due	No later than June 2013 (18 month maximum)
Attainment Date	No later than January 2017 (5 year maximum)

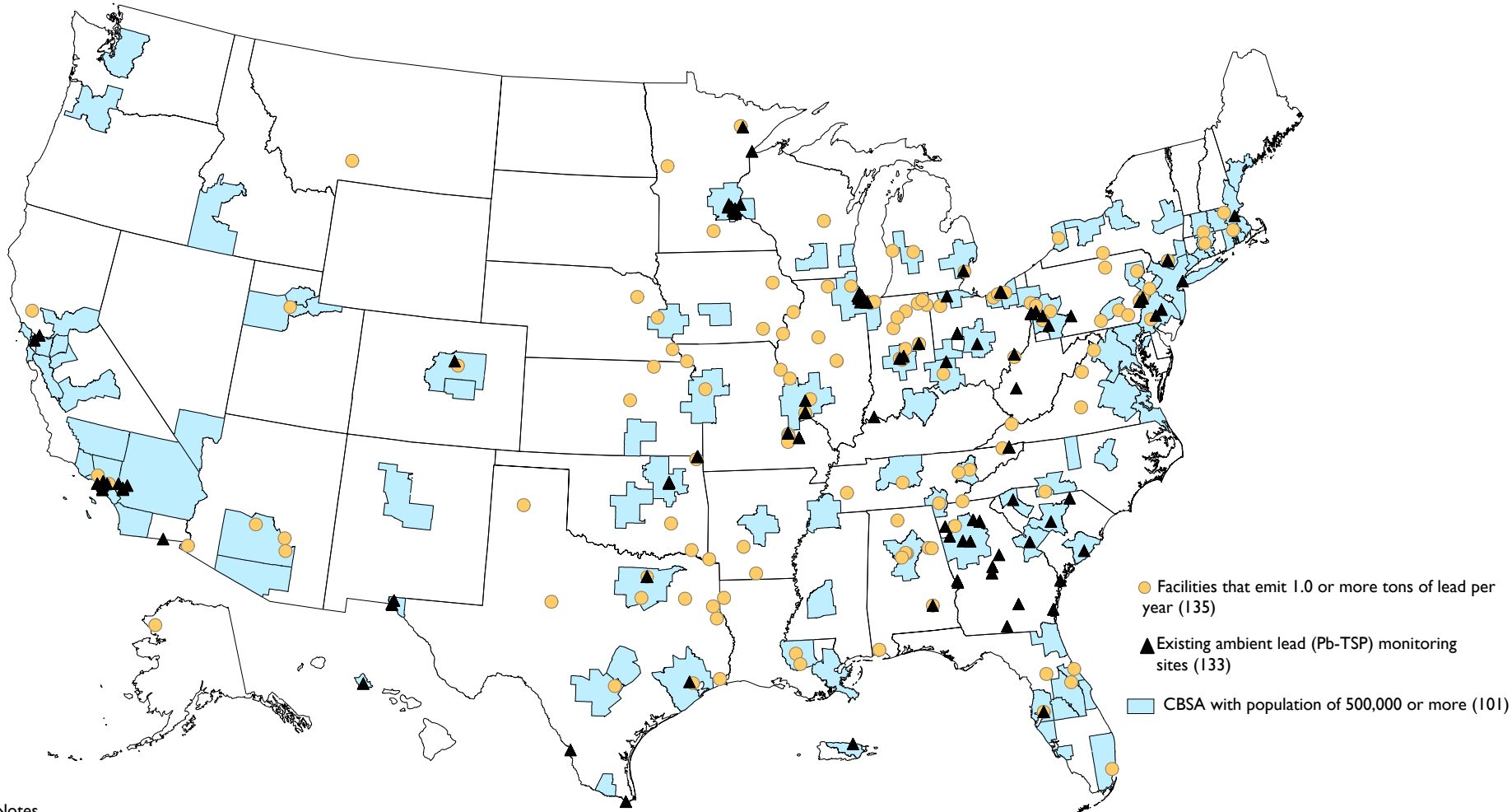
Counties with Monitors Violating the 2008 Lead Standard of 0.15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)

(Based on 2005 – 2007 Air Quality Data)



Notes

1. 18 of 111 monitored counties violate the 2008 lead standard of 0.15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) measured as total suspended particulate matter (TSP).
2. These estimates are based on the most recent air quality data available (2005–2007). EPA will not designate areas based on these data, but likely on data from 2007-2009 or 2008-2010.
3. The existing monitoring network for lead is not sufficient to determine whether many areas of the country would meet the revised standards of 0.15 $\mu\text{g}/\text{m}^3$. EPA is re-designing the national lead monitoring network to allow assessment of compliance with the revised standards.
4. Monitored air quality data is available from the Air Quality System at <http://www.epa.gov/ttn/airs/airsaqs/>



Notes

1. Ambient lead monitoring sites measure lead in total suspended particulate (Pb-TSP). The 133 monitoring sites shown are those operating in 2008.
2. The current monitoring network for lead is not sufficient to determine whether many areas of the country would meet the 2008 lead standards. EPA is re-designing the nation's lead monitoring network to allow assessment of compliance with the revised standard. EPA is requiring Pb-TSP monitors in areas near lead sources with emissions greater than or equal to 1.0 ton per year, and a monitor in every urban area with population of 500,000 or greater.
3. The emissions estimates used to develop this map are based on EPA's 2002 National Emission Inventory (NEI) with modifications documented in Tom Pace's 05/01/08 memorandum and Marion Hoyer's 05/12/08 and 05/14/08 memoranda to the docket.