

Van Nuys Airport  
Health Impact Assessment (HIA)

*A summary of the health-associated impacts of the Van Nuys Airport on the neighboring communities (June 2023)*

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This rapid HIA was written by second year pediatric residents completing their pediatric residency through the UCLA Pediatric Residency Training Program. Residents care for patients throughout Los Angeles County, from Sylmar to Long Beach, including children living around the Van Nuys Airport. The authors have elected to participate in a longitudinal training elective called the Public Health Ambulatory Basics and Beyond (PHABB) track which includes several service-learning activities promoting child health and partnering with communities. This HIA was completed during the PHABB Environmental Health block and was supervised by faculty from the UCLA Department of Pediatrics.

Disclosures

None of the authors or faculty members have received any external funding to complete this assessment, nor have any competing financial interest in the Van Nuys Airport.

Methods

This is a non-participatory rapid health impact assessment conducted during the last two weeks of January 2023. Research methods included scientific literature reviews, meeting with community members, review of regulations as they pertain to airports and their health impacts, and consultation with experts.

## Introduction

Located in the heart of the San Fernando Valley in the city of Los Angeles, the Van Nuys Airport (VNY) is a public airport used by private, chartered, and small commercial aircrafts. Van Nuys Airport (VNY) was built in 1928. VNY is one of the busiest general aviation airports in the country with over 300,000 takeoffs and landings per year.

Throughout its history, the airport has been used for general aviation, a military base during World War II, as well as the location for many iconic film and television productions. Recently however, private jet operations have increased significantly causing compounding noise and jet exhaust exposure in the surrounding communities. Residents living in proximity of VNY have raised concerns about the possible health effects from exposure to gaseous and particulate pollutants emitted from the airport.

## Community testimonials

Community leaders continue to express concerns about the Van Nuys airport's impact on the health of children and their families in the surrounding neighborhood, as well as the negative effect the airport may have on learning in schools. One resident described in detail how her daughter's elementary school teacher paused her lesson plan every few minutes as multiple airplanes flew over, making it impossible to hear the instruction over the engine noise ("LA City Council to Analyze Increase in Charter Flights at Van Nuys Airport," 2022). These disruptions to learning raise questions about the long-term effects of the noise pollution on child development. Furthermore, Van Nuys residents highlighted the disruptions to sleep they experience nightly, as airplanes fly over their neighborhoods as frequently as every 10 minutes overnight. One resident expressed frustration that the Quieter Nights program offered by the airport is voluntary for private companies, making it difficult to enforce. In addition to the noise disruptions, the Van Nuys community members worry about the exposure to pollutants, including lead, smoke, and particulate matter. At a community meeting, a scene commonly described by the members included witnessing jet planes idling at the edge of the airport for hours on end, with exhaust blowing directly into the surrounding neighborhood. With the changing demographics of the Van Nuys area now including more vulnerable populations such as young children, pregnant women, and socioeconomically disadvantaged individuals, the perceived lower air quality and presence of toxins may prove to be detrimental to their health, as numerous studies have already been conducted in other regions that demonstrate the negative effect of pollution on children's health, learning and global development.

## Van Nuys Airport - Governance

VNY is owned by the City of Los Angeles and is operated by Los Angeles World Airports (LAWA). LAWA is run by a Board of Airport Commissioners (BOAC) who creates airport policy. The BOAC is comprised of seven business and civic leaders appointed by the Mayor of Los Angeles and approved by the City Council. The Citizens Advisory Council (CAC), which is composed of representatives from the BOAC, Mayor's Office and the LA City Council, is tasked with protecting the interests of the local citizens.

With many governing bodies invested in the operations of VNY, it is important to note that there is no explicit contract of rules and regulations for VNY between the Federal Aviation Administration (FAA) and the city. Rather, LAWA's scope of regulation over VNY is

overridden by federal law dictated by the FAA. Most recently in 2021, VNY received \$18.9 million in funds from the FAA through the Airport Improvement Program (AIP) grant to resurface and seal the pavement for the airport's primary runway (16R/34L). VNY has also accepted grant money through the AIP in previous years. By accepting grants from the FAA, VNY is obligated to be under the regulation of the FAA "throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project."

The conflict of governance over VNY has created weak implementations of certain environmental policies proposed by LAWA at the local level. The regulation of noise pollution for VNY is mandated by the Airport Noise and Capacity Act (ANCA) of 1990, however implementation of new restrictions after this publication cannot be done without approval from the FAA based on the Code of Federal Regulations, Part 161. This limitation of statute is best illustrated in the *Quieter Night Program* which is a voluntary program aimed at reducing nighttime jet operations to mitigate noise to the immediate residential area. Data has shown that since the implementation of this program in 2020, the percentage of nighttime jets has remained steady ranging from 5.9-6.2%. Hence, nighttime noise levels remain high, as confirmed by the neighboring residents since this program came into effect.

### The Affected Community

The Van Nuys area is predominantly comprised of single-family residences, along with commercial, industrial, and public spaces such as parks and schools. The population of Van Nuys was 168,111, according to the most recent census, with a majority of Latinx residents. With 12,758 people per square mile, the city of Van Nuys ranks amongst the most densely populated cities in the US.

According to a 2019 study by Henry et al, the area surrounding VNY has a total enrollment of 123,849 students in 228 schools, with 146 public schools and a high proportion of socioeconomically disadvantaged students (*Table 1*). The study found that students in the immediate vicinity of the airport experienced three to six more hours of exposure to pollution per school day than those further away, with up to 78.9% of public-school students being socioeconomically disadvantaged. The area's schools and daycare centers include Bright Horizons at Sherman Oaks, Kids Klub Child Development Centers, and Valley Presbyterian School. Additionally, there are several hospitals and retirement homes in the vicinity of VNY that care for those with fragile and vulnerable health conditions that can be further exacerbated by air pollution. Valley Presbyterian Hospital, Sherman Oaks Hospital, and Avant Garde Senior Living are a few examples of such centers within the vicinity of the airport.

Efforts to focus attention on the health impacts of airport pollution on the surrounding community have been in place since at least the late 1980s, when a Los Angeles Times article conveyed the frustrations of community members regarding noise complaints and "touch-and-go" pilot training exercises from VNY. At the time, VNY was already the busiest general aviation airport in the country, causing issues with pollution and noise. Shifts in air traffic from

propeller planes to larger private jets, has raised numerous concerns due to its increasing burden of pollution in the middle of a densely populated city.

Table 1. School and student population information - Van Nuys Airport (from Henry, et al)

Airport	Number of Schools with available enrollment data (% of total schools)	Number of public Schools (% of total schools)	Enrollment at all schools	Enrollment at public schools (% of all schools)	Total Socio-Economically Disadvantaged enrollment (% of total public school enrollment)
VNY	228 (99.13%)	146 (64.04%)	123849	103414 (83.5%)	81547 (78.9%)

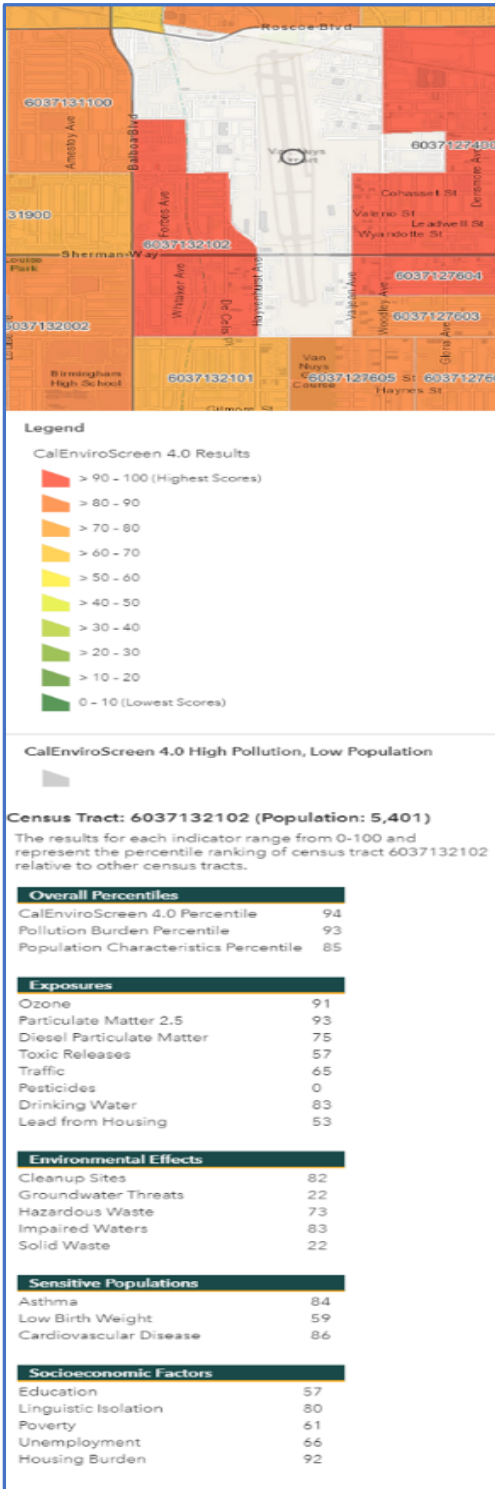
### Van Nuys Airport – Environmental Impact Studies

The General Aviation Airport Air Monitoring Study, conducted as part of a Community-Scale Air Toxics Ambient Monitoring Grant from the U.S. EPA, investigated the concentrations of several toxic air pollutants (i.e. PM, BC, OC, VOCs, lead and other trace elements, VOCs and carbonyls) in communities around the VNY and Santa Monica Airport (SMO). Sampling of air pollutants near VNY runways and community locations under flight paths occurred from 11/22/05 to 03/03/06 and 07/28/06 to 09/26/06. The average concentrations of the measured chemical species were compared to the corresponding South Coast Air Basin averages and to values obtained at two additional concurrent monitoring sites located in Central Los Angeles and in Burbank, CA. The resulting data were analyzed to determine the potential impact of airport emissions on measured pollutant levels.

The most significant airport-related impacts on air quality were observed for lead and ultrafine particles (UFPs). The study found that the 24-hour average total suspended particulate (TSP) lead concentrations were substantially higher (up to 2 and 9 times higher at VNY and SMO, respectively) than the corresponding South Coast Basin levels, and mostly below the new national ambient air quality standard. The lead concentration gradient at VNY sites reflected the relative distance of the various monitoring sites from the runway areas, indicating the impact of the piston-driven aircraft and leaded fuel. Further, aircraft idling near the runway before departure and during take-off were found to generate large numbers of UFPs at VNY with continuous (1-minute) particle number levels up to 600 times higher than those measured in background air.

Airport impacts on other pollutant levels were difficult to determine in this study. For example, the highest volatile organic compounds (VOCs) concentrations measured at VNA were generally comparable to or lower than those observed at the two companion urban monitoring sites (Burbank and Central Los Angeles, respectively). Additionally, the concentrations of PM<sub>2.5</sub>, organic carbon, and elemental carbon at all Van Nuys and Santa Monica stations were at or below the corresponding South Coast Basin averages. It is likely that local and regional sources (e.g. motor-vehicle emissions from nearby traffic and atmospheric transport of aged pollutants) were mainly responsible for the observed atmospheric levels of these toxic air pollutants.

The U.S. Environmental Protection Agency conducted a study from 2012 and 2013 in which state and local air authorities collected and certified lead concentration data at 17 different airports across the country. VNY was found to have the sixth highest three-month average lead concentration (tied with Auburn Municipal Airport, WA) with a value of 0.06 ug/m<sup>3</sup>. In the Environmental Protection Agency's 2017 National Emission Inventory, seven airports across Southern California (i.e., Long Beach, Van Nuys, John Wayne, Chino, Torrance Municipal, Riverside Municipal, and French Valley) were among the top 100 lead-producing airports nationwide with VNY rated number seven and Long Beach Airport rated number two.



## Population vulnerability index

CalEPA’s Office of Environmental Health Hazard Assessment (OEHHA), CalEnviroScreen 4.0 analyzes data from 21 indicators of environmental, public health and socioeconomic conditions in California’s 8,000 census tracts. Indicators range from pesticide use, air pollution, and children’s lead exposure to asthma, low birth weight infants, poverty, and linguistic vulnerability. The latest version was published in 2021.

For the immediate area surrounding VNY, the overall pollution burden ranked in the 94<sup>th</sup> percentile out of all California Census Tracts. PM 2.5 burden ranks in the 93<sup>rd</sup> percentile, meaning it is higher than 93% of the census tracts in California. Sources of diesel emissions within and nearby the populated parts of this census tract emit **0.288** tons per year, which places it in the 75<sup>th</sup> percentile.

With regards to Asthma rates, the CalEnviroScreen 4.0 indicator looks at the estimate of emergency room visits for asthma per 10,000 people over the years 2015-2017. Emergency room visits for asthma are a marker of poorly controlled or more severe asthma. The asthma percentile for this area is higher than 84% of the census tracts in California.

The Low Birth Weight Indicator looks at the percent of babies born less than 2500 grams (5.5 pounds) out of the total number of births from 2009 to 2015. In the area surrounding VNY, the percent low birth weight is **59, which is considered as “above average” as compared to other areas of California.**

Lead is a neurotoxin that causes significant adverse health effects, particularly in young children. Children’s exposure to lead, even at low levels, can cause lower IQ scores and behavioral challenges like attention deficit hyperactivity disorder (ADHD). The Children's Lead Risk from Housing percentile is above average for other census tracts, at 53%.

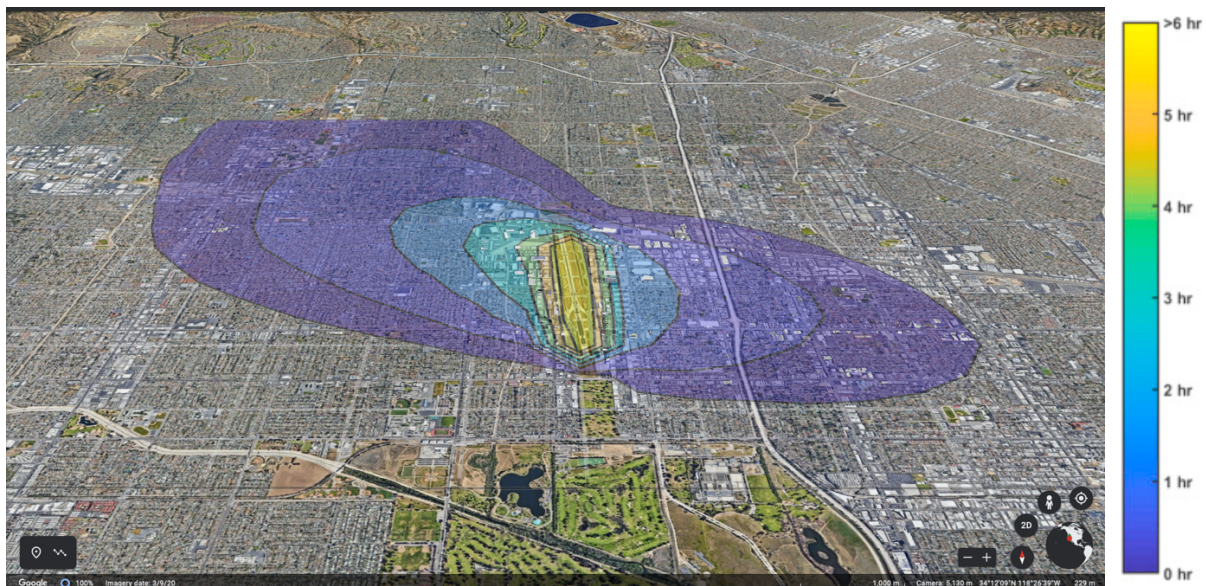
Graph 1. Pollution burden and community vulnerability.  
Courtesy of Calenviroscreen 4.0

## Impact on School Children

Henry et al. measured the impact of the air pollution from seven of the busiest airports in California on the surrounding schools within a 10-km radius, at 1-minute intervals during the school hours, averaged over 15 years. The pollution burden by VNY was calculated and stratified based on the number of hours of exposure to pollution from the airport. This study

Table 2. Number of hours of exposure to airport related air pollution in children attending schools surrounding VNY	
Exposure Range (Hours per day)	Number of children exposed while at school from 7:30–15:30
0–0.1	68092
0.1–1.0	51547
1.0–3.0	4210
3.0–6.0	0
Total students	123849

found that during 2015-2016 academic year an estimated 3,198 students had an average daily exposure of 1-3 hours of air pollution from VNY throughout the academic year (*Table 2 and Map 1*). The high ratio of socioeconomically disadvantaged students (78.9%), combined with the large number of students exposed to moderately high levels of pollution, makes an already vulnerable community increasingly susceptible to the ripple effects of the health impact of pollution on these children and their families.



Map 1. Airport related pollution pattern calculated at 1-minute intervals during the 2015-2016 academic year. Map by Google Earth.

## General Impact of Jet Airplanes and Propeller Planes on Air Pollution

Jet airplanes and propeller planes have a significant impact on air pollution, particularly in urban areas where air quality is already a major concern. The combustion of fossil fuels used in the engines of these planes releases a variety of pollutants and have associated increase in health risks. According to Bendsten et al, jet engines produce volatile organic compounds (VOC) such as CO<sub>2</sub>, NO<sub>x</sub>, CO, SO<sub>x</sub>, low molecular weight polycyclic aromatic hydrocarbons (PAH), particulate matter (PM) with associated PAH, metals (including lead) and soot.

Studies have consistently shown that air pollution directly correlates with downwind proximity to nearby airports. Ultrafine particles (UFPs) are three to five times more concentrated under jet airplane landing paths. As an example, particle number concentration (PNC) adjacent to Los Angeles International Airport (LAX) is four times higher than on nearby highways. Furthermore, as a study at Boston Logan International Airport has demonstrated, residences within several kilometers of the airport experience elevated PNC and NO<sub>2</sub> concentrations inside and outside their homes. Although most studies have focused on commercial airports, the findings are relevant to smaller general aviation airports that host a mix of propeller- and jet- airplanes. For instance, UFP concentrations in residential areas near the Santa Monica Airport (SMO) increased by 10- and 2.5- fold at 100 meters and 600 meters downwind, respectively.

Other pollutants such as carbon black that is produced by incomplete combustion of fossil fuels, is a known carcinogen and has been linked to respiratory and cardiovascular problems. Similarly Lead pollution from jet and propeller planes has poses a risk to cognitive development in children, causing learning and behavioral problems later in life.

### Major Fuels Used at Van Nuys Airport

Van Nuys Airport does not explicitly disclose the types of fuel supplied to it operating aircrafts. Nevertheless, information gleaned from external sources indicates that most planes are furnished with Jet A, 100 Octane Low Lead (100LL), and sustainable aviation fuel (SAF) options (KVNY - Van Nuys Airport, 2023). A comprehensive examination of these major fuels was conducted to assess their characteristics and implications for health and the environment.

100LL is a variety of aviation gasoline (AVGAS) that is predominantly utilized in piston engine aircraft. It is notable that AVGAS is the sole transportation fuel in the United States containing lead. In response to concerns over lead exposure, the Los Angeles Board of Airport Commissioners resolved in July 2022 to expedite the transition from leaded fuel at VNY. During 2021, around 330,000 gallons of leaded aviation fuel were sold at VNY. The airport anticipates that, until a universal replacement fuel is introduced, up to 40,000 gallons of unleaded fuel could be sold at VNY each year.

Sustainable aviation fuel (SAF) is derived from a range of eco-friendly feedstocks, such as cooking oil, non-palm waste oils, solid waste like packaging, paper, and food scraps, and forestry waste (BP, 2022). Utilizing SAF has the potential to decrease carbon emissions by up to 80% over the lifecycle of the fuel when compared to conventional jet fuel (BP, 2022). It is crucial to note that SAF can be blended with traditional jet fuel at ratios of up to 50%, after which the mixture is re-certified as Jet A or Jet A-1. The precise number of aircrafts at VNY using each fuel type remains uncertain. However, it is important to recognize that despite the varying carbon footprints of these fuels, their exhaust emissions can be comparably detrimental to the health of nearby residents.

### Exposure to Jet Fuel Exhaust at the Van Nuys Airport

The 2005 General Aviation Airport Air Monitoring Study evaluated air quality in communities near general aviation airports, including VNY. This study found the total suspended particulate lead concentrations in the areas near the airport were twice as high as their cohort neighborhoods. Similarly, Aircraft idling generated 600 times higher amounts of ultrafine



particles (UFPs) during takeoff compared to background air. These findings are consistent with a similar study at the Santa Monica Airport. During the winter months, the concentration of these pollutants are exacerbated due to anthropogenic and meteorologic changes.

Ironically, community efforts that culminated in decrease in Santa Monica Airport's (SMO) aviation capacity and diversion of private jets have led to significant increase in air traffic in nearby airports, including VNY.

Although the exact numbers are difficult to ascertain at this time, there has clearly been an increase of over 82,000 annual flight operations since 2019. As of the time of this report, Van Nuys airport website reports an average of 300,000 takeoffs and landings annually. Based on this data, one can infer that airport-related pollution levels and health impact at this time far exceed the previously studied values that were summarized in the 2005 air quality report.

### Health Effects of specific jet exhaust pollutants

*Polycyclic aromatic hydrocarbons* – Polycyclic aromatic hydrocarbons (PAHs) are a group of chemical compounds that are generated by the incomplete combustion of organic matter, including jet fuel. Exposure to PAHs from jet fuel exhaust has been linked to a range of negative health effects, particularly in children and pregnant women. PAHs can easily enter the body through inhalation, ingestion, or skin absorption. Once these compounds enter the body, they can cause various health problems, such as cancer, developmental and behavioral disorders, and respiratory diseases.

Exposure to PAHs during pregnancy can also lead to negative health outcomes, including premature birth, low birth weight, and developmental delays. PAHs can also cross the placenta and affect the fetus directly, increasing the risk of congenital malformations and cognitive impairments.

Children are particularly vulnerable to the health effects of PAHs due to their developing immune and respiratory systems that can lead to a lifetime of physiologic compromise. Several studies have found that exposure to PAHs from jet fuel exhaust is associated with increased rates of childhood asthma, allergies, and other respiratory diseases. A study conducted in Los Angeles found that children living near airports with heavy jet traffic had higher rates of asthma than children living in less polluted areas.

Prenatal exposure of the pregnant mothers to PAH compounds seems to be particularly harmful to their fetus. The clinical effect on these children seem to include alterations in DNA methylation and histone modifications, which can affect gene expression and increase the risk of cancer in children and pregnant women. Furthermore, a series of studies have demonstrated a clinically significant drop in the full-scale IQ (4.31) and verbal IQ (4.67) of 5-year-old children who were heavily exposed during pregnancy compared to their less-exposed cohorts. All values were adjusted for maternal IQ, environmental tobacco smoke exposure, and variables within the home environment.

*Ultrafine particles (UFP)* - UFP are aerosols with an aerodynamic diameter of 0.1  $\mu\text{m}$  (100 nm) or less. Due to their small size, they can move freely throughout the body and reach even the

most distal lung regions, called alveoli. Studies have shown that UFP can permeate through the lungs into the circulatory system and travel throughout the body. A 2020 study found that healthy non-smoking volunteers with short-term exposure to the ambient air near an airport experienced decreased lung function (mainly forced vital capacity) and electrocardiogram (ECG) changes (e.g., prolonged QTc). Although UFP are difficult to trace and study within a living organism, their negative impact is most likely mediated through oxidative stress and pro-inflammatory effect, leading to contraction of the airways that manifest as asthmatic events. Similar mechanism is suspected to be responsible for the detrimental impact of UFP on the cardiac blood vessels that ultimately lead to increased incidence of heart attack and stroke.

The proximity of many schools to airports, along with children's higher oxygen consumption per body mass, exacerbates their total exposure throughout the day. Preterm exposure of pregnant women to UFP also poses unparalleled and often poorly understood danger to the fetus during various embryonic developmental stages. Recent studies have shown that pregnant women that are exposed to high levels of UFPs from jet airplane exhaust are 14% more likely to have a preterm birth than those less exposed.

*Black Carbon* - The incomplete combustion of fossil fuels in jet engines produces black carbon. Numerous studies have found increased black carbon concentrations in and around airports. Black carbon exposure causes adverse health outcomes by way of oxidative stress, inflammation, and gene mutations. Song et al conducted a systematic review and meta-analysis of 70 studies and found that varying duration of exposure to black carbon was associated with a significant increase in cardiovascular disease in all age groups, and particularly older adults. Among older adults, short-term black carbon exposure was associated with a 1.6% increase in cardiovascular disease, and long-term exposure with a 6.8% increase. This meta-analysis also found that black carbon is correlated with asthma morbidity for 0- to 18- year-old children. Several studies have found a dose-dependent association between black carbon exposure and all-cause morbidity and mortality. A large 26-year cohort study of predominantly male French adults found that black carbon exposure is associated with increased risk of all-site and lung cancers. Pregnant women who are exposed to black carbon have increased rates of fetal low birth weight, which is further associated with fetal demise. A 2020 study found black carbon in neonatal cord-blood and fetal tissue samples, with the amount of black carbon directly correlated to maternal exposures. This indicates that black carbon can pass through the placenta into fetal circulation that allows it to cross the blood-brain barrier and alter the natural course of a child's neurologic development.

*Lead* - Given the use of leaded fuel at VNY, it is imperative to assess the lead levels in the surrounding communities. The health effects of lead poisoning in children are well-studied and include delayed neurocognitive development, learning and behavioral difficulties, and hearing and speech problems. Even low levels of lead exposure (less than 10 µg/dL) have been shown to be associated with lower IQ and symptoms of ADHD. Per the California Communities Environmental Health Screening Tool, children residing in the immediate surrounding homes to the west of the Van Nuys airport are at the highest risk of lead exposure (>90th percentile). While other risk factors for lead exposure cannot be excluded, the increased risk compared to more distal communities is concerning given the known exposure to leaded fuel products at VNY. A 2015 Michigan study found elevated blood lead levels in children living in proximity to a piston-engine airport. When compared to children living >4km away from the airport, children

living within 1km, 1-2km, 2-3km, and 3-4km were 25.2%, 16.5%, 9.1%, and 5.4% more likely to have a blood lead level greater than 5g/dL, respectively. A 2023 study of leaded aviation gasoline exposure risk and child blood lead levels in Santa Clara County demonstrated that the blood lead levels of the sampled children directly correlated with proximity to the airport, living east and downwind of the airport, volume of piston-engine aircraft traffic, and quantities of AVGAS consumed.

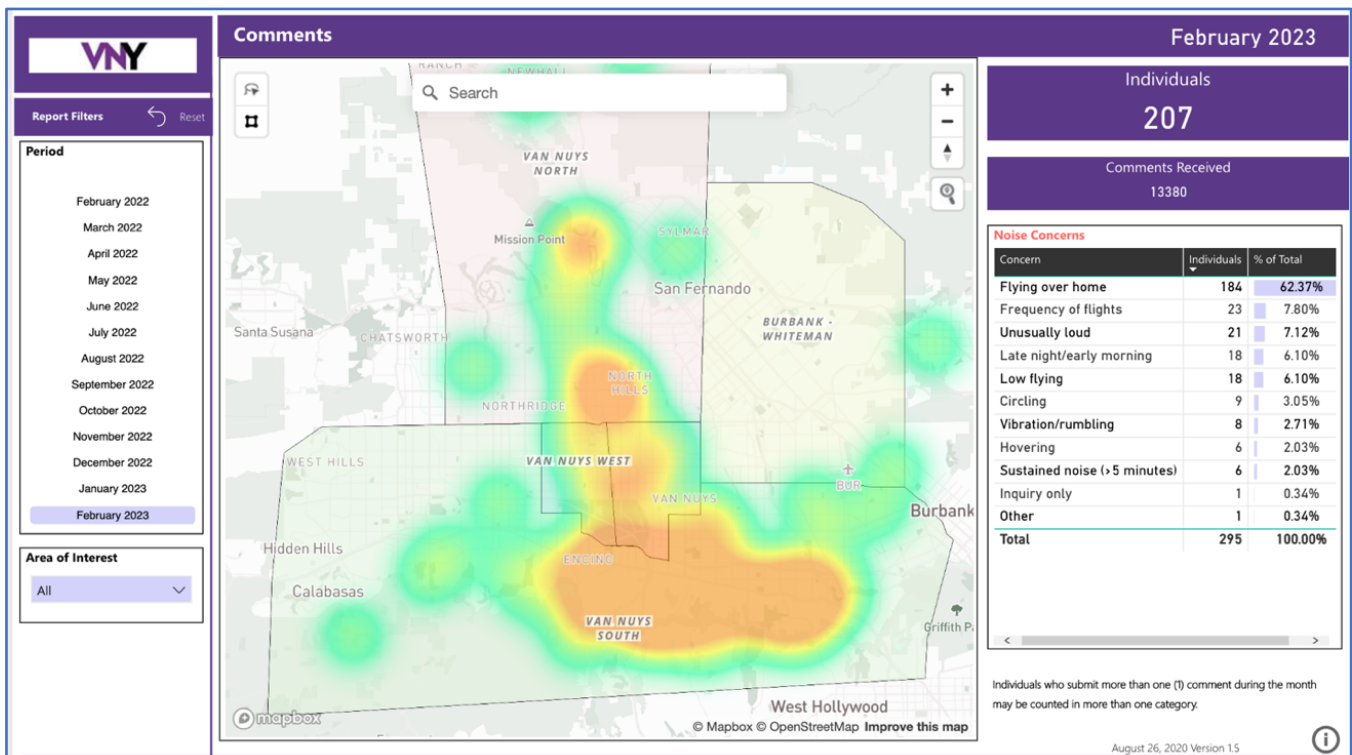
*Carbon dioxide (CO<sub>2</sub>):* The California annual statewide greenhouse gas (GHG) emission inventory compiled statewide anthropogenic GHG emissions from 2000-2020, including estimates for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and fluorinated gasses. Among all sectors, transportation is the largest contributor of GHG, representing 37% of all emissions, followed by the industrial sector at 20%, and the commercial and residential sector at 10%. According to the California Air Resource Board, vehicles make up 25% of emissions compared to 0.8% for aviation.

Although these numbers suggest that aviation has minimal impact on surrounding emissions in comparison to automobiles, further analysis of the CO<sub>2</sub> burden from aviation offers a different perspective. More specifically, comparing carbon dioxide (CO<sub>2</sub>) emissions per physical unit of the consumed fuel, motor gasoline produces 356.8 kg CO<sub>2</sub>/petroleum barrel (1 petroleum barrel = 42 US gallons) while jet fuel produces 409.6 kg CO<sub>2</sub>/petroleum barrel. *This increased burden of CO<sub>2</sub> is significantly amplified in private jet use compared to commercial air travel.* A recent study by *Transport and Environment*, a European nonprofit advocating for zero-emission mobility showed private jets are 5 to 14 times more polluting than commercial planes when looking at CO<sub>2</sub> intensity per passenger.

### Exposure to Noise Pollution

In 1980, Los Angeles County designated VNY as a “noise problem airport.” In the decades since, LAWA has taken measures to reduce its noise impact. At present, LAWA has local mandatory and voluntary noise abatement measures to minimize aircraft noise. Mandatory measures include a partial curfew restricting certain types of aircraft (stage 2 and 3) from departing during late night hours, while there are no restrictions on landings or helicopters. The voluntary programs include the Quiet Jet Departure Program and the Quieter Nights Program. The Quiet Jet Departure Program encourages jet operators to use quiet departure procedures not to exceed target decibel levels on takeoff. The Quieter Nights Program, established in 2020, encourages jet aircraft operators to avoid flights at VNY between 11 p.m. and 7 a.m. whenever possible.

The Federal Aviation Administration (FAA) has set its allowable noise contour to 65 dB DNL (day-night average sound level) as the threshold above which aircraft noise is incompatible with residential areas. Based on this standard threshold, since 2012, VNY has claimed a zero-noise impact designation. Nevertheless, an increase in jet aircraft based at VNY has resulted in an increase in noise complaints from the surrounding community. In 2019, these complaints prompted the Los Angeles City Council to unanimously vote to have the FAA investigate the underlying procedures that led to rising noise complaints. Additionally, the Noise Portal and Comment system, which was established to monitor noise concerns submitted by community individuals, has consistently revealed that aircraft flight path over homes was a major source of noise. The volume of comments in 2022 ranged from thirteen- to twenty-seven thousand monthly, with about 200-300 individuals submitting comments. Two-thirds of these complaints were due to aircraft flying directly over homes, while other common complaints include reporting late night or early morning flights, the frequency of flights overall, or unusually loud noises (*Map 2*).



Map 2. An example of noise complaints from the VNY Noise Portal and Comment System from February 2023. Maps indicate density of noise complaints correlated with flight paths. The density of complaints concentrates along the southern region of VNY where the majority of flight departures occur.

The severity of airport noise pollution prompted Congress to pass the FAA Reauthorization Act of 2018 which directed the FAA to re-evaluate the use of this day-night level metric and consider other noise sampling methods to address community airplane noise concerns within one year of passage (*Section 188, 5*).

## Health Effects of Noise Pollution

Noise pollution is recognized as an environmental pollutant and a health hazard. It is well-documented that noise exposure can cause physical and mental health effects. Long term exposure to loud sounds can lead to tinnitus, which is an abnormal ringing sound, and Noise Induced Hearing Loss (NIHL). NIHL has been seen in those exposed to noises such as traffic or from occupational or entertainment exposures. Early exposure to loud noises can lead to early presentations of NIHL and other non-auditory issues. Loud sounds have also been shown to increase catecholamine release in children. Although some physiologic responses to loud noises are useful when humans are under stress or in “fight-or-flight” mode, chronic exposure has significant detrimental effects on the cardiovascular system. Chronic noise pollution can increase the risk of heart disease, manifesting as heart attacks, strokes, arrhythmias, and hypertension.

Noise pollution also has significant cognitive and mental health effects, including sleep disturbances, concentration problems, fatigue, and headaches. Noise pollution can also lead to learning disorders. Studies done in areas where airports and schools are in close vicinity to one another show a strong association with aircraft noise exposures at school and poor recognition memory, poor recall memory, and poor reading comprehension. As an example, a study of 9- to 10-year-old children from the rural Alpine areas found that even modest levels of noise exposure (above 60 dBA) was associated with poorer short-term memory performance. In addition, the Munich Airport Study showed that high noise exposure was associated with deficits in long-term memory and reading comprehension in 10-year-old children. Interestingly, this same study showed that two years following the airport closure, these cognitive impairments disappeared, suggesting that the effects of noise pollution may be reversible if there is cessation of noise. There is indisputable evidence that noise pollution from airports causes an unhealthy learning environment for children.

Noise pollution also has significant effects on the mother-baby dyad. It is during this critical period that the fetus is rapidly growing, organs are developing, and both mother and fetus are sensitive to environmental exposures. Noise pollution puts newborns at risk for low birth weight, prematurity, congenital anomalies, hearing loss, behavioral issues, respiratory and cardiovascular problems. In a Canadian study of 70,000 birth records, road traffic noise exposure was associated with low birth weight, even after adjusting for air pollution. These associations have serious health impacts in developing children, as well as significant implications for future generations as a whole.

## Summary

Van Nuys airport as the busiest general aviation airport in the country offers a series of unique challenges and opportunities for the city of Los Angeles and the neighboring community.

One of the major challenges in mitigating Van Nuys airport noise and air pollution is the conflict of governance between various stakeholders, including the City of Los Angeles, Los Angeles World Airports (LAWA), the Federal Aviation Administration (FAA), and the high-density community living in proximity to the airport. While the City of Los Angeles and LAWA have the responsibility to manage and operate the airport, the FAA's regulatory oversight of VNY limits the scope of LAWA's regulation, particularly with respect to noise pollution. Meanwhile, rapid increase in the number of flights and its related car traffic has clearly surpassed the local residents' threshold for tolerating noise and air pollution. Thus, any policy changes or mitigation measures need to balance the wellbeing of the community while assuring compliance with FAA regulations.

Despite such seemingly formidable challenges, the report points to opportunities for improvement in a prioritized fashion as listed below.

**Enhance Air Quality Monitoring:** Improvement in air quality monitoring allows for a better understanding of the common air pollutants, variation throughout the day, and pollution hot spots that deserve further studies and more immediate targeted mitigation measures.

**Expand Public Transportation:** The Mayor's Office can work with the Los Angeles County Metropolitan Transportation Authority to expand public transportation options, such as buses and shuttle programs to reduce the number of cars on the road and related emissions. More immediate measures such as incentivization of low- or zero- emission vehicles and banning engine idling during passenger pick up and drop off, along with streamlined ride sharing and taxi programs for improved efficiency will reduce airport traffic related pollution, while enhancing the overall operations of the airport.

Some of the broader interventions include development of more green space as a pollution and noise barrier, educating the public about the environmental and human cost of private jet travel, and rerouting of the planes to avoid residential homes.

In the long run, Southern California's strong aviation and aerospace presence offers a unique opportunity for initiating an innovation challenge by the mayor's office to have companies find engineering solutions that would mitigate the overall impact of airports on the surrounding environment throughout the world.

Ultimately, we believe that increased community engagement on this matter can help the Mayor's Office build a stronger community bridge to tackle a slew of community issues that extend beyond the Van Nuys airport.

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