To: DOC and CEC DOC 08-AFC-8A From: Douglass California Energy Commission
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The American Lung Association's, <u>State of the Air 2012</u>, is a summation of many long-term studies on the quality of the air and the effect of polluted air on the population in the United States. They looked at ozone levels and particle levels from official monitoring sites across our nation for the years 2008, 2009, and 2010.

Pollution information by cities in the United States:

- 1. Bakersfield and Delano, California are tied for worst in "Cities Most Polluted by Short-term Particle Pollution". A total of 7 San Joaquin Valley cities are mentioned in ranks 1-5. (p.1)
- 2. Bakersfield is ranked worst in "Cities Most Polluted by Year-round Particle Pollution". A total of 4 San Joaquin Valley cities are mentioned in ranks 1-5. (p.2)
- 3. Bakersfield and Delano are in third place for worst "Most Ozone-Polluted Cities". A total of 8 San Joaquin Valley cities are mentioned in ranks 1-5. (p.3)

### Pollution information by counties in California:

- 1. Kern County is ranked worst for "Counties Most Polluted by Short-term Particle Pollution". 3 San Joaquin Counties are in ranks 1-5. (p.4)
- 2. Kern County is ranked worst for "Counties Most Polluted by Year-round Particle Pollution". 3 San Joaquin Counties are in ranks 1-5. (p.5)
- 3. Kern County is in third place for worst "Most Ozone-Polluted County". 3 San Joaquin Counties are in ranks 1-6. (p.6)

### High ozone days in Kern County 2008-2010:

- 1. 209 Orange-Unhealthy for Sensitive Groups
- 2. 48 Red-Unhealthy
- 3. 2 Purple-Hazardous (p.7)

### High particle days in Kern County 2008-2010:

- 1. 126 Orange-Unhealthy for Sensitive Groups
- 2. 21 Red-Unhealthy
- 3. 2 Purple-Very Unhealthy (p.8)

Unhealthy air quality is harmful for the whole population but, the Lung Association says that children birth-18 and adults 65 and older are the most at risk. Lung diseases are the first to be listed: pediatric and adult asthma, chronic bronchitis, and emphysema. (p8-19) People living in areas with high ozone and particle pollution and who have cardiovascular disease and/or diabetes risk premature death. One study is finding that fine particle levels are associated with lung cancer in people who have never smoked. (p.11) New EPA guidelines will look at even smaller particles than what is now measured.

According to the San Joaquin Air Pollution Control Board's 2011 report the people of the San Joaquin Valley are working to comply with the EPA regulations. Our air quality

is better than it has been in 10 years. Our efforts are achieving cleaner air. A coal/coke gasification factory will erase what progress we have made. We have complied with EPA recommended no burn days. You must mandate that HECA follow the same rules we do. If you approve this proposal our families will have to endure the loss of many more loved ones and deal with lung diseases that rob vitality and joy from life. The coke and coal will be combusted 24 hours a day, 7 days a week, 365 days a year, adding 520 million tons of pollution to the air, raising even higher our levels of ozone and particles.

The Lung Association has written a report Toxic Air: The Case for Cleaning Up Coal-fired Power Plants . Coal-fired plants are among the largest contributors to particulate pollution, ozone, mercury, and global warming. You cannot tell me that gasification and sequestration are a clean solution for air quality. The Tupman facility will not even sequester the greenhouse gas, CO2. HECA will turn it over to Occidental Petroleum to play with. This plant will add more than 520 million tons of pollution a year for 30 years. The only clean solution is not to build this factory. The whole of Kern County is to be the test for this technology. Our lives are too high a price to pay for a science experiment that can only increase pollution of our bodies, air, land, water, and vegetation. 84 known hazardous pollutants are released from coal some of those are: arsenic, mercury, dioxins, formaldehyde, and hydrogen chloride. HECA will use an "old-school" fuel with a technology "face lift" but, coke and coal will still leave a poisonous and deadly residue.(p.10) Why isn't this project powered by natural gas?

You must be familiar with the topography of our valley and the unhealthy air that is trapped here. To permit SCS Energy to build this chemical factory fueled by coke and coal would be both irresponsible and criminal. The 520 million tons of pollution projected (not including the CO2) for each year is just the tip of the ice berg. No one really knows how well this process will work. This figure does not even include the cars, trucks, and trains transporting people and materials in and out of the site or the CO2 that will not be sequestered.

To protect the lives of our children and our Senior Citizens please say no to SCS Energy. To protect our agricultural business, please say no to HECA. To protect the whole San Joaquin Valley, please say no to this chemical factory. Trudy Douglass

5408 Inverrary Ct. Bakersfield, CA 93309



# People at Risk In 25 U.S. Cities Most Polluted by Short-term Particle Pollution (24-hour $PM_{2.5}$ )

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	2012 Rank <sup>1</sup>	2012 Rank <sup>a</sup> Metropolitan Statistical Areas	Total Population <sup>2</sup>	Under 18 <sup>3</sup>	65 and Over <sup>3</sup>	Pediatric Asthma <sup>4,8</sup>	Adult Asthma <sup>5,8</sup>	Chronic Bronchitis <sup>6,8</sup>	Chronic CV Bronchitis <sup>6,8</sup> Emphysema <sup>7,8</sup> Disease <sup>9</sup>	CV Disease	Diabetes <sup>10</sup>	Poverty <sup>11</sup>
	<b>⊢</b>	Bakersfield-Delano, CA	839,631	254,081	75,437	16,855	44,572	24,047	9,398	173,566	47,097	172,531
	2	Fresno-Madera, CA	1,081,315	320,356	110,683	21,251	57,991	31,596	12,865	231,750	63,239	276,242
	W	Hanford-Corcoran, CA	152,982	42,548	12,030	2,822	8,348	4,423	1,619	31,019	8,299	29,606
7	4	Los Angeles-Long Beach-Riverside, CA	17,877,006	4,565,478	1,951,619	302,853	1,017,973	557,067	228,858	4,109,426	1,125,917	2,869,935
	5	Modesto, CA	514,453	147,158	54,831	9,762	28,134	15,444	6,401	114,432	31,427	100,554
( t   	6	Pittsburgh-New Castle, PA	2,447,393	494,323	424,210	47,100	192,733	88,118	42,691	702,228	210,278	292,906
Va ı	7	Salt Lake City-Ogden-Clearfield, UT	1,744,886	533,826	153,471	36,709	110,172	49,331	19,048	353,672	79,802	210,795
	00	Logan, UT-ID	125,442	40,137	10,337	2,658	7,717	3,345	1,228	23,253	5,195	18,653
<u> </u>	9	Fairbanks, AK	97,581	25,001	6,375	1,731	7,184	2,919	1,026	20,296	3,491	8,804
	10	Merced, CA	255,793	80,698	23,960	5,353	13,302	7,191	2,853	52,121	14,142	58,212
'U I	11	Provo-Orem, UT	526,810	185,814	34,500	12,777	30,927	12,976	4,395	87,084	18,883	75,775
7	12	Visalia-Porterville, CA	442,179	144,124	41,779	9,561	22,675	12,297	4,931	89,570	24,362	108,143
PEA. I	13	Eugene-Springfield, OR	351,715	69,689	52,781	5,256	26,830	12,309	5,587	95,028	20,424	65,849
ı	14	Green Bay, WI	306,241	75,104	38,204	6,671	19,118	10,013	4,367	76,174	16,251	31,524
	15	Stockton, CA	685,306	200,724	71,181	13,315	37,106	20,338	8,380	150,333	41,250	128,331
N	16	Las Cruces, NM	209,233	55,858	25,881	4,456	14,971	6,503	2,806	48,910	12,556	52,262
l	17	Harrisburg-Carlisle-Lebanon, PA	683,043	152,398	102,609	14,521	52,634	23,488	10,866	183,301	54,575	71,977
1	18	Chicago-Naperville-Michigan City, IL-IN-WI	9,686,021	2,431,946	1,110,997	236,714	668,440	307,949	129,526	2,300,130	626,492	1,304,822
ı	18	San Diego-Carlsbad-San Marcos, CA	3,095,313	724,168	351,425	48,038	181,080	99,026	40,726	730,127	199,827	445,556
ı	20	Milwaukee-Racine-Waukesha, WI	1,751,316	431,446	221,571	38,324	109,226	57,101	24,984	434,587	92,773	267,038
<b>@</b>	21	Sacramento—Arden-Arcade—Yuba City, CA-NV	2,461,780	610,637	306,306	40,690	143,119	79,611	34,539	603,037	166,939	361,014
ļ	22	Davenport-Moline-Rock Island, IA-IL	379,690	89,568	57,111	7,347	24,569	12,863	5,987	100,626	25,407	49,380
Į	22	Philadelphia-Camden-Vineland, PA-NJ-DE-MD	6,533,683	1,526,723	871,837	149,002	483,714	217,185	96,168	1,660,434	479,061	821,977
ı	22	Washington-Baltimore-Northern Virginia, DC-MD-VA-WV	8,526,282	2,013,794	928,610	219,161	554,909	275,715	113,600	2,045,032	568,526	770,807
-	25	South Bend-Elkhart-Mishawaka, IN-MI	563,834	146,933	74,786	13,197	39,968	18,121	8,102	139,037	41,734	87,904
1	25	Yakima, WA	243,231	74,038	28,122	4,453	16,242	7,193	3,096	54,119	12,716	57,612

- Citics are ranked using the highest weighted average for any county within that Combined or Metropolitan Statistical Area.
   Total Population represents the at-risk populations for all counties within the respective Combined or Metropolitan Statistical Area.
   Those 18 and under and 55 and over are vulnerable to PM<sub>Ma</sub> and are, therefore, included. They should not be used as population denominators for disease estimates.
   Pediatric asthma estimates are for those under 18 years of age and represent the estimated number of people who had asthma in 2010 based on state rates (BRFSS) applied to population estimates set in those 18 years and older and represent the estimated number of people who had asthma in 2010 based on state rates (BRFSS) applied to population estimates (U.S. Census).
   Chronic bronchitis estimates are for those 18 years and older and represent the estimated number of people who had asthma in 2010 based on state rates (BRFSS) applied to population estimates (U.S. Census).
   Chronic bronchitis estimates are for adults 18 and over who had been diagnosed in 2010, based on national rates (NHIS) applied to population estimates (U.S. Census).
   Adding across rows does not produce valid estimates, e.g., summing pediatric and adult asthma and/or emphysema and chronic bronchitis.
   Adding across rows does not produce valid estimates, e.g., summing pediatric and adult asthma and/or emphysema and chronic bronchitis.
   CV diseases for cardiovascular diseases and estimates, e.g., summing pediatric and adult asthma and/or emphysema and chronic bronchitis.
   Diabetes estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census).
   Diabetes estimates are for adults 18 and over who have been diagnosed within their lifetime, based on state rates (BRFSS) applied to population estimates (U.S. Census

Rank         Metropolitan Statistical Areas         Population         Metropolitan Statistical Areas         Feature Population         Mover Vover 12         62 and Population         Mover 13         62 and Over 14         62 Al, 281         75, 437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           4         Visalia-Porterville, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louis-Nile-Lefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,883         1,526,723         871,837           12         Birmingham-Hoover-Cullman, AL         1,208,453         288,331         158,949           12         Steubenville-Weitron, OH-WV         1,208,453         281,337         662,604         431,376	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partizonal Par	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Particles People at Risk in 25 U.S. Cities Most Polluted by Year-Round Particles Rank Metropolitan Statistical Areas Population Under 18: 55 and People 18: 55 and Peop	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitional People at Risk In 25 U.S. Cities Most Population Under 18' Example Conditional People at Risk In 25 U.S. Cities Most Population Under 18' Example Conditional People Co		
Rank*         Metropolitan Statistical Areas         Population*         Total Population*         655 and Population*         Under 13*         655 and Population*           § 1         Balkersfield-Delano, CA         839,631         254,081         754,373           § 2         Hanford-Corcoran, CA         152,982         42,548         1,2030           § 3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,555,478         1,951,619           § 4         Visalia-Porterville, CA         402,179         144,124         41,779           § 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,147,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Clincinnati-Middletown-Villeland PA-NJ-DE-MD         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         3,44,414         181,225           10         Philadeliphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           12         Brimanyahari, AL         1,208,455         288,331         158,949	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partitank: Metropolitan Statistical Areas         Total Total Population: Under 18t Over	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic 2012  Rank: Metropolitan Statistical Areas  Population: Under 18' Over A 25 U.S. Cities Most Polluted by Year-Round Partic 2012  Rank: Metropolitan Statistical Areas  Population: Under 18' Over A 25 U.S. Cities Most Population: Under 18' Over A 25 U.S. Cities Most Population: Under 18' Over A 25 U.S. Cities Population: Under 18' Over A 25 U.S. Citi	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Catalogy Rank Heropolitan Statistical Areas Population* Under 18* Over Application Corporation CA 125,982 42,548 12,030 20 125,982 42,548 120,300 3 Los Angeles-Long Beach-Riverside. CA 17,277,006 4,565,478 1,951,619 3 Los Angeles-Long Beach-Riverside. CA 17,277,006 4,565,478 1,951,619 3 10 Philadeliphia-Camden, AZ 1,000	5,950 16,130 8,980 4,009 69,007	
Rank*         Metropolitan Statistical Areas         Population*         Total Population*         655 and Population*         Under 13*         692 of Population*         655 and Population*         60 mopulation*         Under 13*         604e²²           § 2         Hanford-Corcoran, CA         152.982         42.548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565.478         1,951,619           § 2         Hanford-Corcoran, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           12         Eurimingham-Hoover-Cullman, AL         2,902,951         662,604         431,376           12         Steubenville-Weirton, OH-WV         2,881,937         662,604         431,376 <t< td=""><td>People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partition           2012 (Panish)         Total Total Pollation         65 and Pollation         75,437         83,631         254,081         75,437         81,537         81,230         254,081         75,437         81,537         81,230         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         256,181         2</td><td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Rank Wetropolitan Statistical Areas Population Under 18' over A 12,030 at 12,082 at 12,082 at 12,083 at 12,</td><td>People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic  2012  People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic  2012  2012  2012  2012  2013  2014  Petropolitan Statistical Areas  2015  2014  Perropolitan Statistical Areas  2015  2014  Perropolitan Statistical Areas  2015  2014  People Peop</td><td>2,064 8,632 5,333 2,547 42,216</td></t<>	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partition           2012 (Panish)         Total Total Pollation         65 and Pollation         75,437         83,631         254,081         75,437         81,537         81,230         254,081         75,437         81,537         81,230         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         254,081         120,303         256,181         2	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Rank Wetropolitan Statistical Areas Population Under 18' over A 12,030 at 12,082 at 12,082 at 12,083 at 12,	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic  2012  People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic  2012  2012  2012  2012  2013  2014  Petropolitan Statistical Areas  2015  2014  Perropolitan Statistical Areas  2015  2014  Perropolitan Statistical Areas  2015  2014  People Peop	2,064 8,632 5,333 2,547 42,216	
Brank         Metropolitan Statistical Areas         Total Population         Total Total Population         Metropolitan Statistical Areas         Formation         Total Under 18¹         65 and Over¹	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partitional Rank: Metropolitan Statistical Areas         Total Total Total Total Rank: Metropolitan Statistical Areas         Population: Under 13: Over* Population: Under	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic vision Number 18 (1988)   1	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Columbus Angleria, CA (1973) (1974) (19	7,347 24,569 12,863 5,987 100,626	
Bank         Metropolitan Statistical Areas         Total Population         Total Total Under 18¹         65 and Over¹           § 1         Bakersfield-Delano, CA         85 and Over¹         Mepopulation*         Under 18¹         65 and Over¹           § 2         Hanford-Corcoran, CA         152,982         24,081         75,437           § 2         Hanford-Corcoran, CA         152,982         24,081         75,437           § 2         Hanford-Corcoran, CA         152,982         24,081         75,437           § 2         Hanford-Corcoran, CA         152,982         24,081         12,933           § 2         Hanford-Corcoran, CA         17,877,006         4,565,478         1,951,619           § 3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,422,179         144,124         41,779           § 4         Visalia-Porterville, CA         1,083         422,179         144,214         41,779           § 5         Fresno-Madera, CA         1,083         1,083         1,1083         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         1,122,887         1,225,723         3,143,275	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partition           2012 Rank¹         metropolitan statistical Areas         Total Population*         Most Total Under 18¹         65 and Over¹           2 1         Bakersfield-Delano, CA         839,631         254,081         75,437           3 2         Los Angeles-Long Beach-Riverside, CA         17,877,064         4,555,478         1,230           3 3         Los Angeles-Long Beach-Riverside, CA         1,081,315         320,356         110,683           4 4         Visalia-Porterville, CA         442,179         144,124         41,779           5 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6 6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7 9         Phoenix-Mesa-Glendale, AZ         2,172,191         541,640         265,863           9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         14,411         181,225           8 Cincinnati-Middletown-Vineland, PA-Nu-DE-MD         6,533,683         1,526,723         871,837           9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         244,414         281,235           10 St. Louis-St. Charles-Farmington, MO-IL         2,902,91         691,253	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic visiting Areas  Park: Metropolitan Statistical Areas  1 Bakersfield-Delano, CA 21 Los Angeles-Long Beach-Riverside, CA 3 Los Angeles-Long Beach-Riverside, CA 4 Visalia-Porteville, CA 4 Visalia-Porteville, CA 5 Presno-Madera, CA 6 Pittsburgh-New Castle, PA 7 Phoenix-Mesa-Glendale, AZ 8 Cincinnati-Middletown-Vilnington, OH-KY-IN 9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 12,025,125 (25,863)  1 St. Louis-St. Charles-Farmington, MO-IL 10 St. Louis-St. Charles-Farmington, MO-IL 11 Cieveland-Akron-Elyria, OH 12 Steubenville-Weitton, OH-WV 13 Steubenville-Weitton, OH-WV 14 Cieveland-Akron-Elyria, OH 15 Columbus, AK 17 Columbus, AK 17 Columbus, IN 18 Circlinatis, AR 19 Columbus, IN 19 Columbus-Anderson-Columbus, IN 19 Columbus-Anderson-Columbus, IN 19 Columbus-Anderson-Columbus, IN 20 Barderston, WV-OH 20 Parkersburg-Marietta, WV-OH 20 Wheeling, Wy-OH 20 Wheeling, Wy-OH 20 Wheeling, Wy-OH 21 Hodiston-Baytown-Huntsville, TX 21 Bardersburg-Marietta, Wy-OH 21 Hodiston, Baston-Baytown-Huntsville, TX 21 Hodiston-Baytown-Huntsville, TX 22 Sattle, TA-55 23 Houston-Baytown-Huntsville, TX 23 Houston-Baytown-Huntsville, TX 24 G6535 1,683,279 25 23,789 26 11 Dayton-Springfield-Greenville, OH 26 Wheeling, Wy-OH 27 Huntington-Baytown-Huntsville, TX 28 Houston-Baytown-Huntsville, TX 29 Houston-Baytown-Huntsville,	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Rank Metropolitan Statistical Areas Population Total Rank Rank Metropolitan Statistical Areas Population Total Rank Rank Rank Rank Rank Rank Rank Rank	.34,057 319,422 171,459 67,219 1,244,401	
Rank*         Metropolitan Statistical Areas         Total Population²         Londer 18*         65 and Over²           § 1         Bakersfield-Delano, CA         839,631         254,081         75,437           § 2         Hanford-Corcoran, CA         152,982         254,081         75,437           § 2         Hanford-Corcoran, CA         152,982         254,081         75,437           § 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           § 4         Visalia-Porterville, CA         41,779         144,179         144,179           § 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,333         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Willmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louis-St. Charles-Farmington, MO-IL         2,902,951         6,533,683         1,526,723         371,837           10         St. Louis-St. Charles-Farmington, MO-I	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitions           2012 Rank¹ Metropolitan Statistical Areas         Total Population² Total Vover¹         65 and Population² Vunder 18¹         75,437         75	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic family Metropolitan Statistical Areas Population* Under 18* Over* A 12,030 Population* Unde	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Total Rank Metropolitan Statistical Areas Population* Under 18* Over Population* Under 1	<u>127,325 322,604 180,163 69,512 1,298,152</u>	
Rank*         Hetropolitan Statistical Areas         Total population         Total population         Tunder 18*         65 and overitan Statistical Areas         Fopulation         Under 18*         65 and overitan Coverian. CA         65 and overitan Statistical Areas         65 and overitan Coverian. CA         839,631         254,081         75,437         254,081         75,437         254,081         75,437         254,081         75,437         254,081         75,437         254,081         75,437         254,081         12,030         23         12,030         23         254,081         12,030         23         12,030         23         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619         24         2,9356         110,683         2,0356         110,683         2,0356         110,683         2,047,79         2,047,279         2,147,124         41,779         2,047,279         2,147,124         41,779         2,147,124         41,779         2,147,124         41,779         2,147,124         41,779         42,210         2,172,131         541,4124         41,779         42,210         2,172,131         541,4124         41,712,813         344,414         131,225         42,210         2,172,131         541,412         21,41,24         24,210         253,683         34,414	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitank           2013 Rank¹ Metropolitan Statistical Areas         Total Population² Under 18³ Over²         65 and Over²           § 1         Bakersfield-Delano, CA         839,631         254,081         75,437           § 2         Hanford-Corcoran, CA         152,982         42,548         1,951,619           § 4         Visalia-Porterville, CA         17,877,006         4,565,478         1,1951,619           § 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           1.2         Steubenville-Weirton, OH-WV         1,284,543         1,267,23         871,837           1.4         Fairbanks, AK         1,284,543         2,902,951         65,336         158,949           1.4         Fairbanks, AK         2,881,337         25,001         63,375 <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic from the politan Statistical Areas Polluted by Total Rakersfield-Delano, CA 839,631 24,031 75,437 Polluted Statistical Areas Population* Under 18* Over Population* Under</td> <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Plank Metropolitan Statistical Areas Population Popul</td> <td>2,303 9,922 5,402 2,650 43,340</td>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic from the politan Statistical Areas Polluted by Total Rakersfield-Delano, CA 839,631 24,031 75,437 Polluted Statistical Areas Population* Under 18* Over Population* Under	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Plank Metropolitan Statistical Areas Population Popul	2,303 9,922 5,402 2,650 43,340	
2012         Metropolitan Statistical Areas         Total Population* Population* Population* Under 18* Over*         65 and Over*	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partizon:           2012 Rank:         Metropolitan Statistical Areas         Population* Under 18* Over* Over*           1 Bakersfield-Delano, CA         839,631         254,081         75,437           2 Hanford-Corcoran, CA         152,982         42,548         125,030           3 Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           4 Visalia-Porterville, CA         1,081,315         320,356         110,683           6 Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7 Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8 Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         34,4414         181,225           10 Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         371,837           12 Steubenville-Weirton, OH-WV         2,902,951         691,253         388,478           12 Fairbanks, AK         2,803,99         23,112         2,445,44         24,792         23,112           14 Fairbanks, AK         2,802,84         2,802,84         2,	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Fank: Metropolitan Statistical Areas Population: Under 18' Over' A 152,022 Hanford-Corcoran, CA 152,082 42,54081 75,437 1 Bakersfield-Delano, CA 152,082 42,54081 75,437 1 Columbus-Auburn-Opelika, CA 152,082 42,54081 12,030 1 Cos Angeles-Long Beach-Riverside, CA 17,877,006 4,565,478 1,951,619 3 Cos Angeles-Long Beach-Riverside, CA 1,813,15 320,356 1,105,651 1,105,851 1,052,651	Column	2,635 10,369 5,771 2,802 46,088	
2012         Metropolitan Statistical Areas         Population*         Total volet*         65 and volet*           Rank*         Metropolitan Statistical Areas         Population*         Under 18*         65 and Over*           1         Bakersfield-Delano, CA         839,631         254,081         75,437           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           4         Visalia-Porterville, CA         442,179         144,124         41,779           4         Visalia-Porterville, CA         442,179         144,124         41,779           5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Velferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         3,44,414         181,225           10         Philadelphia-Camden-Vineland, Pa-NuJ-De-MD	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partitank* Metropolitan Statistical Areas         Total Total Papulation* Under 18¹ Over¹ Over¹         65 and Over¹         65 and Over¹         65 and Over¹         67 and Over¹         65 and Over¹         67 and Over¹         68 and Over¹         68 and Over¹         68 and Over¹         68 and Over¹         69 and Over²         <	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Polluted by Year-Round Partic Polluted by Year-Round Partic Polluted by Year-Round Partic Polluted Pollono, CA 155, 478 155	Column	241 19,615 10,019 4,736 78,785	
2012         Total Rank*         Metropolitan Statistical Areas         Total Over's Population*         Metropolitan Statistical Areas         Population*         Under 18*         65 and Over's Over's Population*         Under 18*         60 ver's Over's Over's Over's Over's Population*         Under 18*         60 ver's Over's Over's Over's Over's Population*         Under 18*         60 ver's Over's Over's Over's Over's Population*         Under 18*         60 ver's Over's Over's Over's Population*         Under 18*         60 ver's Over's Over's Population*         25,083         254,083         254,083         254,083         254,083         254,083         251,619         20 ver's Population*         24,270         24,270         24,1210         24,1210         24,1210         24,127,333         244,124         241,779         24,127,333         244,323         242,210         27         24,127,333         244,323         242,210         27         24,127,333         244,323         242,210         27         21,127,871         24,127,219         241,210         21,127,219         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210         241,210	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partizank         Total Total Total Total Total Total Number 183 (Norrigan)         65 and Overigan Number 183 (Norrigan)         Total Total Total Total Number 183 (Norrigan)         65 and Overigan Number 183 (Norrigan)         75,437 <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  Rank¹ Metropolitan Statistical Areas  1 Bakersfield-Delano, CA  2 Hanford-Corcoran, CA  3 Los Angeles-Long Beach-Riverside, CA  4 Visalia-Porterville, CA  5 Fresno-Madera, CA  6 Pittsburgh-New Castle, PA  7 Phoenix-Mesa-Glendale, AZ  9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483  2 Honiadelphia-Camden-Vineland, PA-NJ-DE-MD  10 St. Louis-St. Charles-Farmington, MO-IL  2 Steubenville-Weirton, OH-WV  11 Cleveland-Akron-Elyria, OH  17 Columbus-Auburn-Opelika, GA-AL  18 Cindinabus, AK  19 Columbus-Auburn-Opelika, GA-AL  10 Columbus-Auburn-Opelika, GA-AL  11 Columbus-Auburn-Opelika, GA-AL  12 Columbus-Auburn-Opelika, GA-AL  13 Columbus-Auburn-Opelika, GA-AL  14 Columbus-Auburn-Opelika, GA-AL  15 Columbus-Auburn-Opelika, GA-AL  16 Columbus-Auburn-Opelika, GA-AL  17 Columbus-Auburn-Opelika, GA-AL  18 Stand Protein Vineland Partic Poolet Poolet Poolet Partic Poolet Partic</td> <td>People at Risk in 25 U.S. Cities Most Polluted by ∀ear-Round Partic Fank Metropolitan Statistical Areas  Population: Under 18¹ Corer A 152,982 42,548 12,030 12,03</td> <td>376 79,087 36,454 16,955 284,970</td>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  Rank¹ Metropolitan Statistical Areas  1 Bakersfield-Delano, CA  2 Hanford-Corcoran, CA  3 Los Angeles-Long Beach-Riverside, CA  4 Visalia-Porterville, CA  5 Fresno-Madera, CA  6 Pittsburgh-New Castle, PA  7 Phoenix-Mesa-Glendale, AZ  9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483  2 Honiadelphia-Camden-Vineland, PA-NJ-DE-MD  10 St. Louis-St. Charles-Farmington, MO-IL  2 Steubenville-Weirton, OH-WV  11 Cleveland-Akron-Elyria, OH  17 Columbus-Auburn-Opelika, GA-AL  18 Cindinabus, AK  19 Columbus-Auburn-Opelika, GA-AL  10 Columbus-Auburn-Opelika, GA-AL  11 Columbus-Auburn-Opelika, GA-AL  12 Columbus-Auburn-Opelika, GA-AL  13 Columbus-Auburn-Opelika, GA-AL  14 Columbus-Auburn-Opelika, GA-AL  15 Columbus-Auburn-Opelika, GA-AL  16 Columbus-Auburn-Opelika, GA-AL  17 Columbus-Auburn-Opelika, GA-AL  18 Stand Protein Vineland Partic Poolet Poolet Poolet Partic	People at Risk in 25 U.S. Cities Most Polluted by ∀ear-Round Partic Fank Metropolitan Statistical Areas  Population: Under 18¹ Corer A 152,982 42,548 12,030 12,03	376 79,087 36,454 16,955 284,970	
2012         Total Rank*         Metropolitan Statistical Areas         Total Over's Population*         Total Vunder 18*         65 and Over's Population*         4 Under 18*         65 and Over's Population*         4 Under 18*         60 ver's Pover's Population*         4 Under 18*         60 ver's Pover's Population*         5 and Over's Population*         5 Under 18*         6 Over's Population*         6 Voer's Population*         6 Population*         254,081         75,437         6 Over's Population*         6 Population*         24,081         75,437         7 Population*         24,081         75,437         7 Population*         24,081         12,030         3         1,083         2,42,130         4 2,555,478         1,951,619         3         1,083         4 42,179         1,41,124         41,179         41,124         41,779         41,179         1,41,124         41,779         41,179         1,41,124         41,779         41,179         1,51,133         320,356         110,683         6         Pittsburgh-New Castle, PA         2,41,739         424,210         2,41,739         424,210         2,41,739         424,210         2,41,712         2,41,712         2,41,712         2,41,712         3,41,414         1,1,683         3,41,414         1,1,683         3,41,414         1,1,1,7,561         5,14,712         3,1,256,733         3,71,837 <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partizonal Rank¹ Metropolitan Statistical Areas         Total Total Total Total Total Number 18³ Over¹ Over²         655 and Over²         75 and Over²         75 and Over²         839,631         254,081         75,437         55 and Over²         75,437         <th< td=""><td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Fank* Metropolitan Statistical Areas  1 Bakersfield-Delano, CA 2012 2013 2 Hanford-Corcoran, CA 2013 3 Los Angeles-Long Beach-Riverside, CA 2014 2015 3 Los Angeles-Long Beach-Riverside, CA 2015 3 Los Angeles-Long Beach-Riverside, CA 2016 4 Visalia-Porterville, CA 2017 2017 2018 2018 2018 2018 2018 2018 2018 2018</td><td>Copule at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Pank Metropolitan Statistical Areas  2012  Rank¹ Metropolitan Statistical Areas  1 Bakersfield-Delano, CA  2 Hanford-Corcoran, CA  2 Los Angeles-Long Beach-Riverside, CA  3 Los Angeles-Long Beach-Riverside, CA  3 Los Angeles-Long Beach-Riverside, CA  4 Visalia-Porterville, CA  4 Persno-Madera, CA  5 Fresno-Madera, CA  6 Pittsburgh-New Castle, PA  7 Phoenix-Mesa-Glendale, AZ  7 Phoenix-Mesa-Glendale, AZ  9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483 344,414 181,225 10 10 Philadelphia-Camden-Vineland, PA-NU-DE-MD  10 St. Louis-St. Charles-Farmington, MO-IL  11 Birmingham-Hoover-Cullinan, AL  12 Steubenville-Weirton, OH-WV  13 Los Angeles Ang</td><td>202 26,911 14,390 5,876 105,741</td></th<></td>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partizonal Rank¹ Metropolitan Statistical Areas         Total Total Total Total Total Number 18³ Over¹ Over²         655 and Over²         75 and Over²         75 and Over²         839,631         254,081         75,437         55 and Over²         75,437 <th< td=""><td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Fank* Metropolitan Statistical Areas  1 Bakersfield-Delano, CA 2012 2013 2 Hanford-Corcoran, CA 2013 3 Los Angeles-Long Beach-Riverside, CA 2014 2015 3 Los Angeles-Long Beach-Riverside, CA 2015 3 Los Angeles-Long Beach-Riverside, CA 2016 4 Visalia-Porterville, CA 2017 2017 2018 2018 2018 2018 2018 2018 2018 2018</td><td>Copule at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Pank Metropolitan Statistical Areas  2012  Rank¹ Metropolitan Statistical Areas  1 Bakersfield-Delano, CA  2 Hanford-Corcoran, CA  2 Los Angeles-Long Beach-Riverside, CA  3 Los Angeles-Long Beach-Riverside, CA  3 Los Angeles-Long Beach-Riverside, CA  4 Visalia-Porterville, CA  4 Persno-Madera, CA  5 Fresno-Madera, CA  6 Pittsburgh-New Castle, PA  7 Phoenix-Mesa-Glendale, AZ  7 Phoenix-Mesa-Glendale, AZ  9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483 344,414 181,225 10 10 Philadelphia-Camden-Vineland, PA-NU-DE-MD  10 St. Louis-St. Charles-Farmington, MO-IL  11 Birmingham-Hoover-Cullinan, AL  12 Steubenville-Weirton, OH-WV  13 Los Angeles Ang</td><td>202 26,911 14,390 5,876 105,741</td></th<>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Fank* Metropolitan Statistical Areas  1 Bakersfield-Delano, CA 2012 2013 2 Hanford-Corcoran, CA 2013 3 Los Angeles-Long Beach-Riverside, CA 2014 2015 3 Los Angeles-Long Beach-Riverside, CA 2015 3 Los Angeles-Long Beach-Riverside, CA 2016 4 Visalia-Porterville, CA 2017 2017 2018 2018 2018 2018 2018 2018 2018 2018	Copule at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Pank Metropolitan Statistical Areas  2012  Rank¹ Metropolitan Statistical Areas  1 Bakersfield-Delano, CA  2 Hanford-Corcoran, CA  2 Los Angeles-Long Beach-Riverside, CA  3 Los Angeles-Long Beach-Riverside, CA  3 Los Angeles-Long Beach-Riverside, CA  4 Visalia-Porterville, CA  4 Persno-Madera, CA  5 Fresno-Madera, CA  6 Pittsburgh-New Castle, PA  7 Phoenix-Mesa-Glendale, AZ  7 Phoenix-Mesa-Glendale, AZ  9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483 344,414 181,225 10 10 Philadelphia-Camden-Vineland, PA-NU-DE-MD  10 St. Louis-St. Charles-Farmington, MO-IL  11 Birmingham-Hoover-Cullinan, AL  12 Steubenville-Weirton, OH-WV  13 Los Angeles Ang	202 26,911 14,390 5,876 105,741	
2011         Metropolitan Statistical Areas         Total Population:         Total Under 18' Over's         65 and Over's           § 1         Bakersfield-Delano, CA         839,631         254,081         75,437           § 2         Hanford-Corcoran, CA         152,982         42,548         12,030           § 4         Visalia-Porterville, CA         17,877,006         4,565,478         1,951,619           § 4         Visalia-Porterville, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         653,683         1526,723         871,837           12         Birmingham-Hoover-Cullman, AL         1,208,453         288,331         158,949           12         Steubenville-Weirton, OH-WV         1,24,544         24,792         23,112           12	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partizonal Rank¹ Metropolitan Statistical Areas         Total Population² Under 18³ Over¹         65 and Sover¹	People at Risk In 25 U.S. Cities Most Polluted by ∀ear-Round Partic Rank' Metropolitan Statistical Areas  Population' Under 18' 55 and Population' Under 18' 75,437 125,4081 75,437 125,4081 125,838 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,338 125,4081 125,438 125,	Copple at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank Metropolitan Statistical Areas Population Under 18: 55 and Partic Polluted Population Under 18: 55 and Partic Population Population Viville Viv	4,292 17,296 10,731 5,088 84,858	
2012         Metropolitan Statistical Areas         Total Population         Total Population         Total Population         465 and Over's           § 1         Bakersfield-Delano, CA         839,631         254,081         75,437           § 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           § 4         Visalia-Porterville, CA         442,179         144,124         41,779           § 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           12         Birmingham-Hoover-Cullman, AL         1,208,453         28,331         158,949           12	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partizonal Rank¹ Metropolitan Statistical Areas         Total Total Total Over¹ Varianton² Under 18³ Over² Varianton² Under 18³ Over²         65 and Over² Varianton² Under 18³ Over² Varianton² Under 18³ Over²           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         1,526,723         871,837           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           12         Steuben	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic  2012    Total Rank*   Metropolitan Statistical Areas   Population*   Noter 18*   Over*   Noter 18*   Noter*   Not	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   Population*	240 147,611 65,880 27,927 494,231	
2012         Total Rank¹         Total Population²         Total Population²         65 and Over³           8 nt         Population²         Under 18³         65 and Over³           9 1         Bakersfield-Delano, CA         839,631         254,081         75,437           9 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3 Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           9 4 Visalia-Porterville, CA         442,179         144,124         41,779           5 Fresno-Madera, CA         1,081,315         320,356         110,683           6 Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7 Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8 Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10 St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           12 Birmingham-Hoover-Cullman, AL         1,208,453         288,331         158,949           12 Steubenville-Weirton, OH-WV         1,24,544         24,792	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partizonal Rank¹ Metropolitan Statistical Areas         Total Total Total Netropolitan Statistical Areas         Formal Partizonal Total Netropolitan Total Total Population² Under 18³ Over¹         65 and Statistical Areas         Formal Population² Under 18³ Over²         0 Mer¹ 18³ Over²         0 Mer² 18³ Over²         0 Mer² 18³ Over²         0 Mer² 18³ Over²         0 Mer² 18³ 1.55,478         1.10,533         0 Mer² 18³ 1.55,478         0 Mer² 18³ 1.55,478         0 Mer² 18³ 1.00,833         0 Mer² 1.00,833         0	People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic  2012  Rank¹ Metropolitan Statistical Areas  ↑ 1 Bakersfield-Delano, CA  ↑ 1 Bakersfield-Delano, CA  ↑ 1 Los Angeles-Long Beach-Riverside, CA  ↑ 1 Visalia-Porterville, CA  ♠ 1 Visalia-Porterville, CA  ♠ 1 Phoenix-Mesa-Glendale, AZ  ↑ Phoenix-Mesa-Glendale, AZ  ↑ Phoenix-Mesa-Glendale, AZ  ↑ Phoenix-Mesa-Glendale, AZ  ↑ Philadelphia-Camden-Vineland, PA-NJ-DE-MD  ↑ Philadelphia-Camden-Vineland, PA-NJ-DE-MD  ↑ St. Louis-St. Charles-Farmington, MO-IL  12 Steubenville-Weirton, OH-WV  13 Steubenville-Weirton, OH-WV  14 Cleveland-Akron-Elyria, OH  15 St. Louis-St. Charles-Farmington, OH-WV  15 St. Charles-Farmington, OH-WV  16 Cleveland-Akron-Elyria, OH  17 St. Cleveland-Akron-Elyria, OH  18 Cleveland-Akron-Elyria, OH  19 Cleveland-Akron-Elyria, OH	Column         Total         Pear-Round Partic           Total         Total         Los and Partic         Pear Population*         Under 18*         Pover*         A         Pear Population*         Pear Population*         Under 18*         Over*         A         Pear Population*	1,731 7,184 2,919 1,026 20,296	
2012         Total Rank¹         Total Population²         Total Over¹         45 and Over²           Rank¹         Metropolitan Statistical Areas         Population²         Under 18³         65 and Over²           1         Bakersfield-Delano, CA         839,631         254,081         75,437           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           4         Visalia-Porterville, CA         442,179         144,124         41,779           5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louis-Vierenon County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           10         St. Louis-St. Charles-Farmington, MO-IL	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Parti           2012 Rank¹ Metropolitan Statistical Areas         Total Population¹ Under 18³ Over³         65 and Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           12         Birmingham-Hoover-Cullman, AL         1,28,453         24,792         23,1	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  2012  2012  2012  2013  2014  2014  2015  20	Copple at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic People at Risk in 25 U.S. Cities Most Polluted by Year-Round Partic Peopliano Statistical Areas    Total Total Total People People	126 213,261 98,669 45,842 772,244	
2012         Total Rank¹         Total Population²         Total Population²         65 and Over³           Rank¹         Metropolitan Statistical Areas         Population²         Under 18³         Over³           ② 1         Bakersfield-Delano, CA         839,631         254,081         75,437           ② 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           ② 4         Visalia-Porterville, CA         442,179         144,124         41,779           ③ 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louis-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           12         Birmingham-Hoover-Cullman, AL         1,	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹ Metropolitan Statistical Areas         Total Total Total Total Total Population² Under 18³ Over³ Over³         65 and Population² Under 18³ Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         17,877,006         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         1,526,723         871,837           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478           12         Birmingham-Hoover-Cullman, AL         1,208,453         288,331         158,949	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Total Rank: Metropolitan Statistical Areas Population: Under 18³ Over Angeles-Long Beach-Riverside, CA 17,877,006 4,565,478 1,951,619 3 Los Angeles-Long Beach-Riverside, CA 17,877,006 4,565,478 1,951,619 3 Los Angeles-Long Beach-Riverside, CA 17,877,006 4,565,478 1,951,619 3 4 Visalia-Porterville, CA 1,031,315 320,356 110,683 6 Pittsburgh-New Castle, PA 2,447,393 494,323 424,210 7 Phoenix-Mesa-Glendale, AZ 1,102,887 1,107,561 514,712 1 8 Cincinnati-Middletown-Wilmington, OH-KY-IN 2,172,191 541,640 265,863 9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483 344,414 181,225 1 1 51,0015-St. Charles-Farmington, MO-IL 2,902,951 691,253 388,478 1 158,949 1 1 10 St. Louis-St. Charles-Farmington, MO-IL 1,208,453 288,331 158,949 1 1 10 St. Louis-St. Charles-Farmington, MO-IL 1,208,453 288,331 158,949 1 10 St. Louis-St. Charles-Farmington, MO-IL 1,208,453 288,331 158,949 1 1 10 St. Louis-St. Charles-Farmington, MO-IL 1,208,453 288,331 158,949 1 1 10 St. Louis-St. Charles-Farmington, MO-IL 1,208,453 288,331 158,949 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Color	2,020 8,511 4,573 2,282 36,997	
Total Rank*         Metropolitan Statistical Areas         Total Population*         Total Over*         65 and Over*           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951         691,253         388,478	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹ Metropolitan Statistical Areas         Total Total Total Population² Under 18³ Over³ Over³         € and Population² Under 18³ Over³           ② 1         Bakersfield-Delano, CA         839,631         254,081         75,437           ③ 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           ② 4         Visalia-Porterville, CA         442,179         144,124         41,779           ② 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD         6,533,683         1,526,723         871,837           10         St. Louis-St. Charles-Farmington, MO-IL         2,902,951 <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Total Rank Metropolitan Statistical Areas Population Under 18' Over Agank Metropolitan Under 18' Ov</td> <td>  Colorinati-Middletown-Wilmington, OH-KY-IN   Description   Description</td> <td>,120 72,591 39,865 17,598 304,358</td>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Total Rank Metropolitan Statistical Areas Population Under 18' Over Agank Metropolitan Under 18' Ov	Colorinati-Middletown-Wilmington, OH-KY-IN   Description	,120 72,591 39,865 17,598 304,358	
Total Rank' Metropolitan Statistical Areas         Total Population*         Total Population*         65 and Over's Over'	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹         Total Total Population*         1 65 and Population*         Under 18³         65 and Population*         Under 18³         65 and Population*         Under 18³         Over³           ② 1         Bakersfield-Delano, CA         839,631         254,081         75,437         75,437           ③ 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           ③ 4         Visalia-Porterville, CA         442,179         144,124         41,779           ⑤ 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225           10         Philadelphia-Camden-Vineland, PA-NJ-DE-MD	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  Rank* Metropolitan Statistical Areas  1 Bakersfield-Delano, CA  2 Hanford-Corcoran, CA  3 Los Angeles-Long Beach-Riverside, CA  4 Visalia-Porterville, CA  5 Fresno-Madera, CA  6 Pittsburgh-New Castle, PA  7 Phoenix-Mesa-Glendale, AZ  8 Cincinnati-Middletown-Wilmington, OH-KY-IN  9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483  10 Philadelphia-Camden-Vineland, PA-NJ-DE-MD  8 ST,837  10 Philadelphia-Camden-Vineland, PA-NJ-DE-MD  10 Philadelphia-Camden-Vineland, PA-NJ-DE-MD  10 Philadelphia-Camden-Vineland, PA-NJ-DE-MD  10 Palladelphia-Camden-Vineland, PA-NJ-DE-MD	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012  Rank' Metropolitan Statistical Areas  Population* Under 18' Over A 152,982 42,548 12,030  1 Bakersfield-Delano, CA  2 Bay, Call Sand Particle Adaption Ad	73,624 197,528 96,454 42,981 740,304	
Total Rank' Metropolitan Statistical Areas         Total Population*         Metropolitan Total Population*         Metropolitan Total Population*         Metropolitan Total Population*         Metropolitan Total Population*         Under 183*         Metropolitan Statistical Areas           ② 1         Bakersfield-Delano, CA         839,631         254,081         75,437           ② 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           ② 4         Visalia-Porterville, CA         442,179         144,124         41,779           ⑤ 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863           9         Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483         344,414         181,225	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹ Metropolitan Statistical Areas         Total Total Population*         65 and Population*         Under 18³ Over³         1 Metropolitan Statistical Areas         Population*         Under 18³ Over³         1 Juder 18³ Over³         1 Juder 18³ Over³         1 Juder 18³ Over³         254,081         75,437         1 Juder 18³ Over³         1 Juder 18³ Over³         1 Juder 18³ Over³         2 Juder 18³ Over³         2 Juder 18³ Over³         1 Juder 18³ Over³         1 Juder 18³ Over³         2	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012 Rank¹ Metropolitan Statistical Areas  1 Bakersfield-Delano, CA 2 Hanford-Corcoran, CA 3 Los Angeles-Long Beach-Riverside, CA 4 Visalia-Porterville, CA 5 Fresno-Madera, CA 6 Pittsburgh-New Castle, PA 7 Phoenix-Mesa-Glendale, AZ 7 Phoenix-Mesa-Glendale, AZ 8 Cincinnati-Middletown-Wilmington, OH-KY-IN 9 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483 8 Cincinnati-Middletown-Scottsburg, KY-IN 1,427,483 8 Louisville-Jefferson County-Elizabethtown-Scottsburg, KY-IN 1,427,483 8 Sinch Areas Most Polluted by Year-Round Partic Value A	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Population Statistical Areas Population	.49,002 483,714 217,185 96,168 1,660,434	
2012         Total Rank¹         Total Population²         45 and Over³           Rank¹         Metropolitan Statistical Areas         Population²         Under 18³         65 and Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8         Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹ Metropolitan Statistical Areas         Total Total Population² Under 18³ Over³ Over³         € 3 and Population² Under 18³ Over³           ② 1 Bakersfield-Delano, CA         839,631         254,081         75,437           ② 2 Hanford-Corcoran, CA         152,982         42,548         12,030           ③ 3 Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           ② 4 Visalia-Porterville, CA         442,179         144,124         41,779           ③ 5 Fresno-Madera, CA         1,081,315         320,356         110,683           6 Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7 Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712           8 Cincinnati-Middletown-Wilmington, OH-KY-IN         2,172,191         541,640         265,863	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic           Total Population? Under 183         65 and Population? Under 183         Population? Under 183         Overs A           1         Bakersfield-Delano, CA         152,982         42,548         12,030         2           2         Hanford-Corcoran, CA         17,877,006         4,565,478         1,951,619         3           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619         3           4         Visalia-Porterville, CA         442,179         144,124         41,779         3           5         Fresno-Madera, CA         1,081,315         320,356         110,683         1           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712         1           8         Cincinnati-Middletown-Willmington, OH-KY-IN         2,172,191         541,640         265,863         1	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Total Rank! Metropolitan Statistical Areas Population: Under 183 Overs Angeles-Long Beach-Riverside, CA 17,877.006 4,565,478 1,951,619 3 Los Angeles-Long Beach-Riverside, CA 1,037,006 4,565,478 1,051,619 3 Costalia-Porterville, CA 42,179 144,124 41,779 5 Fresno-Madera, CA 1,031,315 320,356 110,683 6 Pittsburgh-New Castle, PA 2,477,393 494,323 424,210 7 Phoenix-Mesa-Glendale, AZ 4,210 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	35,354 110,720 46,992 20,586 358,161	
2012         Total Population*         Colspan         65 and Population*         Under 183         65 and Over's Population*         Under 183         Over's Population*         Under 183         Over's Population*         Under 183         Over's Population*         Under 183         Under 183         Over's Population*         Under 183         Under 183 <th colsp<="" td=""><td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹           Total Population¹         1 total Population²         1 under 18³ over³           1         Bakersfield-Delano, CA         839,631         254,081         75,437           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1.951,619           4         Visalia-Porterville, CA         442,179         144,124         41,779           5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712</td><td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank: Metropolitan Statistical Areas  Pank: Metropolitan Statistical Areas  Population: Under 18: Over A Vover A Visalia-Porterville, CA  Visalia-Porterville, CA  Phoenix-Mesa-Glendale, AZ  Phoenix-Mesa-Glendale, AZ  Post Poolluted by Year-Round Partic Vover A Visalia-Porterville A Vis</td><td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank: Metropolitan Statistical Areas    1   Bakersfield-Delano, CA                                    </td><td>2,022 159,476 70,437 30,544 534,359</td></th>	<td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹           Total Population¹         1 total Population²         1 under 18³ over³           1         Bakersfield-Delano, CA         839,631         254,081         75,437           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1.951,619           4         Visalia-Porterville, CA         442,179         144,124         41,779           5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712</td> <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank: Metropolitan Statistical Areas  Pank: Metropolitan Statistical Areas  Population: Under 18: Over A Vover A Visalia-Porterville, CA  Visalia-Porterville, CA  Phoenix-Mesa-Glendale, AZ  Phoenix-Mesa-Glendale, AZ  Post Poolluted by Year-Round Partic Vover A Visalia-Porterville A Vis</td> <td>People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank: Metropolitan Statistical Areas    1   Bakersfield-Delano, CA                                    </td> <td>2,022 159,476 70,437 30,544 534,359</td>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹           Total Population¹         1 total Population²         1 under 18³ over³           1         Bakersfield-Delano, CA         839,631         254,081         75,437           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1.951,619           4         Visalia-Porterville, CA         442,179         144,124         41,779           5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210           7         Phoenix-Mesa-Glendale, AZ         4,192,887         1,107,561         514,712	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank: Metropolitan Statistical Areas  Pank: Metropolitan Statistical Areas  Population: Under 18: Over A Vover A Visalia-Porterville, CA  Visalia-Porterville, CA  Phoenix-Mesa-Glendale, AZ  Phoenix-Mesa-Glendale, AZ  Post Poolluted by Year-Round Partic Vover A Visalia-Porterville A Vis	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic Pank: Metropolitan Statistical Areas    1   Bakersfield-Delano, CA	2,022 159,476 70,437 30,544 534,359
Total Rank*         Total Population*         65 and Population*         Under 18³         65 and Population*         Under 18³         Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹ Metropolitan Statistical Areas         Total Total Population¹ Under 18³ Over³         65 and Population¹ Under 18³ Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         1,2030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683           6         Pittsburgh-New Castle, PA         2,447,393         494,323         424,210	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic    Total   Total   Peopliation* Under 18*   Over*   A     1   Bakersfield-Delano, CA   152,982   42,548   12,030     2   Hanford-Corcoran, CA   152,982   42,548   12,030     3   Los Angeles-Long Beach-Riverside, CA   17,877,006   4,565,478   1,951,619   3   4   Visalia-Porterville, CA   1,877,006   442,179   144,124   41,779     5   Fresno-Madera, CA   1,081,315   320,356   110,683     6   Pittsburgh-New Castle, PA   2,447,393   494,323   424,210	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic    Total   Total   Population* Under 18*   Over*   A	3,850 297,158 130,677 56,150 981,249	
2012         Total Population*         65 and Population*         Under 18³         69 Ander 18°         Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437           Ø 2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           Ø 4         Visalia-Porterville, CA         442,179         144,124         41,779           Ø 5         Fresno-Madera, CA         1,081,315         320,356         110,683	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank! Metropolitan Statistical Areas         Total Total Population* Under 18*         65 and Population* Under 18*         152,081         75,437         2         Participal Rank! Metropolitan Statistical Areas         839,631         254,081         75,437         2         Participal Rank! Metropolitan Statistical Areas         12,030         2         Participal Rank! Metropolitan Statistical Areas         12,030         2         Participal Rank! Metropolitan Statistical Areas         12,030         2         24,030         24,548         12,030         2         24,548         12,030         2         24,548         1,030         2         24,548         1,030         2         24,548         1,030         2         24,548         1,030         2         24,548         1,030         2         24,548	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012 Rank¹ Metropolitan Statistical Areas Population² Under 18³ Over³ A  1 Bakersfield-Delano, CA 839,631 254,081 75,437  2 Hanford-Corcoran, CA 152,982 42,548 12,030  3 Los Angeles-Long Beach-Riverside, CA 17,877,006 4,565,478 1.951,619 3  4 Visalia-Porterville, CA 17,877,006 42,179 144,124 41,779  5 Fresno-Madera, CA 1,081,315 320,356 110,683	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  2012 Rank¹ Metropolitan Statistical Areas Population² Under 18³ Over³ A  2 Hanford-Corcoran, CA 152,982 42,548 12,030  3 Los Angeles-Long Beach-Riverside, CA 17,877,006 4,565,478 1.951,619 3  4 Visalia-Porterville, CA 17,877,006 42,179 144,124 41,779  5 Fresno-Madera, CA 1,081,315 320,356 110,683	,100 192,733 88,118 42,691 702,228	
Value         Total Rank¹         Total Population²         Total Population²         45 and Over³           Value         1         Bakersfield-Delano, CA         839,631         254,081         75,437           Value         2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           4         Visalia-Porterville, CA         442,179         144,124         41,779	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank¹         Total Total Population²         65 and Population²         Under 18³         65 and Population²         Under 18³         65 and Population²         Under 18³         55,437         25,437         25,437         42,548         12,030           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619           3         Visalia-Porterville, CA         442,179         144,124         41,779	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic    People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   Total   Total   People   Population   Under 18   Over   A	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic    People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic   People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic	21,251 57,991 31,596 12,865 231,750	
Political Areas         Total Population         Total Population         45 and Over <sup>3</sup> 1         Bakersfield-Delano, CA         839,631         254,081         75,437           2         Hanford-Corcoran, CA         152,982         42,548         12,030           3         Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Rank!           Total Population: Under 18 <sup>3</sup> Over <sup>3</sup> 8 akersfield-Delano, CA         839,631         254,081         75,437           1 Bakersfield-Corcoran, CA         152,982         42,548         12,030           3 Los Angeles-Long Beach-Riverside, CA         17,877,006         4,565,478         1,951,619	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  Total Population* Under 18*	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic    Pank   Metropolitan Statistical Areas   Population   Under 18   Over   A	9,561 22,675 12,297 4,931 89,570	
2012         Total Population* Over 183         65 and Over 3           Rank¹ Metropolitan Statistical Areas         Population² Under 18³ Over 3         Under 18³ Over 3           1 Bakersfield-Delano, CA         839,631 254,081 75,437         75,437           2 Hanford-Corcoran, CA         152,982 42,548 12,030	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partice Total Rank* Metropolitan Statistical Areas Population* Under 18* Over*    1   Bakersfield-Delano, CA   839,631   254,081   75,437     2   Hanford-Corcoran, CA   152,982   42,548   12,030	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  Pank! Metropolitan Statistical Areas Population! Under 18! Over! A  1 Bakersfield-Delano, CA 839,631 254,081 75,437  Pank 152,982 42,548 12,030	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  Pank! Metropolitan Statistical Areas Population: Under 18: Over A  1 Bakersfield-Delano, CA 839,631 254,081 75,437  Panford-Corcoran, CA 152,982 42,548 12,030	2,853 1,017,973 557,067 228,858 4,109,426	
2012         Total         65 and           Rank¹         Metropolitan Statistical Areas         Population²         Under 18³         Over³           Ø 1         Bakersfield-Delano, CA         839,631         254,081         75,437	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Participal Total Total Rank¹ Metropolitan Statistical Areas Population² Under 18³ Over²  1 Bakersfield-Delano, CA 839,631 254,081 75,437	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  Total Rank' Metropolitan Statistical Areas Population' Under 18' Over' A  839,631 254,081 75,437	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  Total Rank <sup>1</sup> Metropolitan Statistical Areas Population <sup>2</sup> Under 18 <sup>3</sup> Over <sup>3</sup> A  839,631 254,081 75,437	2,822 8,348 4,423 1,619 31,019	
2012 Total 65 and Rank <sup>1</sup> Metropolitan Statistical Areas Population <sup>2</sup> Under 18 <sup>3</sup> Over <sup>3</sup>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Particul Total 65 and Population <sup>2</sup> Under 18 <sup>3</sup> Over <sup>3</sup>	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic  Total Fand Pe  Rank <sup>1</sup> Metropolitan Statistical Areas Population <sup>2</sup> Under 18 <sup>3</sup> Over A	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic	16,855 44,572 24,047 9,398 173,566	
	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Partic	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Particl	People at Risk In 25 U.S. Cities Most Polluted by Year-Round Particles	Pediatric Adult Chronic CV Asthma <sup>4,8</sup> Asthma <sup>5,8</sup> Bronchitis <sup>6,8</sup> Emphysema <sup>7,8</sup> Disease <sup>8</sup>	
And Appendix					

- . Cities are ranked using the highest design value for any county within that Combines or Metropolitian Statistical Area.

  Total Population represents the nerisk populations for all counties within the espective Combined or Metropolitian Statistical Area.

  Those 18 and under an 65 and over are value rules to 1M<sub>2</sub>, and are, this relieve, included. They should not be used as population derived to supulation estimates are for those to years and older and represent the estimated number of Leocile who had astim a m2010 based on state rates (BRESS) applied to oppulation estimates are for should be years and older and represent the estimated number of people who had based on state rates (BRESS) applied to population estimates (U.S. Census).

  Chronic bronchitis estimates are for adults 18 and over who had been pregnosed within their lifetime, based on national rates (NHS) applied to population estimates (U.S. Census).

  Temphysema estimates are for adults 18 and over who have been pregnosed within their lifetime, pased on national rates (NHS) applied to population estimates (U.S. Census).

  Cy disease is cardiovascular disease and estimates are based on National Heart Lung and Blood institute (NHLB) estimates are for adults 18 and over who have been pregnosed within their lifetime, cased on state rates (BRESS) applied to population estimates (U.S. Census).

  Diabettes estimates are for adults 18 and over who have been pregnosed within their lifetime, cased on state rates (BRESS) applied to population estimates (U.S. Census).

# People at Risk In 25 Most Ozone-Polluted Cities

21 Cincir (23) Stock 24 Bator				21 Birmi	20 Pittsb	19 Phoe	18 Charl	16 Philac	16 Chico, CA	15 New	14 El Ce	13 Wash	12 Dalla	Bangor	(10) Merce	1	8 Hous	7 San L		) Hanfo	4 Fresn	3 Bake	(2) Visali	1 Los A	2012 Rank <sup>1</sup> Metro
	Baton Rouge-Pierre Part, LA	Stockton, CA	Cincinnati-Middletown-Wilmington, OH-KY-IN	Birmingham-Hoover-Cullman, AL	Pittsburgh-New Castle, PA	Phoenix-Mesa-Glendale, AZ	Charlotte-Gastonia-Salisbury, NC-SC	Philadelphia-Camden-Vineland, PA-NJ-DE-MD	, CA	New York-Newark-Bridgeport, NY-NJ-CT-PA	El Centro, CA	Washington-Baltimore-Northern Virginia, DC-MD-VA-WV	Dallas-Fort Worth, TX	Modesto, CA	Merced, CA	San Luis Obispo-Paso Robles, CA	Houston-Baytown-Huntsville, TX	San Diego-Carlsbad-San Marcos, CA	SacramentoArden-ArcadeYuba City, CA-NV	Hanford-Corcoran, CA	Fresno-Madera, CA	Bakersfield-Delano, CA	Visalia-Porterville, CA	Los Angeles-Long Beach-Riverside, CA	Metropolitan Statistical Areas
	825,905	685,306	2,172,191	1,208,453	2,447,393	4,192,887	2,402,623	6,533,683	220,000	22,085,649	174,528	8,526,282	6,697,402	514,453	255,793	269,637	6,051,363	3,095,313	2,461,780	152,982	1,081,315	839,631	442,179	17,877,006	Total Population <sup>2</sup>
	204,083	200,724	541,640	288,331	494,323	1,107,561	610,448	1,526,723	46,168	5,059,741	51,098	2,013,794	1,850,846	147,158	80,698	50,841	1,683,279	724,168	610,637	42,548	320,356	254,081	144,124	4,565,478	Under 18³
	89,297	71,181	265,863	158,949	424,210	514,712	269,005	871,837	33,817	2,906,533	18,152	928,610	617,125	54,831	23,960	41,022	523,789	351,425	306,306	12,030	110,683	75,437	41,779	1,951,619	65 and Over³
	16,955	13,315	52,022	33,120	47,100	103,850	55,318	149,002	3,063	496,081	3,390	219,161	140,000	9,762	5,353	3,373	127,325	48,038	40,690	2,822	21,251	16,855	9,561	302,853	Pediatric Asthma <sup>4,8</sup>
	41,518	37,106	159,476	72,591	192,733	297,158	136,032	483,714	13,391	1,609,241	9,415	554,909	357,872	28,134	13,302	16,916	322,604	181,080	143,119	8,348	57,991	44,572	22,675	1,017,973	Adult Asthma <sup>s,8</sup>
	26,153	20,338	70,437	39,865	88,118	130,677	75,955	217,185	7,563	733,058	5,139	275,715	200,820	15,444	7,191	9,556	180,163	99,026	79,611	4,423	31,596	24,047	12,297	557,067	Chronic Bronchitis <sup>6,8</sup>
	10,735	8,380	30,544	17,598	42,691	56,150	31,737	96,168	3,464	321,030	2,104	113,600	78,933	6,401	2,853	4,342	69,512	40,726	34,539	1,619	12,865	9,398	4,931	228,858	Emphysema <sup>7.8</sup>
	130,090	128,331	297,254	202,352	292,906	676,590	367,170	821,977	43,392	2,893,957	36,666	770,807	960,577	100,554	58,212	36,179	992,603	445,556	361,014	29,606	276,242	172,531	108,143	2,869,935	Poverty

Notes:

Cites are ranked using the highest weighted average for any country within the Combined or Metropolitan Statistical Area.

Total Population represents the actrisk populations for all counties within the respective Combined or Metropolitan Statistical Area.

Total Population represents the actrisk populations for all counties within the respective Combined or Metropolitan Statistical Area.

Total Population represents the actrisk populations for all counties within the respective Combined on Population denominators for bisease estimates.

The Adult asthma estimates are for those under 18 yours or rape and represent the estimated number of countie who had asthma in 2010 beyond on stude motes (BRT SS) applied to population estimates.

The Adult asthma estimates are for adults: 2 and over who have been deen unable of purpose with the population estimates (U.S. Census).

The Emphysema astimates are for adults: 18 and over who have been degroesed within that if items, 68sed on national rates (NHS) applied to population estimates (U.S. Census).

Adding across rows does not produce valid estimates, e.g., summing ped across adult asthma and/or emphysema and chronic bronchins.

# People at Risk in 25 Counties Most Polluted by Short-term Particle Pollution (24-hour PM\_\_)

	At-Risk Groups	:						At-Risk Groups		(F) 110 kg 112.5	2.5		Unhealthy Ranges, 2008-2010	Ranges, 2010
2012 Rank	County	ST	Total Population <sup>2</sup>	Under 18³	65 and Over <sup>3</sup>	Pediatric Asthma <sup>4,6</sup>	Adult Asthma <sup>s,8</sup>	Chronic Bronchitis <sup>6,8</sup>	CV Emphysema <sup>7,8</sup> Disease <sup>9</sup>	CV B Disease	Diabetes <sup>10</sup>	Poverty <sup>11</sup>	Weighted	Grade <sup>13</sup>
1	Kern	CA	839,631	254,081	75,437	16,855	44,572	24,047	9,398	173,566	47,097	172,531	53.8	-n
2	Fresno	CA	930,450	277,507	93,421	18,409	49,721	27,034	10,932	197,670	53,861	245,330	41.2	п
(3)	Kings	CA	152,982	42,548	12,030	2,822	8,348	4,423	1,619	31,019	8,299	29,606	29.8	П
4	Riverside	CA	2,189,641	620,108	258,586	41,135	120,166	66,447	28,441	498,296	137,270	354,768	28.8	TI
5	Stanislaus	CA	514,453	147,158	54,831	9,762	28,134	15,444	6,401	114,432	31,427	100,554	26.8	m
6	Allegheny	PΑ	1,223,348	241,663	205,059	23,026	96,938	43,705	20,759	344,552	102,934	141,453	26.3	חד
7	Hawaii	エ	185,079	42,280	26,834	4,662	13,426	6,404	2,964	50,212	12,390	33,285	23.5	חד
00	Los Angeles	CA	9,818,605	2,402,208	1,065,699	159,352	566,147	308,756		2,266,565	619,371	1,699,264	20.3	חד
9	Salt Lake	TU	1,029,655	299,781	89,367	20,614	66,384	29,531	11,231	210,224	47,227	139,675	19.3	П
10	Cache	U	112,656	35,639	8,694	2,451	6,988	2,985	1,062	20,466	4,503	17,323	15.0	חד
11	Shoshone	ō	12,765	2,660	2,537	122	915	474	245	3,910	985	2,606	12.7	חד
12	Fairbanks North Star Borough	Þ X	97,581	25,001	6,375	1,731	7,184	2,919	1,026	20,296	3,491	8,804	11.8	¬n
(21	Merced	CA	255,793	80,698	23,960	5,353	13,302	7,191	2,853	52,121	14,142	58,212	11.7	T1
14	Utah	T	516,564	181,977	33,457	12,514	30,344	12,705	4,280	85,060	18,413	74,539	11.5	TI
15	Weber	T	231,236	69,311	23,388	4,766	14,730	6,698	2,713	48,982	11,201	31,542	10.0	Ŧ
(B)	Tulare	CA	442,179	144,124	41,779	9,561	22,675	12,297	4,931	89,570	24,362	108,143	9.8	т
17	Muscatine	₽	42,745	11,164	5,843	695	2,476	1,393	635	10,809	2,403	5,782	9.2	ח
18	Lane	OR	351,715	69,689	52,781	5,256	26,830	12,309	5,587	95,028	20,424	65,849	8.7	П
19	Brown	≦	248,007	61,823	28,789	5,491	15,440	7,963	3,378	59,793	12,676	24,829	7.0	П
20)	San Joaquin	CA	685,306	200,724	71,181	13,315	37,106	20,338	8,380	150,333	41,250	128,331	6.8	77
21(	Lemhi	₽	7,936	1,576	1,758	73	582	308	167	2,602	659	1,660	6.7	ח
21	Doña Ana	Z	209,233	55,858	25,881	4,456	14,971	6,503	2,806	48,910	12,556	52,262	6.7	'n
23	Plumas	CA	20,007	3,601	4,154	239	1,308	784	410	6,527	1,886	3,012	6.5	TI
23	Lewis and Clark	MH	63,395	14,376	8,757	990	4,455	2,189	996	17,049	3,474	7,041	6.5	חד
25	San Bernardino	CA	2,035,210	594,588	181,348	39,442	109,976	59,433	23,199	429,655	116,882	362,099	6.3	п
2	0	Ü >	247	7277							3000		0 1	۱ ا

Counties in the San Joaquin Valley

- WEST. Courties are ranked by weighted average. See note 12 below.

  Total Population represents the at-risk populations in coundes with PV \_ monitors.

  Those 18 and under and 55 and over are vulnerable to PM \_ and are, therefore, included. They should not be used as population denominators for disease estimates.
- Pediatric asthma estimates are for those under 18 years of age and represent the estimated number of deople who had asthma in 2015 based on state rates (BRFSS) applied to population estimates (U.S. Censis).
- Ω1 1. Adult actimal estimates are for mose 18 years and older and represent the estimated number of people who had astimate n 2021 based on state rates (BR-53) applied to population estimates (U.S., Census).

  Chronic bronichts estimates are fir adults 18 and over who had been plagnosed in 2010, cased on hat onal rates (KHIS) applied to population estimates (U.S., Census).

  Emblysema estimates are for adults 18 and over who have been plagnosed within their lifetime, based on national rates (NHIS) applied to population estimates (U.S., Census).

pi

- 8. Adding across lows does not produce valid estimates, e.g., symming pediatric and adult asthma and/or emphysema and ahronic bronchitis.

  9. CV disease estimates are based on National Heart Lung and Blood institute (NH\_BI) est mates of cardiovascular disease sciplied to population estimates (U.S., Cens.s).

  10. Diabetes estimates are for adult it Sand over who have ceen diagnosed within their lifetime, based on state rates (BRESS) applied to population estimates (U.S. Cens.s).

  11. Poverty estimates come from the U.S. Cens.s Bureau and are for all ages.

  12. The Weighted Average was derived by counting the number of days in each unnealthful range (orange, red., purple, maroons) in each year (2008-2010), multiplying the total in each range by the assigned standard weights (i.e., 1 for orange, 1.5 for red. 2010 by purple, 2.5 for maroons), and calculating the average.



				***************************************			***************************************								
Pass	13.2	28,101	18,465	54,988	3,322	6,919	11,111	2,598	32,315	39,734	193,063	٧٧	Kanawha	23	
Pass	13.2	93,697	42,886	141,939	8,441	18,186	39,549	11,559	81,041	123,279	535,153	유	Montgomery	23	
Pass	13.2	125,861	57,395	188,884	10,939	24,702	59,161	18,239	99,095	171,807	741,096	₹	Jefferson	23	
Pass	13.2	36,998	13,916	44,288	2,500	5,950	10,973	4,368	22,082	48,598	189,885	GA	Muscogee	23	
Pass	13.3	82,194	43,524	144,235	8,509	18,517	40,213	11,586	78,968	123,575	541,781	유	Summit	22	
Pass	13.4	37,017	33,020	109,780	6,795	13,508	28,801	6,919	68,877	72,611	365,169	PA	Westmoreland	20	
Pass	13.4	48,197	26,449	88,365	4,989	11,775	26,590	8,683	42,484	92,604	368,130	운	Butler	20	
Pass	13.6	227,716	104,479	345,470	20,639	44,014	95,026	27,215	198,541	290,262	1,280,122	유	Cuyahoga	17	
Pass	13.6	184,537	61,762	207,757	11,496	28,268	64,968	19,914	96,102	226,505	903,393	Ē	Marion	17	
Pass	13.6	8,804	3,491	20,296	1,026	2,919	7,184	1,731	6,375	25,001	97,581	AK	Fairbanks North Star Borough	17	
Pass	13.7	3,402	2,432	7,255	449	895	1,411	299	4,602	4,577	24,069	W/	Brooke	15	
Pass	13.7	119,809	61,402	165,636	9,558	21,754	39,726	17,750	86,443	154,528	658,466	AL	Jefferson	15	
Pass	13.8	31,172	37,464	126,487	7,308	16,456	37,427	11,820	63,875	124,055	498,886	PA	Chester	13	
Pass	13.8	38,068	19,162	70,216	4,119	9,096	18,844	6,026	38,428	61,246	269,282	=	Madison	13	
Pass	14.1	13,632	8,299	27,699	1,591	3,640	8,021	2,295	14,055	26,109	110,232	ž	Clark	12	フに
Pass	14.4	144,741	61,013	202,912	11,754	26,553	58,986	17,781	106,863	189,640	802,374	유	Hamilton	10	A V
Pass	14.4	1,699,264	619,371	2,266,565	125,611	308,756	566,147	159,352	1,065,699	2,402,208	9,818,605	CA	Los Angeles	10	~ ``
Pass	14.5	362,099	116,882	429,655	23,199	59,433	109,976	39,442	181,348	594,588	2,035,210	CA	San Bernardino	9	
Fail	15.4	51,500	23,143	90,685	5,331	11,852	26,593	9,348	52,071	99,700	375,770	AZ	Pinal	00	18
Fail	16.0	141,453	102,934	344,552	20,759	43,705	96,938	23,026	205,059	241,663	1,223,348	PΑ	Allegheny	7	5
Fail	16.4	245,330	53,861	197,670	10,932	27,034	49,721	18,409	93,421	277,507	930,450	CA	Fresno	6)	station
Faii	16.5	108,143	24,362	89,570	4,931	12,297	22,675	9,561	41,779	144,124	442,179	CA	Tulare	5	
Fail	17.0	354,768	137,270	498,296	28,441	66,447	120,166	41,135	258,586	620,108	2,189,641	CA	Riverside	4	garage,
Fail	17.1	29,606	8,299	31,019	1,619	4,423	8,348	2,822	12,030	42,548	152,982	CA	Kings	(3)	l,
Fail	18.4	33,285	12,390	50,212	2,964	6,404	13,426	4,662	26,834	42,280	185,079	Ξ	Hawaii	2	
Fail	21.2	172,531	47,097	173,566	9,398	24,047	44,572	16,855	75,437	254,081	839,631	CA	Kern	9	Ø,
Grade <sup>13</sup>	Design Value <sup>12</sup>	Poverty <sup>11</sup>	Diabetes <sup>10</sup>	CV Disease <sup>9</sup>	Chronic CV Bronchitis <sup>6,8</sup> Emphysema <sup>7,8</sup> Disease <sup>9</sup>		Adult Asthma <sup>s,8</sup>	Pediatric Asthma <sup>4,8</sup>	65 and Over³	Under 18³	Total Population <sup>2</sup>	ST	2012 Rank <sup>1</sup> County	2012 Rank¹	M
PM <sub>2.5</sub> Annual, 2008-2010	PM <sub>2.5</sub> / 2008-		!		ups	21									
			PM <sub>2.5</sub> )	Annual	Pollution (Annual PM <sub>2.5</sub> )		und Par	Year-rou	uted by	ฟือst Poll	Counties N	n 25 (	People at Risk in 25 Counties Most Polluted by Year-round Particle	Pec	Ö
(														Vo	79 Vi
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- Notes:
  1. Counties are ranked by design value. See note 12 below.
  2. Total Population represents the aterisk populations is counties with PM impinitors.
  4. Those 18 and under and 65 and over are vulnerable to PM impinity included. Proy should not be used as population denominators for disease estimates.
- Pediatric asthma estimates are for those under 18 years of age and represent the estimated number of ceocle who had asthma in 2016 based on state rates (BR-SS) applied to population estimates (U.S. Census).
- Adult asthma estimates are for move 18 years and older and represent the estimated number of people who had summar 2010 based on size a rates (BRPSs) applied to people on estimates (U.S. Census).
   Chronic bonchitis estimates are for adults 18 and over who had been diagnosed in 2010, cased on har onal rates (NHS) applied to population estimates (U.S. Census).
   Emphysema estimates are for adults 18 and over who have been diagnosed within their lifetime, based on national rates (NHS) applied to population estimates (U.S. Census).

- Adding across lows does not produce valid estimates, e.g., summing pediatric and adult asthmal and/or emphysema and amonic proteints.

  9. CV disease is cardiovascular disease and estimates are based on National Heart Lung and Blood Institute (NHLBI) estimates of card ovascular disease applied to population estimates (U.S. Cersus).

  10. Diabetes estimates are for adults if and over who have been diagnosed within their lifetime, based on state rates (ERSS) applied to population estimates (U.S. Census).

  11. Doverty estimates come rom the U.S. Census Rureau and are for all ages.

  11. Poverty estimates come rom the U.S. Census Rureau and are for all ages.

  12. The Design Value is the calculates consciously or whether the air quality in a meets the standard. The source for the Quality Standard, and is used by IPA to action ne whether the air quality in a meets the standard. The source for the Quality Standard and is used by IPA to action ne whether the air quality in a meets the standard. The source for the Quality Standard and successional applications are possible to the production of a common and productions in the production of a common and actions are possible to the production of a common and actions are possible to the production of a common and actions are possible to the production of a common and actions are producted by the production of a common and actions are producted by the production and actions are producted by IPA to action and actions are producted by the produc
- 13. Crodes are based on E-As determination of moeting or failure to moet the NAAQS for amout PM., Jevels during 2008-2010, Counties meeting the NAAQS received grades of Fail.

# People at Risk in 25 Most Ozone-Polluted Counties

	,						At-Risk Groups				High Ozone Days in Unhealthy Ranges, 2008–2010	e Days in Ranges, 1010
2012 Rank <sup>1</sup>	County	TS	Total Population <sup>2</sup>	Under 18³	65 and Over <sup>3</sup>	Pediatric Asthma <sup>4,8</sup>	Adult Asthma <sup>s,8</sup>	Chronic Bronchitis <sup>6,8</sup>	Emphysema <sup>7,8</sup>	Poverty	Weighted Avg. <sup>10</sup>	Grade <sup>11</sup>
1	San Bernardino	CA	2,035,210	594,588	181,348	39,442	109,976	59,433	23,199	362,099	127.8	71
2	Riverside	CA	2,189,641	620,108	258,586	41,135	120,166	66,447	28,441	354,768	111.3	TI
(3)	Tulare	CA	442,179	144,124	41,779	9,561	22,675	12,297	4,931	108,143	95.7	TI
4	Kern	CA	839,631	254,081	75,437	16,855	44,572	24,047	9,398	172,531	95.0	חד
σ (	Los Angeles	CA	9,818,605	2,402,208	1,065,699	159,352	566,147	308,756	125,611	1,699,264	86.2	מד
6	Fresno	CA	930,450	277,507	93,421	18,409	49,721	27,034	10,932	245,330	61.5	71
0	Kings	CA	152,982	42,548	12,030	2,822	8,348	4,423	1,619	29,606	42.3	חד
(w)	Sacramento	CA	1,418,788	363,053	158,551	24,083	81,006	44,570	18,564	234,470	41.5	חד
9	El Dorado	CA	181,058	41,175	26,524	2,731	11,057	6,392	3,002	16,825	27.2	ח
10	San Diego	ÇA	3,095,313	724,168	351,425	48,038	181,080	99,026	40,726	445,556	25.2	т1
11	Harris	√×	4,092,459	1,147,835	333,487	86,823	217,153	119,788	44,982	758,916	24.3	П
12	Placer	CA	348,432	85,085	53,562	5,644	20,512	11,765	5,556	31,489	24.2	П
13	San Luis Obispo	CA	269,637	50,841	41,022	3,373	16,916	9,556	4,342	36,179	23.0	ח
13	Ventura	CA	823,318	211,915	96,309	14,057	47,178	26,210	11,194	89,880	23.0	חד
	Merced	CA	255,793	80,698	23,960	5,353	13,302	7,191	2,853	58,212	22.5	חד
16	Nevada	CA	98,764	19,106	19,174	1,267	6,321	3,754	1,922	11,456	22.0	П
	Stanislaus	CA	514,453	147,158	54,831	9,762	28,134	15,444	6,401	100,554	21.5	ת
띖	Tarrant	XT	1,809,034	507,061	161,385	38,355	96,149	53,843	20,989	258,595	21.2	TI
19	Mariposa	CA	18,251	3,242	3,821	215	1,196	717	376	2,665	19.8	Th
20	Harford	MB MB	244,826	60,410	30,564	7,155	15,428	8,092	3,566	16,715	19.2	חד
)22	Uintah	TV	32,588	10,857	2,997	747	1,977	894	356	4,594	18.0	П
22	Madera	CA	150,865	42,849	17,262	2,842	8,270	4,562	1,933	30,912	16.7	П
25	Imperial	SA	174,528	51,098	18,152	3,390	9,415	5,139	2,104	36,666	15.7	m
24	Fairfield	CT	916,829	227,019	124,075	25,492	63,223	30,325	13,680	84,125	13.7	חד
25	Amador	CA	38,091	6,393	7,865	424	2,512	1,495	772	4,286	12.7	חד
Notes:			•									

- Note: Note: Present and set sy weighted average publishing in counties with the counties and another stress of a counties with the stress of population and counties with the counties of the advised populations in counties with the stress of the active counties of the another stress of the active violentable to PRI, and arts, threshold in the estimated number of beopie who has applied to population estimates of the following and older and represent the estimated number of beopie who has applied to population estimates of the following stress of the advised and over who have been beginded in 2010, assed on national faces (NHS) applied to population estimates of the following stress of the advised and over who have been been proposed within their lifetime, based on national faces (NHS) applied to population estimates (U.S. Census).

  2. Poverty ast materials and offer who have been present the estimate and/or emphysician and chronic Pronchits.

  3. Poverty ast materials are consistent and after another and and the full faces of the proposed within their lifetime, based on national faces (NHS) applied to population estimates (U.S. Census).

  3. Poverty ast materials will describe a face of the proposed within their lifetime, based on national faces (NHS) applied to population estimates (U.S. Census).

  3. Poverty ast materials and over who have been present the estimate and/or emphysema and chronic Pronchits.

  3. Poverty ast materials are all astronates, e.g., simm may ped act can adult astronates of the proposed within their lifetime, based on national faces (NHS) applied to population estimates (U.S. Census).

  3. Poverty astronates are for materials and proposed within their lifetime, based on national faces (NHS) applied to population estimates (U.S. Census).

  3. Poverty astronates are for adult 2 and adult astronates (U.S. Census).

  3. Poverty astronates are for adult 2 and adult astronates (U.S. Census).

  3. Poverty astronates are for adult 2 and adult astronates (U.S. Census).

  3. Poverty astronates are for adult



### CALIFORNIA

American Lung Association in California
424 Pendleton Way

424 Pendleton Way Oakland, CA 94621 (510)638-5864 www.lung.org/california

### HIGH OZONE DAYS 2008-2010

HIGH PARTICLE POLLUTION DAYS 2008-2010

Annual

Pass/ Fail

PASS

DNC

						24	Hour			Anr
)range	Red	Purple	Wgt. Avg	Grade	Orange	Red	Purple	Wgt. Avg	Grade	Design Value
14	2	0	5.7	דד	o	0	0	2.0	0	9.0
29	6	0	12.7	7	DNC	DNC	DNC	DNC	DNC	DNC
31	3	0	11.8	П	4	3	0	2.8	0	11.5
29	3	0	11.2	TI	2	0	0	0.7	σ	7.1
2	0	0	0.7	æ	2	0	0	0.7	æ	Z O
16	0	0	5.3	771	7	0	0	2.3	0	8.3
63	11	ъ	27.2	רד	DNC	DNC	DNC	DNC	DNC	DNC
134	31	2	61.5	TI	116	ري س	0	41.2	רר	16.4
0	0	0	0.0	D	DNC	ONC	DNC	DNC	DNO	DNC
0	0	0	0.0	$\triangleright$	0	0	0	0.0	D	6.8
47	0	0	15.7	Ħ	7	0	0	2.3	0	7.5
ω	0	0	2.7	D	11	N	0	4.7	TI	7.0
209	48	2	95.0	Th	126	21	2	53.8	711	21.2
104	14	<b>j3</b>	42.3	TI	85	3	0	29.8	Π	17.1
0	0	0	0.0	Þ	سا	i	0	0.8	œ.	4.6
185	41	တ	86.2	77)	ហ	4	0	20.3	П	14.4
44	4	0	16.7	П	Z O	NO	Ī O	NO	Z	NC
0	0	0	0.0	▷	Z	INC	Ī N O	NC NC	N C	NC
50	ഗ്വ	دـا	19.8	TI	DNC	DNC	DNC	DNC	DNC	DNC
0	0	0	0.0	D	0	0	0	0.0	D	8.7
52	w	<b>↓~</b> ••	22.5	П	35	0	0	11.7	חד	NC
Ы	0	0	0.3	æ	0	0	0	0.0	Þ	6.4
σ	0	0	1.7	0	DNC	DNC	DNC	DNC	DNC	DNC
60	4	0	22.0	77	Ui	2	0	2.7	D	7.0
29	2	0	10.7	77	17	<b>⊦</b> ->	0	6.2	חד	11.9
65	σ	0	24.2	The state of the s	ы	0	0	0.3	00	8.4

Kern

Inyo

Kings

020

Los Angeles

PASS

PASS

FAIL

PASS PASS PASS PASS

DNC FAIL

PASS

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Fresno

El Dorado

Contra Costa

Glenn

Humboldt

Imperial

Butte

Amador

County

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Alameda

Colusa

Calaveras

Placer

Orange

PASS PASS PASS

DNC

Z

Napa

Nevada

Merced

Monterey

Mariposa Mendocino Marin

Madera

### CALIFORNIA

## American Lung Association in California

424 Pendleton Way Oakland, CA 94621 (510)638-5864 www.lung.org/california

Butte

Alameda Amador

Colusa

Calaveras

Contra Costa

### AT-RISK GROUPS

**Lung Diseases** 

3.010,232	98,764	136,484	415,057	255,793	87,841	18.251	252,409	150,865	R	64,665	152,982	839,631	18,546	174,528	134,623	28,122	930,450	181,058	1,049,025	21,419	45,578	220,000	38.091	1,510,271	Total Population
736.659	19,106	31,486	111,013	80,698	19,461	3,242	52,214	42,849	3,402,208	13.672	42,548	254,081	3,900	51,098	27,061	7,865	277,507	41,175	260,505	6,410	8,943	46,168	6,393	340,621	Under 18
349,677	19,174	20,594	44,422	23,960	13,493	3,821	42,192	17,262	1,065,699	11.440	12,030	75,437	3,535	18,152	17,725	3,737	93,421	26,524	130,438	2,495	9,565	33,817	7,865	167,746	65 & Over
48,867	1,267	2,089	7,364	5,353	1,291	215	3,464	2,842	159,352	907	2,822	16,855	259	3,390	1,795	522	18,409	2,731	17.281	425	593	3.063	424	22,595	Pediatric Asthma
174,505	6,321	8,149	23,192	13,302	5,355	1,196	15,773	8.270	566,147	4,023	8.348	44,572	1,155	9,415	8,305	1,566	49,721	11,057	61,165	1,155	2,924	13,391	2,512	89,705	Adult Asthma
96,221	3,754	4,641	12,653	7,191	3,079	717	9,179	4,562	308,756	2,359	4.423	24,047	683	5.139	4,634	883	27,034	6,392	34,299	643	1,762	7,563	1,495	49,163	Chronic Bronchitis
40,413	1,922	2.154	5,168	2,853	1,448	376	4,449	1,933	125,611	1,171	1,619	9,398	348	2,104	2,011	399	10.932	3,002	15,008	279	933	3,464	772	20,160	Emphysema
717,529	30,888	36,235	92,980	52,121	24,297	5,974	73,566	34,079	2,266,565	19,103	31,019	173,566	5,589	37,792	35,125	6,805	197,670	50,672	261,582	4,862	14,747	58,474	12,337	363,118	Cardio- vascular Disease
197,679	8,887	10,175	25,402	14,142	6,876	1,727	20,965	9,378	619,371	5,461	8.299	47,097	1,601	10.327	9,758	1,900	53,861	14,431	72,993	1,347	4.270	16,306	3,549	99,717	Diabetes
 363,924	11,456	14,189	68,031	58,212	16,976	2,665	22,456	30,912	1,699,264	13,438	29,606	172,531	2,535	36,666	23,752	4,890	245,330	16,825	97,544	3,161	4,996	43,392	4,286	200,273	Poverty
									V			the state of the s													

Marin

Mariposa Mendocino Madera

Los Angeles

Napa

Merced Monterey

Nevada Orange Kings

Lake

Xers.

Inyo

Humboldt Imperal El Dorado Fresno Glenn

### People At Risk

Looking at the nation as a whole, the American Lung Association State of the Air 2012 finds—

More than 4 in 10 people (41%) in the United States live in counties that have unhealthful levels of either ozone or particle pollution.

Over 127.2 million Americans live in the 235 counties where they are exposed to unhealthful levels of air pollution in the form of either ozone or short-term or year-round levels of particles.

■ Nearly 4 in 10 people in the United States (38.5%) live in areas with unhealthful levels of ozone.

Counties that were graded F for ozone levels have a combined population of almost 116.7 million. These people live in the 195 counties where the monitored air quality places them at risk for decreased lung function, respiratory infection, lung inflammation and aggravation of respiratory illness. The actual number who breathe unhealthy levels of ozone is likely much larger, since this number does not include people who live in adjacent counties in metropolitan areas where no monitors exist.

air failed all three tests.

■ Nearly one in six (16.1%) of people in the United States live in an area with unhealthful short-term levels of particle pollution.

Nearly 50 million Americans live in 66 counties that experienced too many days with unhealthy spikes in particle pollution, a decrease from the last report. Short-term spikes in particle pollution can last from hours to several days and can increase the risk of heart attacks, strokes and emergency-room visits for asthma and cardiovascular disease, and most importantly, can increase the risk of early death.

Nearly 6.4 million people (2.1%) in the United States live in an area with unhealthful year-round levels of particle pollution.

These people live in areas where chronic levels are regularly a threat to their health. Even when levels are fairly low,

exposure to particles over time can increase risk of hospitalization for asthma, damage to the lungs and, significantly, increase the risk of premature death.

Over 5.7 million people (1.9%) in the United States live in six counties with unhealthful levels of all three: ozone and short-term and year-round particle pollution.

With the risks from airborne pollution so great, the American Lung Association seeks to inform people who may be in danger. Many people are at greater risk because of their age or because they have asthma or other chronic lung disease, cardiovascular disease or diabetes. The following list identifies the numbers of people in each at-risk group.

- People with Asthma—Nearly 2.5 million children and over 7.4 million adults with asthma live in parts of the United States with very high levels of ozone. Over 3.1 million adults and over 940,000 children with asthma live in areas with high levels of short-term particle pollution. Over 382,000 adults and over 125,000 children with asthma live in counties with unhealthful levels of year-round particle pollution.
- Older and Younger—Over 13.7 million adults age 65 and over and nearly 29 million children age 18 and under live in counties with unhealthful ozone levels. Over 5.6 million seniors and over 12.5 million children live in counties with unhealthful short-term levels of particle pollution. Over 765,000 seniors and over 1.7 million children live in counties with unhealthful levels of year-round particle pollution.
- People with chronic bronchitis and mearly 1.6 million people with chronic bronchitis and nearly 1.6 million with emphysema live in counties with unhealthful ozone levels. Over 1.5 million people with chronic bronchitis and over 652,000 with emphysema live in counties with unhealthful levels of short-term particle pollution. Over 196,000 people with chronic bronchitis and more than 84,000 with emphysema live in counties with unhealthful year-round levels of particle pollution.



The nation must

### Keep the Clean Air Act strong

to protect public health

Cardiovascular Disease—Over 11.6 million people with cardiovascular diseases live in counties with unhealthful levels of short-term particle pollution; nearly 1.5 million live in counties with unhealthful levels of year-round particle pollution. Cardiovascular diseases include coronary heart disease, heart attacks, strokes, hypertension and angina pectoris.

- **Diabetes**—Over 3.1 million people with diabetes live in counties with unhealthful levels of short-term particle pollution; over 409,000 live in counties with unhealthful levels of year-round particle pollution. Research indicates that because diabetics are already at higher risk of cardiovascular disease, they may face increased risk due to the impact of particle pollution on their cardiovascular systems.
- the federal poverty definition people with incomes meeting the federal poverty definition live in counties with unhealthful levels of ozone. Over 7.9 million people in poverty live in counties with unhealthful levels of short-term particle pollution, and over 1.1 million live in counties with unhealthful year-round levels of particle pollution. Evidence shows that people who have low incomes may face higher risk from air nollution.

### What Needs To Be Done

Many major challenges require the Administration and Congress to take steps to protect the health of the public. Here are a few that

the American Lung Association calls for to improve the air we all breathe.

Protect the Clean Air Act. The continued improvement shown in the State of the Air report is possible because of the Clean Air Act, the nation's strong public health law that the U.S. Congress passed 40 years ago. The Act requires that the EPA and each state take steps to clean up the air. Some members of Congress are proposing changes to the Clean Air Act that could dismantle progress made in the last 40 years. The nation must keep that law strong to continue to protect public health.

- Clean up dirty power plants. Over 400 coal-fired power plants in over 40 states are among the largest contributors to particulate pollution, ozone, mercury, and global warming. Their pollution blows across state lines into states hundreds of miles away. They produce 84 known hazardous air pollutants, including arsenic, mercury, dioxins, formaldehyde and hydrogen chloride, as shown in the Lung Association report Toxic Air: The Case for Cleaning Up Coal-fired Power Plants. In 2011, EPA issued the final rules that will cut the emissions that create ozone and particle pollution and, for the first time, set national limits on the toxic pollutants they can emit. However, some have challenged these standards in the courts. The Lung Association has taken legal steps to defend EPA's efforts. Congress needs to support EPA's actions to clean these plants up.
- and incinerators. Boilers provide power and fuel processes for industry, commercial facilities and institutions. Similar to power plants, but smaller, boilers are also more numerous: there are 1.5 million of them. Many produce toxic air emissions, including the same toxic emissions that power plants produce. EPA needs to adopt strong final standards to limit emissions from these boilers.
- Release to f dirty diesel vehicles and heavy equipment. Rules EPA put in effect over the past several years mean that new diesel vehicles and equipment must be much cleaner. Still, the vast majority of diesel trucks, buses, and heavy equipment (such as bulldozers) will likely be in use for thousands more miles, spewing dangerous diesel exhaust into communities and neighborhoods. The good news is that affordable technology exists to cut emissions by 90 percent. Congress needs to fund EPA's diesel cleanup ("retrofit") program. Congress should also require that clean diesel equipment be used in federally-funded construction programs.
- Strengthen the particle pollution standards. In 2006, EPA failed to strengthen the annual standard for fine particles,



# Health Effects of Ozone and Particle Pollution

zone and particle pollution are the most widespread air pollutants—and among the most dangerous. Recent research has revealed new insights into how they can harm the body—including taking the lives of infants and altering the lungs of children. All in all, the evidence shows that the risks are greater than we once thought.

Recent findings provide more evidence about the health impacts of these pollutants:

- A major review of particle pollution and other air pollutants concluded that many cause heart attacks, even when people inhale elevated levels for as little as one week.¹ This review looked at evidence from 177 studies and found that particle pollution (both fine and coarse), carbon monoxide, nitrogen oxides, and sulfur dioxide all increased the risk of heart attack.
- Particle pollution that lasts for just a short while may be causing strokes, even at levels considered safe, according to a study of Boston area patients.<sup>2</sup> In particular, researchers found that breathing levels of traffic-related particles were linked to increased risk of stroke within 12 to 14 hours of breathing them.
- Up to 35,700 premature deaths can be prevented in the United States every year if the Environmental Protection Agency (EPA) strengthens the health standards for particle pollution—also known as soot—according to a report, Sick of Soot: How the EPA Can Save Lives by Cleaning Up Fine Particle Pollution, released in November by the American Lung Association, Clean Air Task Force and Earthjustice. That report summarized the findings of an in-depth look at how cleaning up the particles could have powerful, lifesaving benefits.<sup>3</sup>
- Good news: Reducing air pollution has extended life expectancy. Thanks to a drop in particle pollution between 1980

- and 2000, life expectancy in 51 U.S. cities increased by five months on average, according to a 2009 analysis.<sup>4</sup>
- Growing evidence shows that diabetics face a greater risk from air pollution than once believed. Several studies found increased risk of several factors associated with cardiovascular risks in people with diabetes.<sup>5</sup> Some new research with animals indicates that fine particle pollution may impact insulin resistance and other factors.<sup>6</sup>
- More people may be vulnerable to air pollution than previously understood. Researchers studying people who had received kidney transplants found that long-term exposure to ozone pollution increased their risk of fatal coronary heart disease.<sup>7</sup>
- Lower levels of ozone and particle pollution pose bigger threats. A Canadian study showed that particle pollution levels well below those considered safe in the U.S. for these pollutants caused premature death. An earlier study had found higher risk of asthma attacks and emergency room visits and hospital admissions for children with asthma. Another study found that low levels of these pollutants increased the risk of hospital treatment for pneumonia and chronic obstructive pulmonary disease (COPD). □
- a Ozone pollution can shorten life, a conclusion confirmed by a 2008 scientific review by the National Research Council.<sup>11</sup> Evidence warns that some segments of the population may face higher risks from dying prematurely because of ozone pollution, including communities with high unemployment or high public transit use and large African-American populations.<sup>12</sup>
- Could particulate matter cause lung cancer in never-smokers? That question is getting closer to being answered with a strong "yes" after researchers looked at the records of 1.2 million volunteers which found that levels of fine particles

measured across the nation in the past few decades are linked to small, but measurable increases in lung cancer in people who never smoked.<sup>13</sup>

- Research is warning that obesity may place people at higher risk from particle pollution. Some studies link particle pollution to increases in measurable reactions in the body that signal harm to health. 14 The increase in the prevalence of obesity in the nation may mean that more people are at risk
- Busy highways are high risk zones. Not only may they worsen diseases, but some evidence warns that years of breathing the pollution near busy roads may increase the risk of developing chronic diseases.
- A growing body of evidence suggests breathing pollution from heavy traffic may cause new cases of asthma in children.<sup>15</sup>
- Emerging research has found particle pollution associated with increasing the risk of new cases of three chronic diseases in adults: adult-onset asthma, 16 diabetes, 17 and COPD, especially in people who already have asthma or diabetes. 18
- \* Research had already connected pollution from heavy highway traffic to higher risks for heart attack, allergies, premature births and the death of infants around the time they are born. 19 Evidence of the impact of traffic pollution, even in a city with generally "cleaner" air, expanded the concern over the health effects of chronic exposure to exhaust from heavy traffic. 20

Two types of air pollution dominate the problem in the U.S.: ozone and particle pollution. They aren't the only serious air pollutants: others include carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide, as well as scores of toxins such as mercury, arsenic, benzene, formaldehyde, and acid gases. However, ozone and particle pollution are the most widespread pollutants.

### Ozone Pollution

It may be hard to imagine that pollution could be invisible, but ozone is. The most widespread pollutant in the U.S. is also one of the most dangerous.

Scientists have studied the effects of ozone on health for decades. Hundreds of research studies have confirmed that ozone harms people at levels currently found in the United States. In the last few years, we've learned that it can also be deadly.

### What Is Ozone?

Ozone  $(O_3)$  is an extremely reactive gas molecule composed of three oxygen atoms. It is the primary ingredient of smog air pollution and is very harmful to breathe. Ozone attacks lung tissue by reacting chemically with it.

The ozone layer found high in the upper atmosphere (the stratosphere) shields us from much of the sun's ultraviolet radiation. However, ozone air pollution at ground level where we can breathe it (in the troposphere) is harmful. It causes serious health problems.

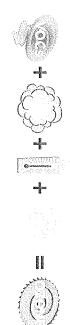
### Where Does Ozone Come From?

What you see coming out of the tailpipe on a car or a truck isn't ozone, but the raw ingredients for making ozone. Ozone is formed by chemical reactions in the atmosphere from two raw gases that do come out of tailpipes, smokestacks and many other sources. These essential raw ingredients for ozone are nitrogen oxides ( $NO_X$ ) and hydrocarbons, also called volatile organic compounds (VOCs). They are produced primarily when fossil fuels like gasoline, oil or coal are burned or when some chemicals, like solvents, evaporate.

When NO<sub>X</sub> and VOCs come in contact with both heat and sunlight, they combine and form ozone smog. NO<sub>X</sub> is emitted from power plants, motor vehicles and other sources of high-heat combustion. VOCs are emitted from motor vehicles, chemical plants, refineries, factories, gas stations, paint and other sources. The formula for ozone is simple, and like any



formula, the ingredients must all be present and in the right proportions to make the final product.



You may have wondered why "ozone action day" warnings are sometimes followed by recommendations to avoid activities such as mowing your lawn or refilling your gas tank during daylight hours. Lawn mower exhaust and gasoline vapors are VOCs that could turn into ozone in the heat and sun. Take away the sunlight and ozone doesn't form, so refilling your gas tank after dark is better on high ozone days. Since we can't control sunlight and heat, we must reduce the chemical raw ingredients if we want to reduce ozone.

## Who is at risk from breathing ozone?

Five groups of people are especially vulnerable to the effects of breathing ozone:

- children and teens;
- anyone 65 and older;
- people who work or exercise outdoors;
- people with existing lung diseases, such as asthma and chronic obstructive pulmonary disease (also known as COPD, which includes emphysema and chronic bronchitis); and
- "responders" who are otherwise healthy but for some reason react more strongly to ozone.<sup>21</sup>

The impact on your health can depend on many factors, however. For example, the risks would be greater if ozone levels are higher, if you are breathing faster because you're working outdoors or if you spend more time outdoors.

Lifeguards in Galveston, Texas, provided evidence of the impact of even short-term exposure to ozone on healthy, active

adults in a study published in 2008. Testing the breathing capacity of these outdoor workers several times a day, researchers found that many lifeguards had greater obstruction in their airways when ozone levels were high. Because of this research, Galveston became the first city in the nation to install an air quality warning flag system on the beach.<sup>22</sup>

# How Ozone Pollution Harms Your Health

Breathing ozone can shorten your life. Two early studies published in 2004 found strong evidence of the deadly impact of ozone in cities across the U.S. and in Europe. Even on days when ozone levels were low, the researchers found that the risk of premature death increased with higher levels of ozone. They estimated that over 3,700 deaths annually in the U.S. could be attributed to a 10-parts-per-billion increase in ozone levels. <sup>23</sup> Another study, published the same week, looked at 23 European cities and found similar effects on mortality from short-term exposure to ozone. <sup>24</sup>

Confirmation came in the summer of 2005. Three groups of researchers working independently reviewed and analyzed the research around deaths associated with short-term exposures to ozone. The three teams—at Harvard, Johns Hopkins and New York University—used different approaches but all came to similar conclusions. All three studies reported a small but robust association between daily ozone levels and increased deaths.<sup>25</sup> Writing a commentary on these reviews, David Bates, MD, explained how these premature deaths could occur:

"Ozone is capable of causing inflammation in the lung at lower concentrations than any other gas. Such an effect would be a hazard to anyone with heart failure and pulmonary congestion, and would worsen the function of anyone with advanced lung disease."<sup>26</sup>

In 2008 a committee of the National Research Council, a division of the National Academy of Sciences, reviewed the evidence again and concluded that "short-term exposure to

ambient ozone is likely to contribute to premature deaths." They recommended that preventing early death be included in any future estimates of the benefits of reducing ozone.<sup>27</sup>

New research has begun to identify which groups face higher risk of death from ozone. A study published in 2010 examined records from ten cities in Italy and found women, diabetics and older adults to have a higher risk of premature death from high ozone.<sup>28</sup>

Ozone at levels currently in the U.S. causes immediate health problems. Many areas in the United States produce enough ground-level ozone during the summer months to cause health problems that can be felt right away. Immediate problems—in addition to increased risk of premature death—include:

- shortness of breath;
- chest pain when inhaling;
- wheezing and coughing
- asthma attacks;
- increased susceptibility to respiratory infections;
- increased susceptibility to pulmonary inflammation; and
- increased need for people with lung diseases, like asthma or chronic obstructive pulmonary disease (COPD), to receive medical treatment and to go to the hospital.<sup>29</sup>

Breathing ozone for longer periods can alter the lungs' ability to function. Two studies published in 2005 explored ozone's ability to reduce the lung's ability to work efficiently, a term called "lung function." Each study looked at otherwise healthy groups who were exposed to ozone for long periods: outdoor postal workers in Taiwan and college freshmen who were lifelong residents of Los Angeles or the San Francisco Bay area. Both studies found that the long exposure to elevated ozone levels had decreased their lung function.<sup>30</sup>

Inhaling ozone may affect the heart as well as the lungs. A 2006 study linked exposures to high ozone levels for as little as

one hour to a particular type of cardiac arrhythmia that itself increases the risk of premature death and stroke.<sup>31</sup> A French study found that exposure to elevated ozone levels for one to two days increased the risk of heart attacks for middle-aged adults without heart disease.<sup>32</sup>

over longer periods. With more long-term data, scientists are variations in ozone levels in their communities.<sup>35</sup> more likely to develop asthma as adolescents in response to the Health Study found that some children with certain genes were into data from their long-term Southern California Children's periods than other children.34 California researchers digging likely to need hospital admissions even during the same time children and children from low income families were more children's asthma found that the risk of admission to hospitals ozone.33 New York researchers looking at hospital records for of death from respiratory diseases associated with increases in long-term national database, researchers found a higher risk increase the risk of early death. Examining the records from a ger than eight hours, including days, months or years—may finding that long-term exposure—that is, for periods lon-New studies warn of serious effects from breathing ozone for asthma increased with chronic exposure to ozone. Younger

Breathing other pollutants in the air may make your lungs more responsive to ozone—and breathing ozone may increase your body's response to other pollutants. For example, research warns that breathing sulfur dioxide and nitrogen oxide—two pollutants common in the eastern U.S.—can make the lungs react more strongly than to just breathing ozone alone. Breathing ozone may also increase the response to allergens in people with allergies. A large study published in 2009 found that children were more likely to suffer from hay fever and respiratory allergies when ozone and PM<sub>2,5</sub> levels were high.<sup>36</sup>

Even low levels of ozone may be deadly. A large study of 48 U.S. cities looked at the association between ozone and all-cause mortality during the summer months. Ozone concentrations by city in the summer months ranged from 16 percent to



deaths from cardiovascular disease, strokes, and respiratory ers found that ozone at those lower levels was associated with 80 percent lower than EPA currently considers safe. Research

### Pollution **Particle**

Ever look at dirty truck exhaust?

tion. Overwhelming evidence shows of exhaust is made of particle pollu-The dirty, smoky part of that stream

smoke—can kill. Particle pollution can increase the risk of with the growth and work of the lungs. heart disease, lung cancer and asthma attacks and can interfere that particle pollution—like that coming from that exhaust

### What Is Particle Pollution?

lution. Yet it is so dangerous it can shorten your lite. can't see the individual particles. You can only see the haze that be seen with an electron microscope. Because of their size, you of hair. Many are even tinier; some are so small they can only are different sizes. Some are one-tenth the diameter of a strand particle pollution is simple. First of all, the particles themselves particles that are in the air we breathe. But nothing about You may not be able to tell when you're breathing particle polforms when millions of particles blur the spread of sunlight. Particle pollution refers to a mix of very tiny solid and liquid

while the smallest are so minute that they can pass through of a single human hair. These particles get trapped in the lungs. smaller particles, those that are smaller than 10 microns (or particles out of our bodies. But those defenses don't keep out us. Our natural defenses help us to cough or sneeze larger molecules we need to survive. the lungs into the blood stream, just like the essential oxygen micrometers) in diameter, or about one-seventh the diameter The differences in size make a big difference in how they affect

Researchers categorize particles according to size, grouping them as coarse, fine and ultrafine. Coarse particles fall be-

> micron in diameter38 and are small enough to pass through the and are called  $PM_{25}$ . Ultrafine particles are smaller than 0.1 harmful to your health. molecules themselves. No matter what the size, particles can be lung tissue into the blood stream, circulating like the oxygen  $PM_{10\cdot2.5}$ . Fine particles are 2.5 microns in diameter or smaller tween 2.5 microns and 10 microns in diameter and are called

and North Central U.S. 40 power plants. By contrast, nitrate particles from motor vehicle and western United States and in different times of the year. exhaust form a larger proportion of the unhealthful mix in the to the high levels of sulfur dioxide emitted by large, coal-fired more sulfate particles than the West on average, largely due mixture of mixtures."39 The mixtures differ between the eastern often think of particles as solids, not all are. Some are comcan be composed of many different compounds. Although we winter in the Northeast, Southern California, the Northwest, For example, the Midwest, Southeast and Northeast states have Environmental Protection Agency puts it, particles are really "a pletely liquid; some are solids suspended in liquids. As the U.S Because particles are formed in so many different ways, they

### Who Is at Risk?

Some people face higher risk, however. People at the greatest risk (you can take a look at levels in your state in this report). Anyone who lives where particle pollution levels are high is at risk from particle pollution exposure include:

- Anyone with lung disease such as asthma and chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema;
- Anyone with heart disease or diabetes<sup>41</sup>;
- Anyone over 65:
- Infants, children and teens;
- People with low incomes; and
- People who work or are active outdoors. 42



Diabetics face increased risk at least in part because of their higher risk for cardiovascular disease. A 2010 study examined prevalence of diagnosed diabetes in relation to fine particle pollution in 2004-2005. The evidence suggested that air pollution is a risk factor for diabetes.<sup>43</sup> Traffic-related air pollution was implicated in two studies. A German study of nondiabetic women found that new cases of diabetes were more likely as levels of traffic-related pollution and particle pollution increased.<sup>44</sup> A similar finding of an increased risk for diabetes in women who lived near roadways came in a large study of nurses and health professionals, although that study did not find a strong association with levels of particle pollution.<sup>45</sup>

# What Can Particles Do to Your Health?

Particle pollution can be very dangerous to breathe. Breathing particle pollution may trigger illness, hospitalization and premature death, risks showing up in new studies that validate earlier research.<sup>46</sup>

Good news came in 2009 from researchers who looked at the impact of the drop in year-round levels of particle pollution between 1980 and 2000 in 51 U.S. cities. Thanks to reductions in particle pollution people living in these cities had five months added to their life expectancy on average. <sup>17</sup> This study adds to the growing research that cleaning up air pollution improves life and health. Other researchers estimated that reductions in air pollution can be expected to produce rapid improvements in public health, with fewer deaths occurring within the first two years after reductions. <sup>48</sup>

Researchers are exploring possible differences in health effects of the three sizes of particles and particles from different sources, such as diesel particles from trucks and buses or sulfates from coal-fired power plants. So far, the evidence remains clear that all particles from all sources are dangerous.<sup>49</sup>

## Short-Term Exposure Can Be Deadly

First and foremost, short-term exposure to particle pollution can kill. Peaks or spikes in particle pollution can last for hours to days. Deaths can occur on the very day that particle levels are high, or within one to two months afterward. Particle pollution does not just make people die a few days earlier than they might otherwise—these are deaths that would not have occurred if the air were cleaner.<sup>50</sup>

Researchers from Harvard University recently tripled the estimated risk of premature death following a review of the newer evidence from fine particle monitors  $(PM_{2.5})$  in 27 U.S. cities.<sup>51</sup>

Particle pollution also diminishes lung function, causes greater use of asthma medications and increased rates of school absenteeism, emergency room visits and hospital admissions. Other adverse effects can be coughing, wheezing, cardiac arrhythmias and heart attacks. According to the findings from some of the latest studies, short-term increases in particle pollution have been linked to:

- death from respiratory and cardiovascular causes, including strokes;<sup>52, 53, 54, 55</sup>
- increased mortality in infants and young children;<sup>56</sup>
- increased numbers of heart attacks, especially among the elderly and in people with heart conditions;<sup>57</sup>
- inflammation of lung tissue in young, healthy adults;<sup>58</sup>
- increased hospitalization for cardiovascular disease, including strokes and congestive heart failure, 50, 60, 61
- increased emergency room visits for patients suffering from acute respiratory ailments;<sup>62</sup>
- increased hospitalization for asthma among children;<sup>63, 64, 65</sup> and
- increased severity of asthma attacks in children.66

Again, the impact of even short-term exposure to particle pollution on healthy adults showed up in the Galveston lifeguard



when fine particle levels were high. 67 study, in addition to the harmful effects of ozone pollution Lifeguards had reduced lung volume at the end of the day

### Year-Round Exposure

shorten life by one to three years. 69 Other impacts range from sively showed.  $^{68}$  Chronic exposure to particle pollution can also can be deadly, as landmark studies in the 1990s concluthe particle levels are very low. premature births to serious respiratory disorders, even when Breathing high levels of particle pollution day in and day ou

Year-round exposure to particle pollution has also been

- increased hospitalization for asthma attacks for children living near roads with heavy truck or trailer traffic;70,71
- slowed lung function growth in children and teenagers;72,73
- significant damage to the small airways of the lungs;73
- increased risk of dying from lung cancer;75 and
- Research into the health risks of 65,000 women over age 50 increased risk of death from cardiovascular disease.76

the annual levels of pollution in their neighborhood.77 lived within the same city faced differing risks depending on disease than had been previously estimated. Even women who ticle pollution faced a much greater risk of dying from heart found that those who lived in areas with higher levels of par-

are highlighted in the box below. lution caused multiple, serious threats to health. Their findings between 2002 and May 2009. EPA concluded that particle polscientists, the Clean Air Scientific Advisory Committee, to in December 2009.78 The Agency had engaged a panel of expert thorough review of the current research on particle pollution The Environmental Protection Agency released the most help them assess the evidence, in particular research published

# EPA Concludes Fine Particle Pollution Poses Serious Health Threats

- Causes early death (both short-term and long-term exposure)
- Causes cardiovascular harm (e.g. heart attacks, strokes, heart disease, congestive heart failure)
- Likely to cause respiratory harm (e.g. worsened asthma worsened COPD, inflammation)
- May cause reproductive and developmental harm

U.S. Environmental Protection Agency, Integrated Science Assessment for Particulate Matter, December 2009, EPA 600/R-08/139F.

# Where Does Particle Pollution Come From?

mechanical and chemical Particle pollution is produced through two separate processes—

ing smaller. Mechanical processes primarily create coarse duce coarse particles. Tire, brake pad and road wear can also operations, and agriculture are among the activities that proparticles.79 Dust storms, construction and demolition, mining Mechanical processes break down bigger bits into smaller bits animal debris are also included as coarse particles.80 create coarse particles. Bacteria, pollen, mold, and plant and with the material remaining essentially the same, only becom-

pounds with water and other compounds in the atmosphere.81 cal compound. Or, they can react with other gases or particles and then condense to become a particle of the same chemisources burn fuels and emit gases. These gases can vaporize most of the tiniest fine and ultrafine particles. Combustion smelters, diesel- and gasoline-powered motor vehicles (cars dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>X</sub>) and volatile organic comthe reaction of elemental carbon (soot), heavy metals, sulfur compound. Particles formed by this latter process come from in the atmosphere to form a particle of a different chemical By contrast, chemical processes in the atmosphere create and trucks) and equipment generate a large part of the raw Burning fossil fuels in factories, power plants, steel mills,

materials for fine particles. So does burning wood in residential fireplaces and wood stoves or burning agricultural fields or forests.

### Focusing on Children's Health

Children face special risks from air pollution because their lungs are growing and because they are so active.

Just like the arms and legs, the largest portion of a child's lungs will grow long after he or she is born. Eighty percent of their tiny air sacs develop after birth. Those sacs, called the alveoli, are where the life-sustaining transfer of oxygen to the blood takes place. The lungs and their alveoli aren't fully grown until children become adults. <sup>82</sup> In addition, the body's defenses that help adults fight off infections are still developing in young bodies. <sup>83</sup> Children have more respiratory infections than adults, which also seems to increase their susceptibility to air pollution. <sup>84</sup>

Furthermore, children don't behave like adults, and their behavior also affects their vulnerability. They are outside for longer periods and are usually more active when outdoors. Consequently, they inhale more polluted outdoor air than adults typically do.85

In 2004, the American Academy of Pediatrics issued a special statement on the dangers of outdoor air pollution on children's health, pointing out the special differences for children.86

### Air Pollution Increases Risk of Underdeveloped Lungs

Another finding from the Southern California Children's Health study looked at the long-term effects of particle pollution on teenagers. Tracking 1,759 children between ages 10 and 18, researchers found that those who grew up in more polluted areas face the increased risk of having underdeveloped lungs, which may never recover to their full capacity. The average drop in lung function was 20 percent below what was expected

for the child's age, similar to the impact of growing up in a home with parents who smoked.<sup>87</sup>

Community health studies are pointing to less obvious, but serious effects from year-round exposure to ozone, especially for children. Scientists followed 500 Yale University students and determined that living just four years in a region with high levels of ozone and related co-pollutants was associated with diminished lung function and frequent reports of respiratory symptoms.<sup>58</sup> A much larger study of 3,300 school children in Southern California found reduced lung function in girls with asthma and boys who spent more time outdoors in areas with high levels of ozone.<sup>59</sup>

### Cleaning Up Pollution Can Reduce Risk to Children

There is also real-world evidence that reducing air pollution can help protect children. Two studies published in 2005 added more weight to the argument.

Changes in air pollution from the reunification of Germany proved a real-life laboratory. Both East and West Germany had different levels and sources of particles. Outdoor particle levels were much higher in East Germany, where they came from factories and homes. West Germany had higher concentrations of traffic-generated particles. After reunification, emissions from the factories and homes dropped, but traffic increased. A German study explored the impact on the lungs of six-year olds from both East and West Germany. Total lung capacity improved with the lower particle levels. However, for those children living near busy roads, the increased pollution from the increased traffic kept them from benefiting from the overall cleaner air. 90

In Switzerland, particle pollution dropped during a period in the 1990s. Researchers there tracked 9,000 children over a nine-year period, following their respiratory symptoms. After taking other factors such as family characteristics and indoor air pollution into account, the researchers noted that during

symptoms.91 of chronic cough, bronchitis, common cold, and conjunctivitis the years with less pollution, the children had fewer episodes

### the impact of Disparities in Air Pollution

who may experience greater higher exposure to pollutants and some racial and ethnic groups are evenly shared. Poorer people and among those who often face The burden of air pollution is not

tocused on urban air pollution and health inequities.93 a workshop the American Lung Association held in 2001 that have less education, or live nearer to major sources, 92 including groups and people who are in a low socioeconomic position, differences in harm from air pollution to racial or ethnic responses to such pollution. Many studies have explored the

from traffic sources. 97 cans from air toxics, including those pollutants that also come Other researchers have found greater risk for African-Amerifor African-Americans but not other races or ethnic groups. 96 for Whites and Hispanics, but not African-Americans,95 or ences among races,94 while others found greater responsiveness fects between racial groups. Some studies have found no differmature death. Results have varied widely, particularly for ef-Many studies have looked at differences in the impact on pre-

of public transportation. 99 A 2008 study of Washington, DC hand-in-hand in areas where Medicaid enrollment was high people living in areas with higher unemployment or higher use African-Americans, researchers also found greater risk for the 2008 study that found greater risk for premature death for examination of particle pollution mortality nationwide. 98 In among 13.2 million Medicare recipients studied in the largest creased the risk of premature death from fine particle pollution dence of that link. Low socioeconomic status consistently inwith greater harm from air pollution. Recent studies show evi-Socioeconomic position has been more consistently associated tound that while poor air quality and worsened asthma went

> found no association with lower income and asthma attacks. 101 attacks.100 However, two other recent studies in France have have the strongest association of high air pollution and asthma the areas with the highest Medicaid enrollment did not always

higher incidence of diabetes. 102 at risk from air pollutants, and the elderly, African-Americans greater risk. For example, diabetics are among the groups most conditions, behaviors, or traits may predispose some groups to groups and increase the risk of harm. Finally, existing health communities, increasing exposure to harmful pollutants. Sec-Scientists have speculated that there are three broad reasons Mexican-Americans and people living near a central city have traffic exposure are among the factors that could handicap vantage. Lack of access to health care, grocery stores and good ond, low social position may make some groups more suscepexample, pollution sources may be located near disadvantaged to class bias to housing market dynamics and land costs. For exposure to pollution because of factors ranging from racism why disparities may exist. First, groups may face greater jobs, poorer job opportunities, dirtier workplaces or higher tible to health threats because of factors related to their disad-

### Be Especially **Highways May** Breathing Dangerous for

places in a community. Growing evidence shows that the vehicle dangerous than being in other near a road, may be even more Being in heavy traffic, or living

near busy roads whole, increasing the risk of harm to people who live or work those highways may be higher than in the community as a emissions coming directly from

evidence by a panel of expert scientists. The panel looked at over 700 studies from around the world, examining the health the Health Effects Institute published a major review of the ing to the most recent review of the evidence. In January 2010, The number of people living "next to a busy road" may include 30 to 45 percent of the population in North America, accord-