## Airport Studies on the Effects of Leaded Avgas on Children's Blood Lead Levels

There are now three comprehensive studies providing compelling evidence that children living in the vicinity of airports that service piston-engine aircraft are at greater risk of lead exposure and elevated blood lead levels.

### Reid-Hillview Airport Lead Study

An 8-3-2021 lead study,[1] commissioned by Santa Clara County in response to concerns about the toxic lead emissions generated by aviation activity at the Reid-Hillview Airport (RHV), included an analysis of data from January 1, 2011 to December 31, 2020 of over 17,000 blood lead level samplings of children residing within one and a half miles of the airport at the time the blood draws were taken. The researchers found that **"Under periods of high piston-engine aircraft traffic, children proximate to Reid-Hillview airport experience an increase in BLLs [blood lead levels] in excess of what the children of Flint experienced during the FWC [Flint Water Crisis]."**[2] The study also revealed that the volume of piston-engine air traffic and the amount of leaded fuel sold on a monthly basis to fixed based operators at RHV also contributed to increased blood lead levels.

In the words of Dr. Sammy Zahran, a leading researcher on the study, **"The Flint water crisis from start to finish unfolded in less than a year and a half. By contrast at Reid-Hillview, the release of lead into the lived environment is a continuous, non-stop, daily unabated flow of an undeniably harmful toxicant. I remind you that we are talking about more than a thousand pounds of lead released annually on nearby populations."**[3]

In response to the study, the Santa Clara Board of Supervisors unanimously voted to ban leaded aviation fuel at RHV and to expedite efforts to close the airport as soon as possible.

More than one-third of the top 100 lead polluting U.S. airports[4] are located on the West Coast. Over 20% are in California.

Of the 960 airports in California, 22 are included on this list. RHV ranks 34th. Nine California airports emit more lead annually than RHV does. The number in parenthesis refers to their ranking - Long Beach-Daugherty Field (2), Van Nuys (7), Montgomery Field (11), Gillespie Field (13), John Wayne (16), Palo Alto Airport of Santa Clara County (19), Chino (21) Livermore Municipal (28).

Nine of the 552 lead polluting airports in Washington State made the top 100 list - Auburn (22), Ephrata Field (32) and Boeing Field (33) emit more lead than RHV does. Harvey Field, Crest Airpark, Bremerton National, Paine Field, Renton Municipal, and Pierce County are also among the top 100.

Among Oregon's 420 lead emitting airports, 3 are among the top 100 lead polluting airports. Hillsboro Airport, the largest facility source of airborne lead pollution in the state, ranks 8th. Bend Municipal and Troutdale are also among the top 100 lead emitting airports nationwide.

Other states heavily impacted by airport lead pollution include Arizona, Colorado, Florida, Texas, and New York.

## Michigan Airport Lead Study

The Effect of Leaded Aviation Gasoline on Blood Lead in Children, published in 2017, involved over 1 million children and 448 airports in Michigan. Dr. Sammy Zahran et al. found that "child BLLs: 1) increased dose-responsively in proximity to airports, 2) declined measurably among children sampled in the months after the tragic events of 9-11, resulting from an exogenous reduction in PEA [piston-engine aircraft] traffic, 3) increased dose-responsively in the flow of piston-engine aircraft traffic across a subset of airports, 4) increased in the percent of prevailing wind days drifting in the direction of a child's residence and 5) behave intuitively and significantly when considering two-way and three-way interactions of our main treatment variables."[5]

As stated in the report, "The consequences of lead exposure in childhood are lasting. Neural-imaging studies find that adults exposed to lead as children have reduced gray matter in regions of the brain known to govern executive judgment, impulsivity and mood regulation...Economists have convincingly linked these intellectual and socio-emotional traits of judgment and impulsivity to long-term life outcomes...persons exposed to lead in early life experience 'an unfolding series of adverse behavioral outcomes: behavior problems as a child, pregnancy and aggression as a teen, and criminal behavior as a young adult.'"[6]

## North Carolina Airport Lead Study

A Geospatial Analysis on the Effects of Aviation Gasoline on Childhood Blood Lead Levels by Marie Miranda et al was published in October of 2011. This study involved the observation of 125,000 blood lead levels (BLLs) in 6 North Carolina counties in relation to proximity to the 66 airports located in these jurisdictions. According to the authors of the study, "Our results suggest that children living within 500 m of an airport at which planes use leaded avgas have higher blood lead levels than other children. This apparent effect of avgas on blood lead levels was evident also among children living within 1,000 m of airports. The estimated effect on blood lead levels exhibited a monotonically decreasing dose–response pattern, with the largest impact on children living within 500 m." In their conclusion they stated, "Our analysis indicates that living within 1,000 m of an airport where avgas is used may have a significant effect on blood lead levels in children."[7]

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[1] Leaded Aviation Gasoline Exposure Risk at Reid-Hillview Airport in Santa Clara County, California. Mountain Data Group. (8/3/2021). Last Accessed online on 01/31/2022 at RHV-Airborne-Lead-Study-Report.pdf (sccgov.org).

[2] Ibid. Pg. xviii.

3 Santa Clara Community Meeting on the Reid Hillview Airport Lead Study (8-11-2021). Last accessed online on 01-31-2022. Quote begins at the 33 minute 47 second mark in the recording.

[4] Top 100 Lead Polluting Airports. Last accessed online on 01/31/2022 at Top100LeadPollutingAirports2021-08-23_1400.xlsx (earthjustice.org).

[5] Zahran, Sammy, Iverson, Terrence, McElmurry, and Weiler, Stephan. The Effect of Leaded Aviation Gasoline on Blood Lead in Children. Journal of the Association of Environmental and Resource Economists, JAERE. (04/11/2017). Pg. 575. Last accessed online on 01/31/2022 at (PDF) The Effect of Leaded Aviation Gasoline on Blood Lead in Children (researchgate.net).

[6] Ibid. Pgs. 575-576.

[7] Miranda, Marie, Anthopolos, Rebecca, Hastings, Douglas. Environmental Health Perspectives. Vol. 119, No. 10. (10/1/2011). Last accessed online on 01-31-2022 at A Geospatial Analysis of the Effects of Aviation Gasoline on Childhood Blood Lead Levels | Environmental Health Perspectives | Vol. 119, No. 10 (nih.gov)