



Transportation Policy Is Health Policy

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Program on Health, Equity and Sustainability

ITE San Francisco Bay Area Lunch Meeting

Complete Streets, Sustainable Communities, and Safe, Active Transportation

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Sustainable, Livable Environments Should Advance Health



Livable 1: suitable for **living** in, on, or with
<a *livable* house> <*livable* wages>

Worldwide, thirteen million deaths annually are due to preventable environmental causes. *World Health Organization, 2008*

Health:

“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”

World Health Organization, 1948

“Healthy” Transportation Networks = Healthy People



Able to walk, bike, take transit, play, access basic needs – safely:

traffic injury, physical activity, obesity, depression, cancer, heart disease, diabetes, social cohesion

Able to sleep well, concentrate, communicate:

traffic-related noise levels associated with stress, hypertension, blood pressure, heart disease, learning delays, sleep disturbances, hearing impairment, community annoyance

Able to breathe clean air:

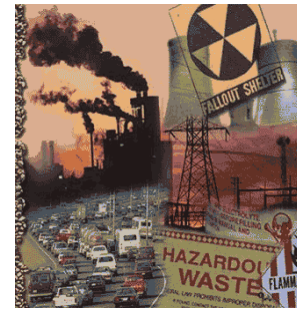
air pollution and proximity to heavy traffic resulting in reduced lung function, increased asthma hospitalizations, asthma symptoms, bronchitis symptoms, and medical visits; air toxics like diesel exhaust and benzene are carcinogens

Environmental justice, Equitable access:

for all populations and subgroups regardless of age, ethnicity, income, immigrant status, etc.



Health Should Be Considered



Health Impact Assessment (HIA): a systematic process to make evidence-based judgments on the health impacts of public decisions

Screening	Determine need for and value of a HIA
Scoping	Determine which health impacts to evaluate, methods for analysis, and workplan to complete the assessment
Assessment	Judge magnitude and likelihood of potential health impacts and identify responsive design strategies and recommendations
Reporting	Communicate results to stakeholders and decision-makers
Monitoring/ Evaluation	Track effects of HIA and decision on health and evaluate HIA from start to finish

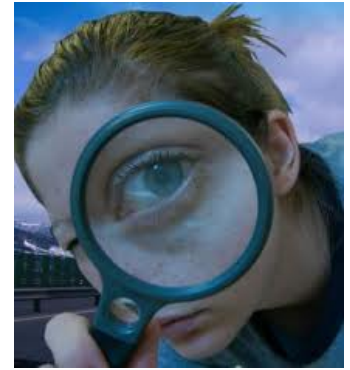


SFDPH HIA Tools

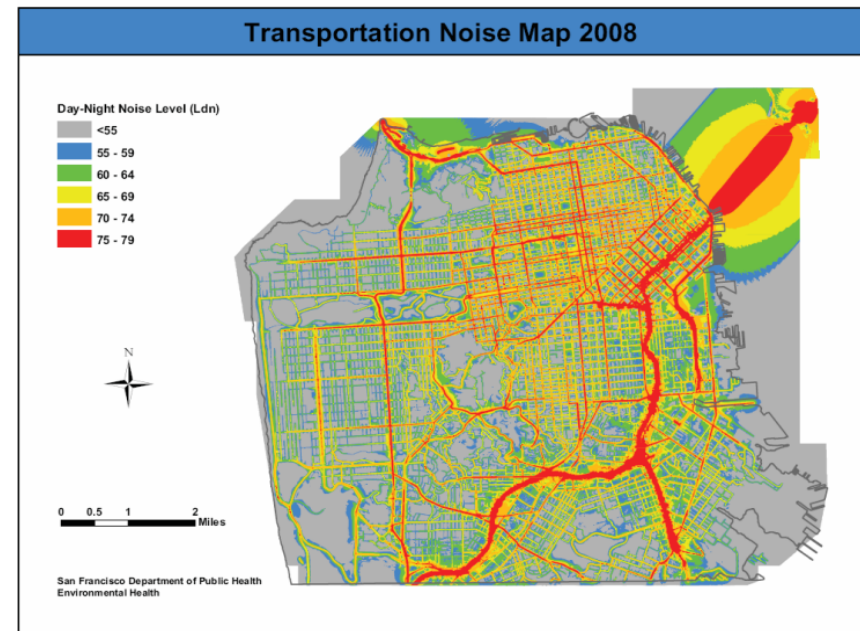
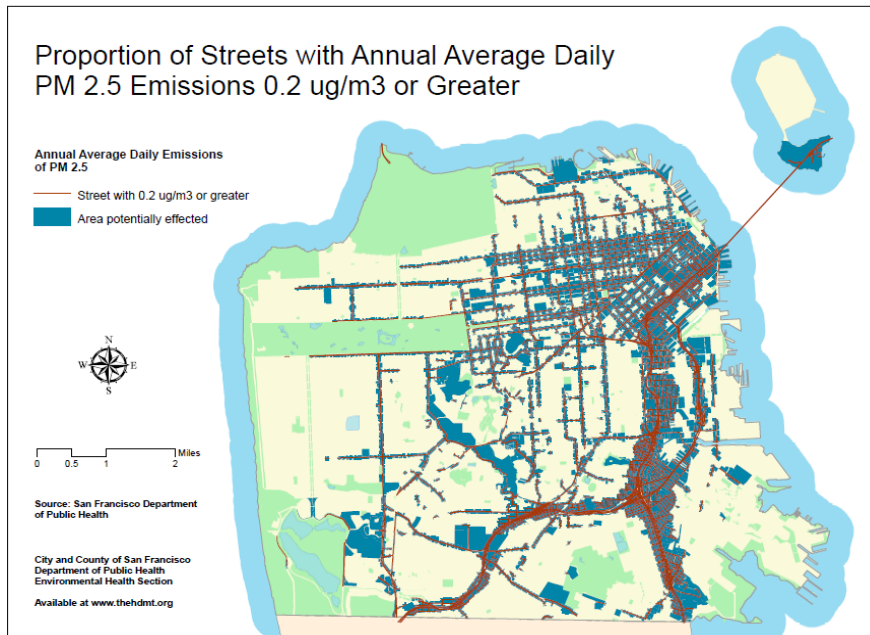
- Air Quality Modeling
- Traffic-related Noise Modeling
- Pedestrian Injury Forecasting

Cross-cutting characteristics:

- Quantitative approach
- Transportation analysis outputs as HIA inputs
- Traffic volume a key predictor
- ArcGIS mapping and spatial analysis
- Interpreted relative to health-based thresholds, targets or goals



SFDPH Traffic-Related Air Quality and Noise Modeling



Inputs: Traffic volumes and speeds; Vehicle type and emissions rates; Temperature and humidity; Road surface type and meteorology; Receptors and exposure height

Outputs: Traffic-related fine particulate matter (PM 2.5) and traffic-related noise levels (decibels) – used to assess population exposure relative to health protective thresholds

Health effects: can be estimated using exposure-response functions from the empirical literature.



Air Quality Assessment and Mitigation in San Francisco

- Identify areas with potential traffic pollution hot spots
- Establish guidance, regulations, and improvement strategies to prevent health impacts associated with air pollution hot spots including concentrations of PM2.5

2011: SFPDPH developing long range community risk reduction plan to reduce air pollution exposure

- Forecasting pollutant exposures for 2020 and 2035
- Considering alternative community risk thresholds

2008: Article 38 of the SF Health Code: Air Quality Assessment and Ventilation Requirement for Urban Infill Residential Developments

Requires sponsors of new development to:

- Assess air pollution from traffic at project sites using modeling tools
- Design buildings or ventilation systems to preserve good indoor air quality

Noise Assessment and Mitigation in San Francisco

Integral part of the Citywide Noise Enforcement program

- SF General Plan citywide noise map updated - compatible land use planning
- Future noise levels for streets, land use parcels, neighborhoods, communities, or the entire city
- Used in the implementation of acoustical building code standards
- SFDPH routinely responds to noise complaints
- Routinely review EIR Noise sections for large-scale residential development

“At least every two years the Department of Public Health shall make recommendations to the Planning Commission for noise assessment and prevention in land use planning or environmental review.” *(Article 29, SF Police Code - Regulation of Noise, 2008 Update)*

Table 1.

LAND USE COMPATIBILITY CHART FOR COMMUNITY NOISE

LAND USE CATEGORY	Sound Levels and Land Use Consequences				
	55	60	65	70	75
RESIDENTIAL - All Dwelling, Group Quarters
TRANSIENT LODGING - Hotels, Motels
SCHOOL, CLASSROOM, LIBRARIES, CHURCHES, HOSPITALS, NURSING HOMES, ETC.
AUDITORIUMS, CONCERT HALLS, AMPHITHEATRES, MUSIC SHELLS
SPORTS ARENA, OUTDOOR SPECTATOR SPORTS
PLAYGROUNDS, PARKS
GOLF COURSES, BOWLING ALLEYS, WATER-BASED RECREATION AREAS, CEMETERIES
OFFICE BUILDINGS - Personal, Business, and Professional Services
COMMERCIAL - Retail, Movie Theaters, Restaurants
COMMERCIAL - Wholesale and Some Retail, Industrial-Manufacturing, Transportation, Communications and Utilities
MANUFACTURING - Noise Sensitive

- Satisfactory, with no special noise insulation requirements.
- New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
- New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
- New construction or development should generally not be undertaken.

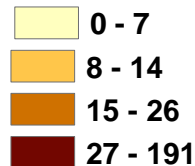
SFDPH Pedestrian Injury Collision Forecasting Model

Significant predictors of area-level collisions:

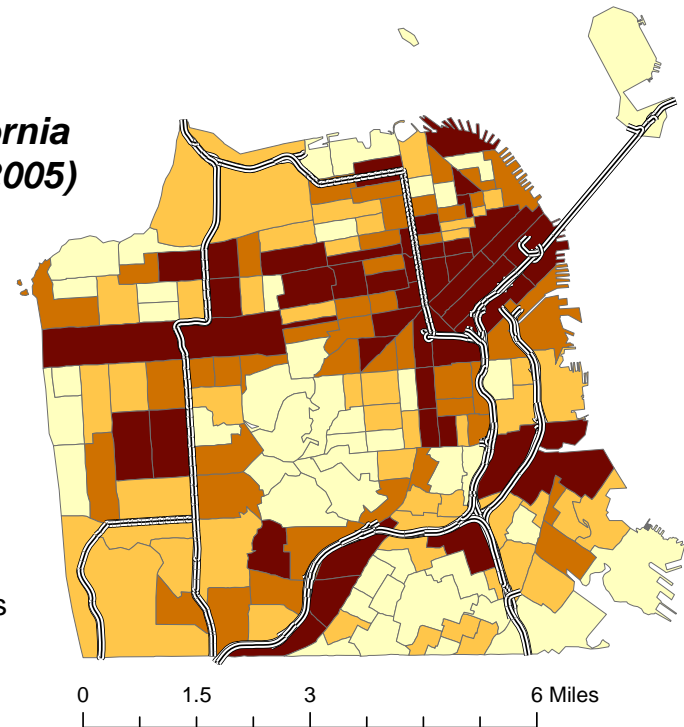
- Traffic volume (+)
- Arterial streets (+) w/o surface transit
- Neighborhood commercial zoning (+)
- Employees (+)
- Residents (+)
- Land area (-)
- Below poverty level (+)
- Age 65 and over (-)

**San Francisco, California
census tracts (2001–2005)**

Number of Collisions



 Highways/Freeways



Source: California Highway Patrol, Statewide Integrated Traffic Records System

Explains over 70% of the census-tract level variation in pedestrian injury collisions.

A multivariate, linear regression model: $\ln(\text{PedInjCollisions}) = b_0 + \sum b_i X_i$

Wier M et al. An area-level model of vehicle-pedestrian injury collisions with implications for land use and transportation planning. *Accident Analysis & Prevention*. 2009 Jan;41(1):137-45.

Injury concentration in San Francisco neighborhoods

- ~50% of injuries occur in 20% of census tracts and in 8% of San Francisco surface area
- Injury rates highest in lower-income neighborhoods—transportation system impacts a social and environmental justice issue

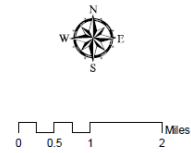
Vehicle-Pedestrian Equity Analysis by Census Tract San Francisco, CA (2004-2008)

Proportion of SF Residents Living in, Proportion of Injuries Happening In

- 20% of SF residents, 50% of SF injuries
- 20% of SF residents, 25% of SF injuries
- 60% of SF residents, 25% of SF injuries

▨ Excluded because of small population

— Major Highways/Freeways



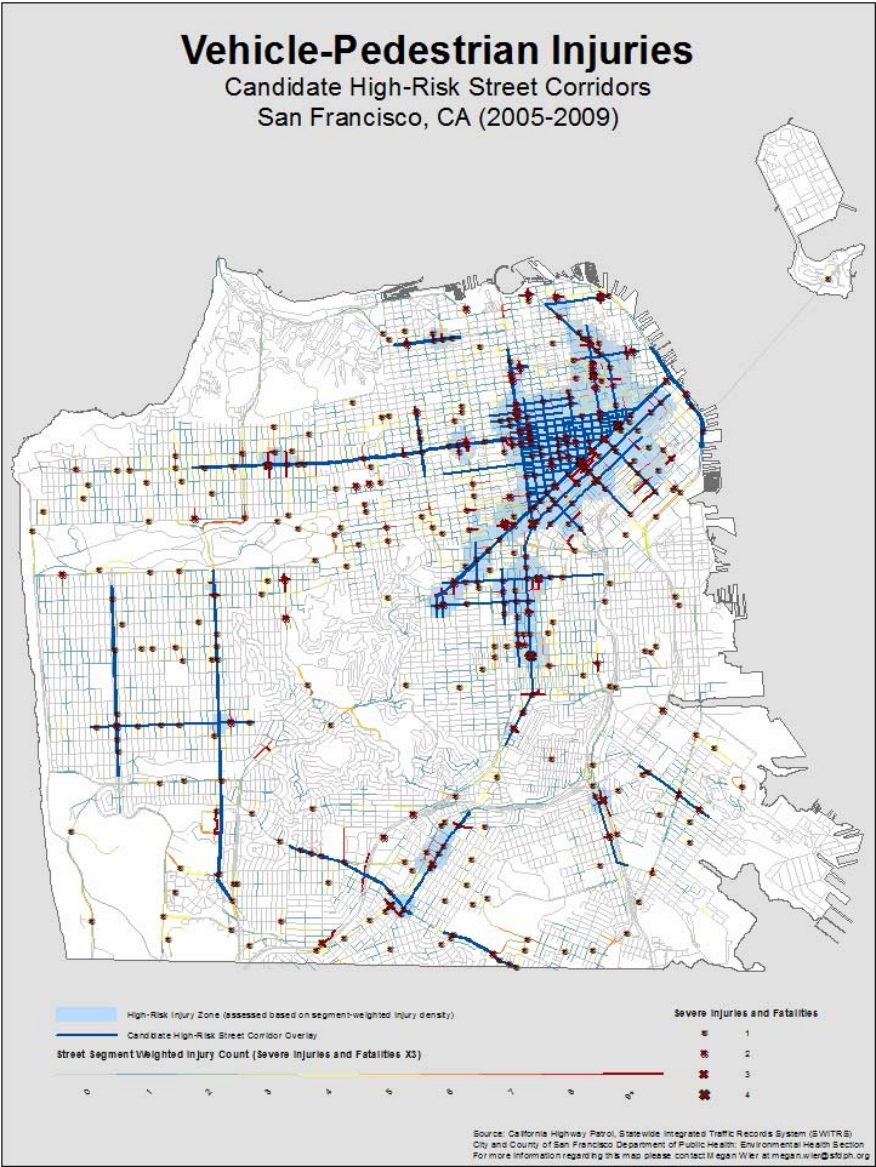
Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)
Data geocoded by Jeff Burton (SFPD)

City and County of San Francisco
Department of Public Health
Environmental Health Section

December 2010 Executive Directive on Pedestrian Safety

- Establishes new medium (25% by 2016) and long range (50% by 2021) reduction targets for serious and fatal pedestrian injuries
- SFMTA and SFPDPH Co-Chair Inter-agency Citywide Task Force
- Short term actions
 - 15 mph school zone speed limits (SFMTA)
 - Pilot 20 mph home zones (SFMTA)
 - High risk corridor engineering program (SFMTA)
 - Targeted pedestrian safety enforcement (SFPD)
 - Pedestrian Injury Prediction modeling (SFPDPH)
 - Applications of Pedestrian Environmental Quality Index (SFPDPH)
 - Best practices research (All)
- Long term: Pedestrian Safety Plan





High-risk corridor methodology identifies:

- 6.7% of city street length in miles
- 55% of severe and fatal pedestrian injuries
- 51% of total pedestrian injuries



Three Healthy and Safe Community Performance Targets in the Regional SCS / RTP

- PM 2.5 attributable mortality
 - Reduce premature deaths from exposure to fine particulates (PM2.5) by 10%
- Transportation injuries
 - Reduce by 50% the number of injuries and fatalities from all collisions (including bike and pedestrian)
- Active transportation time
 - Increase the average daily time walking or biking per person for transportation by 60% (for an average of 15 minutes per person per day)

Solutions to Support Healthier Communities

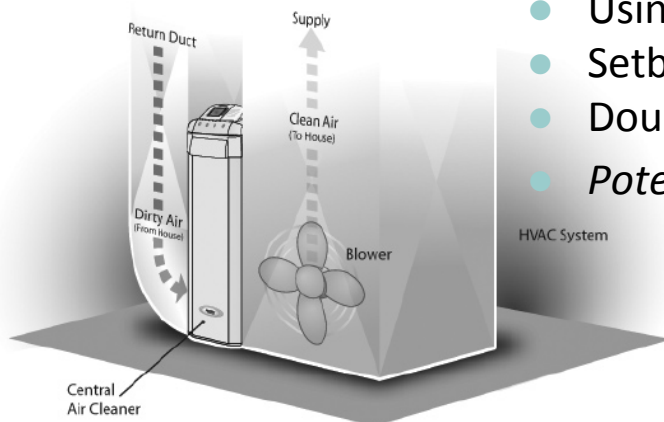
Transportation Systems:

- Traffic Volume Reductions (e.g., Road and Parking Pricing Policy, Transportation Demand Management, Truck Routing)
- Speed Reductions
- Soundwalls
- Street and Intersection Improvements
- Attention to high injury areas, routes traveled by vulnerable populations (i.e., children, elderly, disabled, transit dependent)



Sensitive Land Uses (*residences, schools, health care facilities, child care, etc.*):

- Indoor Ventilation and Filtration Systems (HVAC)
- Using lower floors for commercial use and upper for residential
- Setback of buildings from roadway air pollution source
- Double-paned Windows
- *Potential co-benefits of energy efficient windows, insulation, etc.*





Public Health as a Key Partner

Transportation System Investments = Public Health Prevention – versus Costs Translated to the Health System

- Annual **hospital costs** for severe pedestrian injury in San Francisco= Approx. \$15 million/annually (*76% of the total costs paid for by public funding*)

Challenging Transportation Decisions, Limited Funding:

- Health-based evidence and analysis can identify issues and opportunities, inform strategic improvements and investments
- Public Health agencies engaged with community stakeholders regarding health issues, equity concerns



Thank you!

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