



# **Emerging Trends in Asian and Pacific Islander Health Disparities and Their Implications for Environmental Risk Assessment**



**A Look at Asian and Pacific Islander American Communities**



# In a Nutshell

Evidence of emerging health disparities indicates several contributing factors with potential implications for environmental risk assessment. Causal factors such as biological variability, environmental exposure, and socio-economic/socio-cultural influences offer clues to health disparities found in Asian and Pacific Islander Americans. Thus, two distinct questions emerge:

- 1) What are some plausible hypotheses around which a research agenda for Asian and Pacific Islander Americans can be formulated and implemented?**
- 2) What role does translational research play in getting the message out to communities at risk?**

The government and the scientific and research community need to obtain better and more coordinated health research, data collection and epidemiology on Asian and Pacific Islander American communities to relate causal factors to disease outcomes. This will ensure a more informed environmental risk assessment and more effective mitigation of risks caused by environmental hazards.

# Asian/Pacific Islander (API) Environmental Health Issues

- APIs living in **substandard housing** may be exposed to environmental hazards, such as lead poisoning, in their homes and communities.
- **Traditional and cultural practices**, including dietary regimen, may subject APIs to toxins in traditional medicines, food (especially imported food items which are unregulated), and other household products such as Chinese chalk pesticide.
- Many API workers, with few employment options, are exposed to **environmental toxins in the workplace** (example: electronics, garment/textiles, drycleaning, nailcare, and hospitality industries).
- **Cultural and linguistic barriers** prevent access to health care.
- The **lack of data, research, and analysis** into causal factors severely curtails effective policies and programs to address API environmental health issues.

# API Kaleidoscope

There are  
28 Asian and  
19 Pacific Islander  
subgroups  
representing a  
vast array of  
languages and  
cultures.

## APIs are Americans of Asian or Pacific Islander descent

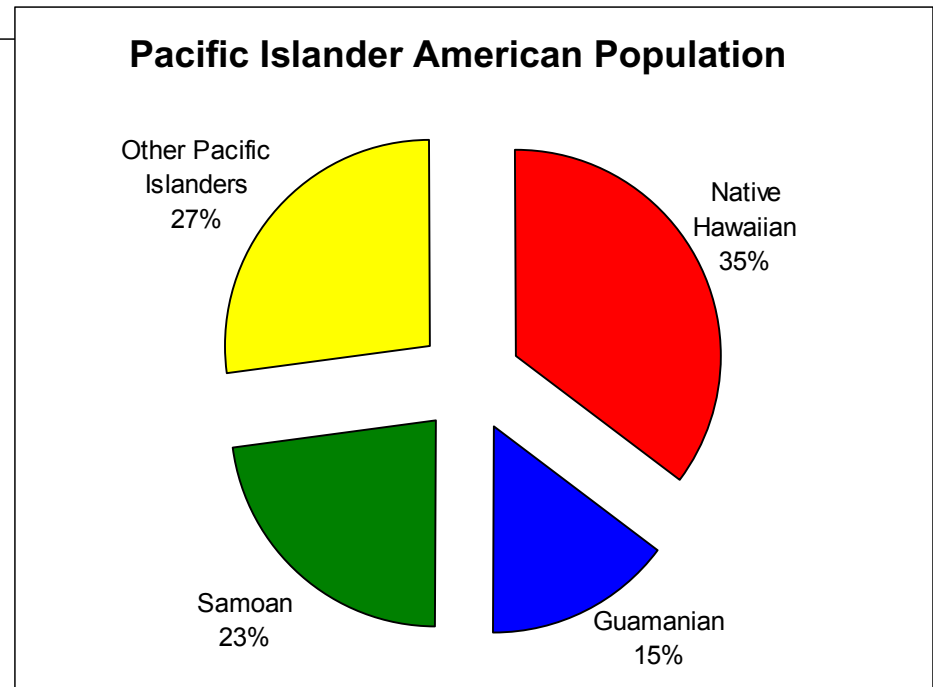
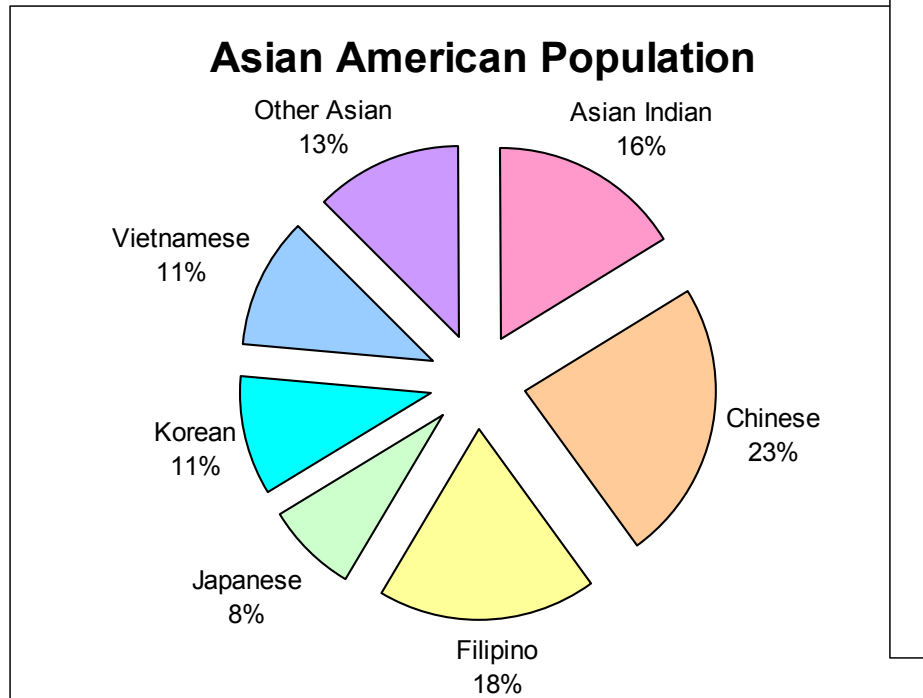
Bangladeshi	Indian	Ponapean
Bhutanese	Indochinese	Saipanese
Bikini Islander	Indonesian	Samoan
Borneon	Iwo-Jiwan	Sikkim
Burmese	Japanese	Singaporean
Cambodian	Javanese	Solomon Islander
Carolinian	Korean	Sri Lankan
Celebesian	Kwajalein Islander	Tahitian
Cerem	Laotian	Tarawa Islander
Cernam	Malayan	Thai
Chinese	Maldavian	Tinian Islander
Cosmopolitan	Mariana Islander	Tokelauan
Eniwetok Islander	Marshall Islander	Tongan
Eurasian	Marshallese	Trukese
Fujian	Melanesian	Vietnamese
Filipino	Micronesian	Yapese
Guamanian	Mongolian	Pakistani
Hawai'ian	Nepali	Papua New Guinean
Hmong	New Hebrides Islander	Polynesian
	Okinawan	

# API Demographics



- As of 2000, APIs constitute 3.6% - 4.2% of the US total population (12 million)
- APIs are the fastest growing racial group in the United States (a 95% increase from 1980 to 1990, a 48% increase since 1990)
- Approximately 70% are recent immigrants and/or refugees, 40-50% of whom have limited English proficiency
- Census estimates by 2050, one out of every 10 Americans will be of Asian or Pacific Islander descent

# API Demographics



Source: US Census 2000

Ethnic enclaves are growing around the US along with the burgeoning API population. In some counties, API populations are already above 10%. Census estimates 45% of APIs are concentrated in 3 metropolitan areas: Los Angeles, New York, and San Francisco

Likewise, 80% of APIs reside in ten states -- California, New York, Hawaii, Texas, New Jersey, Illinois, Washington, Florida, Virginia and Massachusetts.

But the fastest growing API populations are in states such as Georgia, Nevada, North Carolina, Nebraska, Arizona, Delaware and New Mexico.

# API Demographics

Select US Counties with significant API populations

**OR COUNTIES**  
 Washington (7%)  
 Multnomah (6%)

**WA COUNTIES**  
 Seattle/King (11%)  
 Snohomish (6%)  
 Whitman (6%)

**MI COUNTY**  
 Washtenaw (6%)

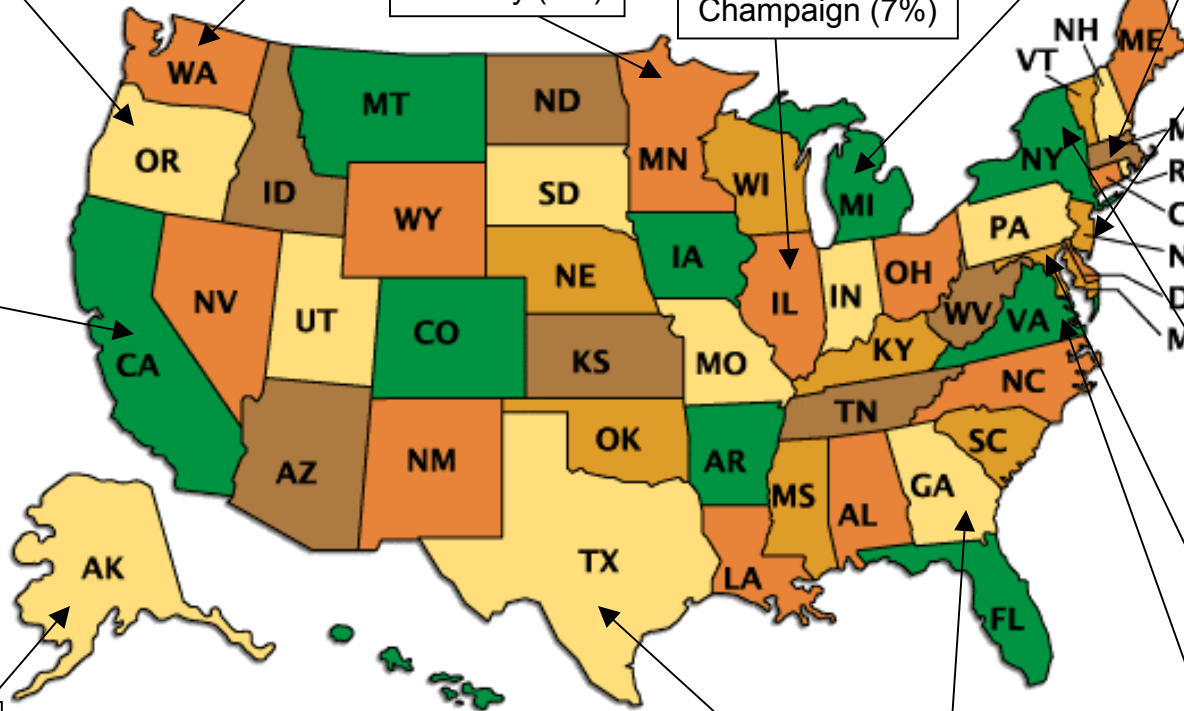
**MA COUNTIES**  
 Suffolk (7%)  
 Middlesex (6%)  
 Norfolk (6%)

**CA COUNTIES**  
 SF (31%)  
 Santa Clara (26%)  
 Alameda (20%)  
 San Mateo (20%)  
 Orange (14%)  
 Solano (13%)  
 LA (12%)  
 San Joaquin (11%)  
 Sutter (11%)  
 Sacramento (11%)  
 Contra Costa (11%)  
 Yolo (10%)  
 San Diego (9%)  
 Fresno (8%)  
 Yuba (8%)  
 Merced (7%)  
 Monterey (6%)

**MN COUNTY**  
 Ramsey (9%)

**IL COUNTIES**  
 DuPage (8%)  
 Champaign (7%)

**NJ COUNTIES**  
 Middlesex (14%)  
 Bergen (11%)  
 Hudson (9%)  
 Somerset (8%)  
 Morris (6%)



**NY COUNTIES**  
 Queens (18%)  
 New York (9%)  
 Kings (8%)  
 Tompkins (7%)  
 Richmond (6%)  
 Rockland (6%)

**AK COUNTIES**  
 Aleutians East (27%)  
 Aleutians West (26%)  
 Kodiak (16%)  
 North Slope (6%)  
 Anchorage (6%)

**HI COUNTIES**  
 Honolulu (46%)  
 Kauai (36%)  
 Maui (31%)  
 Hawaii (27%)

**TEXAS COUNTIES**  
 Fort Bend (11%)  
 Collin (7%)

**GA COUNTY**  
 Gwinnett (7%)

**MD COUNTIES**  
 Montgomery (11%)  
 Howard (8%)

**VA COUNTIES**  
 Fairfax (13%)  
 Fairfax City (12%)  
 Arlington (9%)  
 Falls Church (7%)  
 Alexandria (6%)

Source: US Census 2000

# Limited English Proficient & Linguistically Isolated Groups

**Cultural and linguistic barriers significantly affect API access to health care and information.**

## Percentage of APIs who do not speak English “well” (or at all)

Hmong (76%)  
Cambodian (70%)  
Laotian (68%)  
Vietnamese (61%)  
Taiwanese (54%)  
Korean (52%)  
Chinese, except Taiwanese (50%)  
Thai (46%)  
Indonesian (40%)  
Tongan (39%)  
Pakistani (30%)  
Japanese (25%)  
Filipino (24%)  
Asian Indian (24%)  
Samoan (22%)  
Guamanian (16%)  
Hawaiian (3%)

## Percentage of APIs who are linguistically isolated

Hmong (60%)  
Cambodian (55%)  
Laotian (52%)  
Vietnamese (42%)  
Taiwanese (37%)  
Korean (35%)  
Chinese, except Taiwanese (34%)  
Thai (27%)  
Indonesian (26%)  
Tongan (19%)  
Pakistani (15%)  
Japanese (14%)  
Filipino (11%)  
Asian Indian (10%)  
Samoan (8%)  
Guamanian (7%)  
Hawaiian (1%)

# Socio-Economic Factors

While the average API family enjoys the highest median family income among all racial/ethnic groups, APIs also have one of the highest rates of poverty in urban and rural areas.

According to the US Department of Agriculture, “The disparity between a high median family income and a poverty rate of 15% suggests a high level of income inequality among rural Asian families.”

An estimated 27% of APIs families earn approximately one-quarter of the poverty level for a family of four.

Source: USDA Rural Conditions and Trends, Vol. 11, No. 2 (2000)

**In San Francisco, 29% of the API population live below the poverty line**

Source: Asian/Pacific Islander Family Resources Network (2001)

**In New York City, 43% of Asian American children are born into poverty**

Source: Coalition for Asian American Children and Families (1997)

**In Minnesota, API children are three times as likely (37%) to live in poverty than all other children**

Source: White House Initiative on Asian Americans & Pacific Islander (2001)

**In Massachusetts, API children are twice as likely (24%) to be impoverished than all other children**

Source: White House Initiative on Asian Americans & Pacific Islander (2001)

# Socio-Economic Factors

- AAPI families are the majority of users of public and HUD-assisted housing in a number of cities with large AAPI populations.
- In its diversity, the AAPI population belies the stereotype of Asian Americans as a "model minority" whose members are uniformly prosperous and well integrated into American life. This diversity poses special challenges for AAPI residents and serious difficulties for the community organizations that serve them.

Source: Chris Walker et al., *Building Capacity: The Challenges and Opportunities of Asian Pacific American Community Development, A Report to the National Coalition for Asian Pacific Community Development*. The Urban Institute, April 27, 2000

- An estimated 30% of APIs in New York City live in overcrowded housing conditions.

Source: White House Initiative on Asian Americans & Pacific Islanders, Interim Report to the President (January 2001)

## Examples of APIs Living in HUD-Subsidized Housing

- Minneapolis (10%)
- Oakland (20%)
- San Francisco (25%)
- Seattle (20%)

## While an estimated 10% of all Americans are impoverished, consider certain API subgroups living in poverty:

- Cambodians (47%)
- Hmong (66%)
- Laotians (34%)
- Vietnamese (34%)

# Socio-Economic Factors

- The cost of health insurance is a major barrier for APIs who are more likely to be self-employed or working for small firms that typically do not offer employer-sponsored coverage.
- The US Census estimates 17% of API children and 24% of API adults are uninsured. Up to 34% of recent immigrants and first/second generation APIs are uninsured.
- About 20% of uninsured APIs are in working families. These workers are often low-wage earners who cannot afford to purchase private insurance.
- Approximately 50% of APIs may be medically underserved.



Source: Families USA (2001)

# Socio-Cultural Factors

(Environmental Risks Due to Traditional Use of Cosmetics, Folk Medicine, and Household Products)



**SURMA** – eye cosmetic with as much as 86% lead

**KOHL** – eye cosmetic with lead

**GHASARD** – brown powder (tonic) ca 16,000 ppm lead

**BALA GOLI** – round, flat black bean dissolved in “gripe” water for stomach ache contains 25 ppm lead

**PAY-LOO-AH** – used by Hmong, contains lead

**SHUNG FAH** – contains lead

**KANDU** – red powder used to treat stomach ache contains 6.7 ppm lead

**KUSHTAY, CHUI FONG** – “herbal pills” with hazardous ingredients

**BAL JIVAN** – chamcho sold with lead-coated spoon, delivers 12 ppm lead per serving (Aslam, et al. 1979)

**CHINESE CHALK** – insecticide imported from China (illegal in the US), often mistaken for blackboard chalk; contains deltamethryn one of the most toxic pesticides



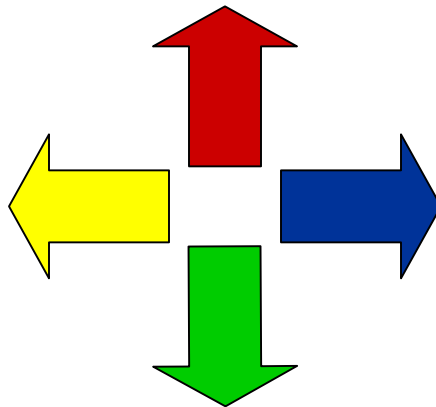
# Risk Assessment Issues

Air / Water / Soil Pollution

Pesticides

Consumer products (e.g., food, toys)

Inappropriate  
intervention



Biological variations  
Genetic susceptibility

Communication  
barriers

Socio-cultural practices

Traditional, folk medicine

Imported foods, products

Socio-economic status (poverty)

Lack of education

Lack of access to health care, information

# Environmental Sources of Lead Contamination

- Lead paint in old houses
- Parents' occupation in lead-based industries (e.g., steel construction, smelting, computer parts manufacturing)
- Other general sources:

Soil

Water

Dust

Gasoline

Air

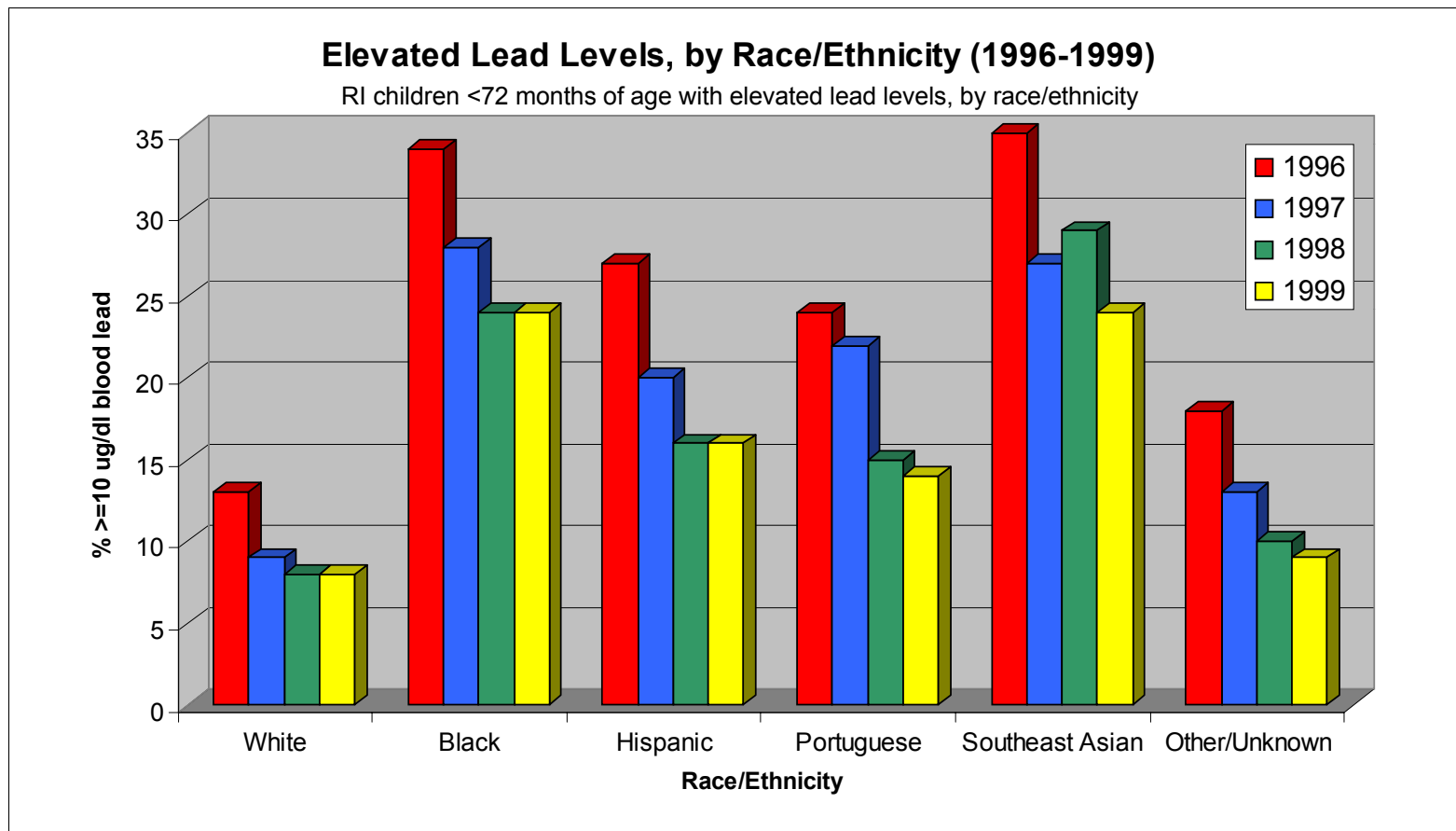
Toys



Environmental sources contribute more to lead poisoning than socio-cultural factors.

# Lead Contamination Trends

Rhode Island's Childhood Lead Poisoning Prevention Program shows an apparent decrease in cases of lead poisoning, including in the Southeast Asian population.



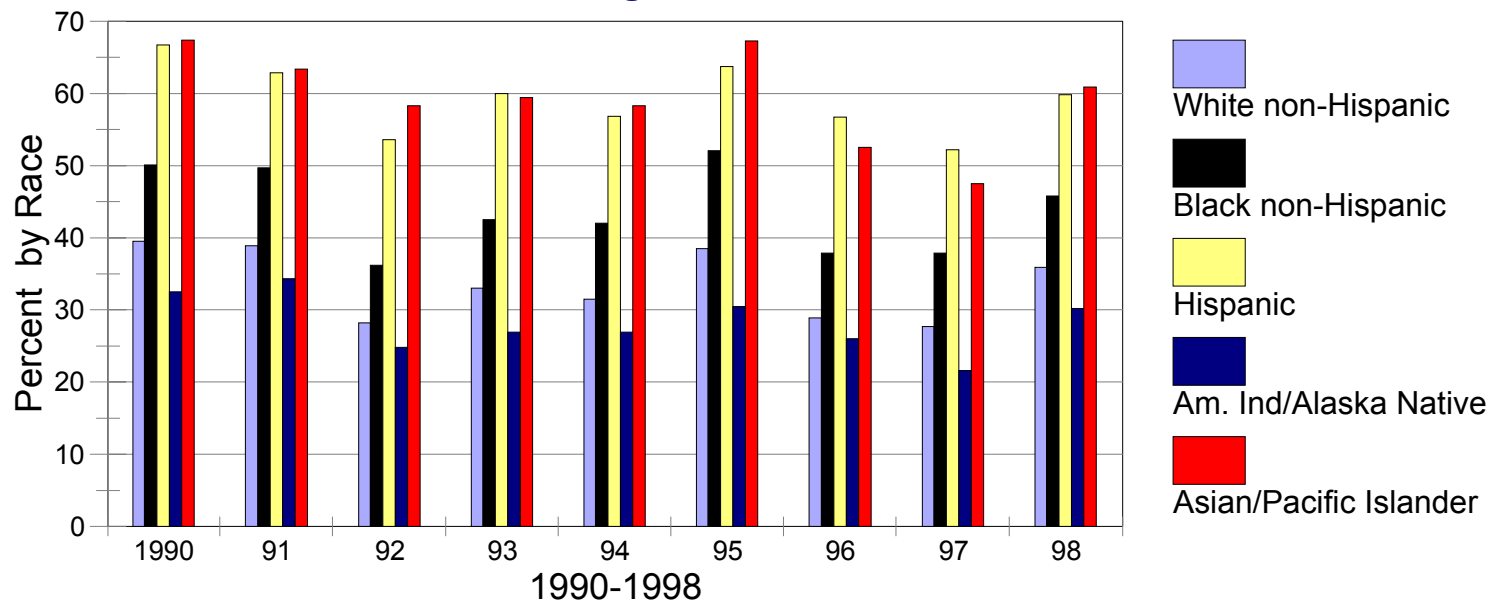
Note: Data for 2000-2001 not available

Source: Rhode Island Dept. of Health (2000)

# Air Quality Trends

The correlation between air quality and respiratory diseases among API children is unclear. According to an air quality study by the CDC, “Either Hispanics or Asians and Pacific Islanders had the highest percent of persons in counties exceeding EPA air quality standards each year between 1990 and 1998.”

**Residents in Counties with Air Quality Exceeding EPA Standards**

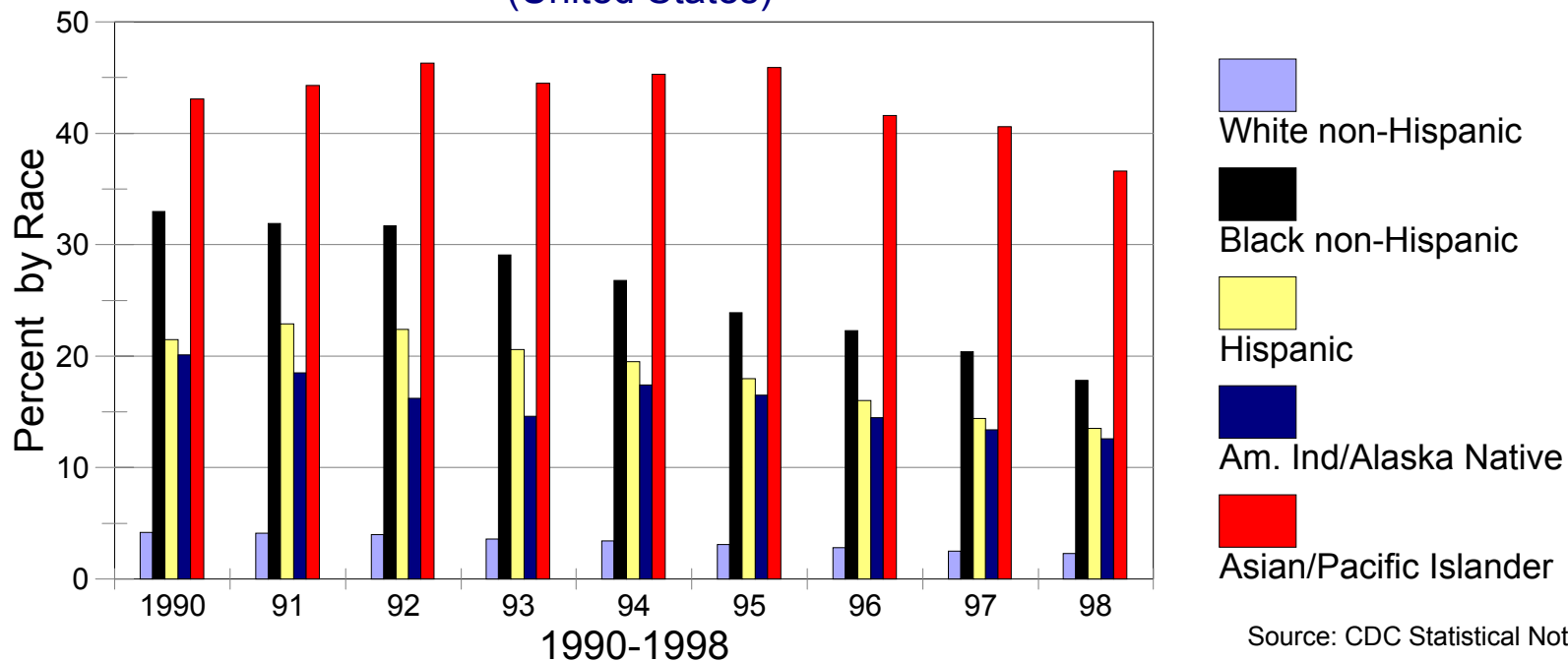


(Source: CDC Statistical Notes, Jan. 2002)

# Tuberculosis Trends

The tuberculosis case rate for APIs was the highest of the 5 racial/ethnic groups and declined the least, despite the fact that there was a special population target for tuberculosis case rates for this group. The percent of children in the samples and the relationship to environmental factors are not clear.

**Tuberculosis Case Rates by Race**  
(United States)



Source: CDC Statistical Notes. Jan. 2002

# Asthma & Upper Respiratory Illnesses

Asthma, a disease of airway inflammation, results from complex interplay between environmental exposures and genetic and other factors. Asthma rates have been increasing in the US for the past 15 years. While all ages, races and ethnic groups are affected, the epidemic is most severe among lower income and minority children.

Source: EPA Office of Children's Health Protection (2002)



## Common Allergic triggers

- House dust mites
- Mold or yeast spores
- Pollen
- Pet dander, saliva and urine
- Cockroach particles
- Aspirin or other non-steroidal anti-inflammatory drugs
- Metabisulfite, used as a preservative in many beverages and some foods

## Common Non-allergic triggers

- Tobacco smoke
- Smog
- Natural gas, propane, or kerosene used as cooking fuel
- Wood smoke
- Coal smoke
- Gas, wood, coal, and kerosene heating units
- Paint fumes
- Viral respiratory infections
- Exercise
- Weather changes

# Seafood Consumption

- EPA Region 10, in cooperation with state, county, industry, academia, and local community groups, conducted a study on the benefits and risks of seafood consumption in the Puget Sound/King County area.
- Community representatives from 10 Asian and Pacific Islander ethnic groups served as “co-managers” and participants throughout the project development.
- Trained bilingual interviewers used culturally-sensitive tools in preferred languages and appropriate ethnic media to communicate with at-risk communities.



(Source: R. Sechena et al., 1999. EPA910/R-99-003)

# API Seafood Consumption

## Environmental Pollutants

- Seafood consumption patterns were highest for foreign-born immigrants (89%), with the Vietnamese and Japanese eating the most fish and the Mien, Hmong and Samoan eating least.
- 53% were female and 47% were male, while 37% were below the 1997 poverty level. Ages ranged from 18 to 55+ years.
- Average consumption was 1.891 g/kg bw/day, while the mean was 1.439 g/kg/day and 46% preferred shellfish.
- Contaminants of concern: aldrin, dieldrin, endrin, heptachlor, hexachlor, hexachlorobenzene, mirex, toxaphene, furans, lead and other metals, fecal coliform, marine biotoxins, bacterial and viral contaminants.
- Need to evaluate the impact of environmental pollutants and traditional diets on prenatal/postnatal and developmental effects of Asian and Pacific Islander American children.

# Environment & Cancer

- Radon (linked to lung cancer) can be found in soil near homes.
- Ultraviolet (UV) light from sun is linked to melanomas.
- Tobacco smoke (linked to lung cancer) contains nicotine, tars, formaldehyde, hydrogen cyanide.
- Exposure to hazardous waste, air and water pollution, and improper use of pesticides may contribute to cancers.
- Children may be exposed to residues of asbestos (1) in schools and public buildings; or (2) from the clothing of parents working in asbestos-related industries.



# Pesticides and Health Effects

- DDT and DDE can accumulate and are stored in fatty tissues of animals and humans. Levels are greater in species higher on the food chain.
- The US EPA classified DDT, an insecticide against mosquitoes and lice, as a Class B2 probable human carcinogen. DDT can cause cancer in laboratory animals including rats, mice or hamsters. Tumors have been found in the liver, adrenal glands, lung, or lymphatic tissues of laboratory animals fed or injected with DDT.
- Also, higher rates of leukemia or lymphomas observed in DDT-exposed agricultural workers may be related to a suppression of the immune system.



Source: Cornell University, Pesticide Factsheet

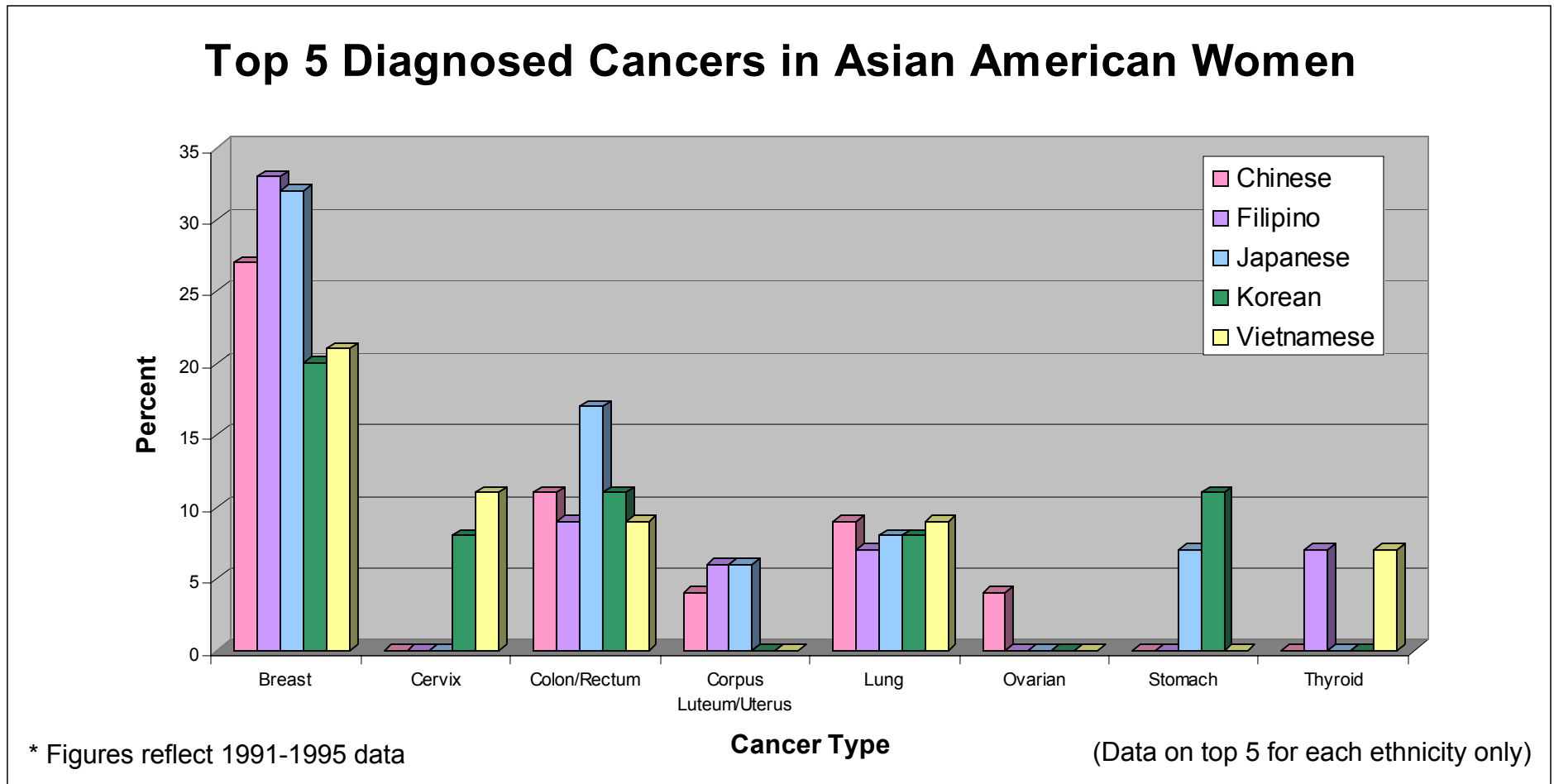
# Pesticides & Breast Cancer

- In the US, the average levels of DDE or DDT in breast milk ranged from 0.2 to 4.3 ppm (parts per million) prior to 1986.
- One component of the DDT that was sprayed, called "o,p'-DDT" was identified as an environmental estrogen 30 years ago.
- Breast milk can be a source of exposure to organochlorine pesticides in the breast-fed infant. Women who eat large amounts of fish may be at risk for bioaccumulation of DDT in their fatty tissues.
- The average levels of DDE or DDT in breast milk ranged from 0.2 to 4.3 ppm (parts per million) prior to 1986. DDT can also bioaccumulate in bottom-feeding fish, which eat plants and other aquatic life living in the sediment.
- Breast milk can be a source of exposure to organochlorine pesticides in the breast fed infant, if mothers fish from contaminated waters.



# Asian American Cancer Rates

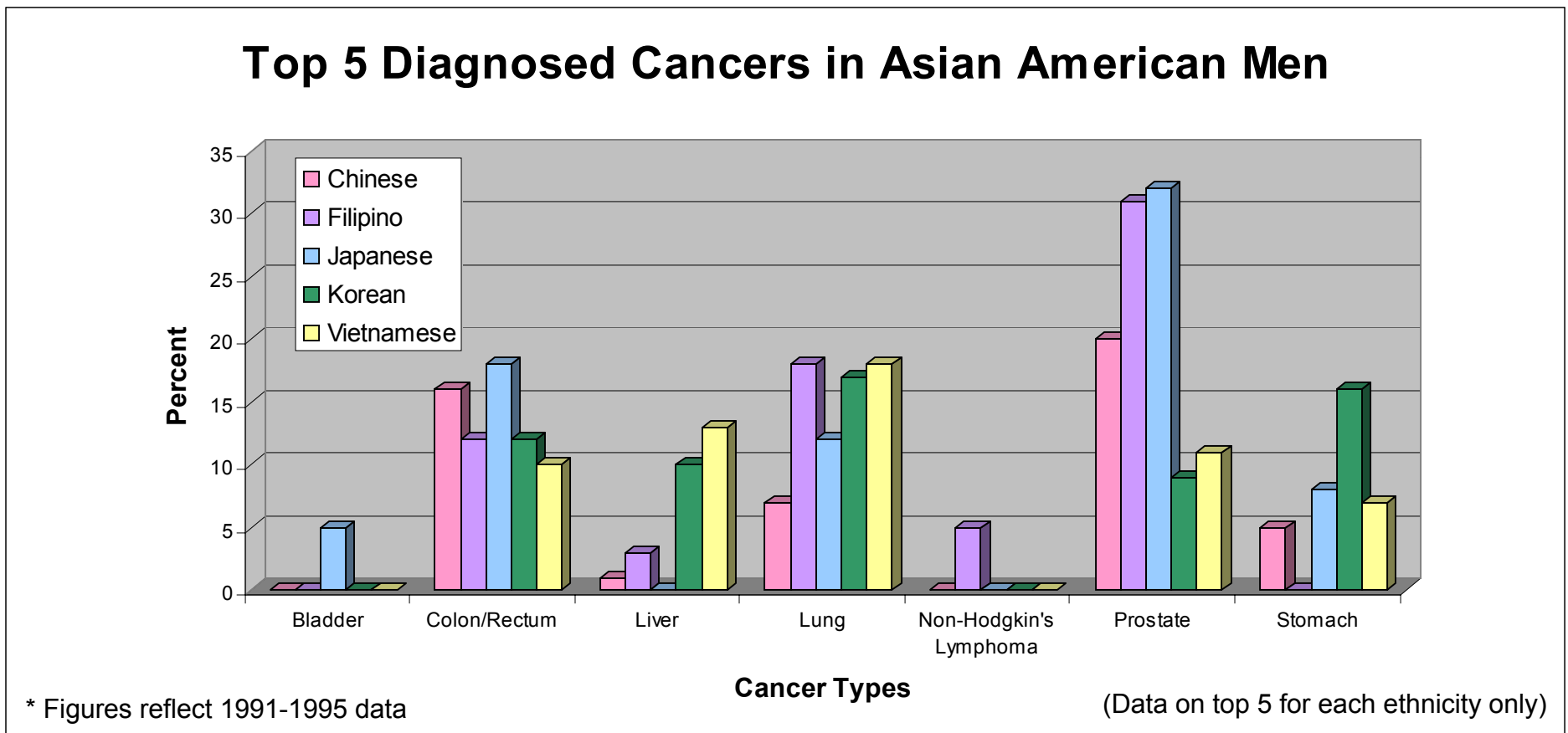
Cancer is the leading cause of death for API women in the United States (1994-1996).



Source: Data Evaluation and Publication Committee of the North American Association of Central Cancer Registries (1999)

# Asian American Cancer Rates

Cancer is the second leading cause of death for API men in the United States (1994-1996).



# Cancer Rates Among Children

- In the United States, cancer is the most common cause of disease-related mortality for children 1-19 years of age.
- The **overall cancer** incidence rate **increased** from the mid-1970s, but rates in the last decade have been **fairly stable**.
- Incidence of leukemia among children younger than 15 years old **moderately increased** (0.9%/year) in the past 20 years. Trend primarily reflects increase in **acute lymphoblastic leukemia**.
- **Central Nervous System** cancer rates **increased** from 1975-1995 (1.5%/year). It is unclear if this trend reflects environmental exposure or improved diagnostic techniques.
- The age-adjusted incidence rates for the category of **germ cell, trophoblastic and other gonadal neoplasm tumors** **increased** from 3.7 to 5.4 per million for children younger than 15 years of age (1975-1979 & 1990-1995), and from 8.5 to 12 per million for those younger than 20 years of age.



Source: EPA Office of Children's Health Protection (2002)

# Cancer Rates Among Children

- Among infants (age less than 1 year), average annual incidence rates per million for all cancer types combined increased 36% between 1976-1984 to 1986-1994. The National Cancer Institute cautions that this trend analysis may be confounded by changes in population characteristics, accuracy of census estimates, screening practices, diagnostic technology, morphology, classifications and case ascertainment.

(Source: USEPA, Office of Children's Health Protection)

- Even with current immunization practices, approximately 13,000 Asian/Pacific Islander children living in the US today are likely to become infected with Hepatitis B virus in the future, resulting in more than 600 deaths from liver cancer. (Source: API American Health Forum, 2001)

## Problems

- Asian Americans tend to see doctors as a last resort thus lowering their chances of detecting cancer at its earliest stages. Reticence is further compounded by cultural, linguistic, and health care provider barriers.

(Source: API American Health Forum, 2001)



# Environmental Exposure and Leukemia



Childhood leukemia rates are highest among Filipinos, followed by white Hispanics, non-Hispanic whites and blacks. (One-third of all childhood cancers are leukemias.)

According to the National Cancer Institute, “Established causes of leukemia include ionizing radiation (such as occurs from x-irradiation), certain drugs used in the treatment of cancer, and some chemicals (most notably benzene) used largely in industrial settings. It is suspected that many childhood leukemias may result from parental exposures before the time of conception or during early fetal development.”

# API Workers at Risk

## Garment/Textile Care

- Koreans, operating 40% of the dry cleaning businesses, may be exposed to perchloroethylene, petroleum, detergents, a variety of spotting agents, and additives, which are possible carcinogens, neurotoxins or irritants.

## Nail Care

- Vietnamese and Korean Americans comprise 33% and 6%, respectively, of nail care technicians are exposed to a variety of substances in an average 40-hr work week. These include methyl/ethyl methacrylate, ethyl ether, formaldehyde, methylene chloride, which have potentially adverse teratogenic, carcinogenic, and cardiovascular effects.

The EPA Design for the Environment Program works with industries to develop cleaner, safer alternative processes and/or products to reduce the potential risks to human health and the environment.

## Electronics Manufacturing

- 40% of microchip workers are Asian and Latino immigrant women
- Microchip workers in Silicon Valley have 1.4 times greater risk of miscarriage than other workers.
- Workers are exposed to glycol ethers, which are known to cause headaches, nausea, and nose bleeds and are suspected to increase the risk of miscarriage.
- Workers did not report concerns because they feared reprimands and could not read warning labels.

The Asian Immigrant Women Advocates (AIWA) teaches female Asian electronic workers English language skills, workplace health and safety, and legal rights under work labor laws.

# Environmental Risks in Asia

- Children throughout Asia are exposed to various chemical and biological contaminants including pesticides, solvents, polychlorinated biphenyls (PCBs), DDT and dioxins. Contaminated water and unsanitary living conditions result in diarrhea, malaria, dengue fever and a host of other diseases.
- In Bangladesh, 25,000,000 people are at risk of cancer, with 900,000 skin cancers expected from arsenic contamination in deep wells.
- Mercury, cadmium, and lead in fish for human consumption in the Philippines have exceeded standards by 4- to 30-fold because of ocean dumping of mine wastes just offshore.
- 23% of children 6-12 years old suffered from skin lesions secondary to pesticide exposure to PCBs in their living and play areas and from child labor in the agricultural fields. In general in Asia there has been little study of PCB exposure, primarily because of the cost of analytical measurements.

# Forming Plausible Hypotheses

How are biological variability, environmental exposure, and socio-economic/socio-cultural influences interrelated and manifested in the health disparities evident in Asian and Pacific Islander Americans?



# Forming Plausible Hypotheses

- **Biological variability**

- what biomarkers of disease risk distinguish Asians and Pacific Islanders from other races/ethnicities?
- what biomarkers determine clinical/ diagnostic and pharmacological measures to alleviate environmentally induced diseases for at-risk APIs?



- **Environmental exposure**

- how are APIs affected by occupational risk?
- which environmental factors are prevalent in API communities?
- are APIs increasingly susceptible to environmental exposure?
- are APIs disproportionately affected by environmental factors?

- **Co-risk factors**

- how does poverty affect health disparities?
- how do traditional and cultural practices (including diet, folk medicines, and imported products) contribute to health disparities?

# Role of Translational Research



- How can translational research alleviate data collection and outreach efforts to adequately overcome barriers to research in Asian and Pacific Islander American communities?
- How can translational research be effectively utilized by health care providers and community residents to help them make more informed decisions about their health and quality of life?

\* Translational research is the conversion of findings from basic, clinical or epidemiological environmental health science research into information, resources, or tools that can be applied by health care providers and community residents to improve public health outcomes in at-risk neighborhoods.

Source: National Institute of Environmental Health Sciences

# **Prioritizing Environmental Risk Assessment and Communication Activities**

- Collect age, gender and race/ethnicity specific data (disaggregate race/ethnic specific data into subpopulations e.g., Chinese, Filipino, Hmong, Indian, Native Hawaiian, Samoan, Vietnamese);
- Determine whether conditions/issues are related to environmental factors or genetic susceptibility;
- Develop short term and long term goals;
- Identify resource constraints; and
- Determine feasibility of initiating and implementing culturally sensitive programs.

# Emerging Trends in Asian and Pacific Islander Health Disparities and Their Implications for Environmental Risks Assessment

A Look at Asian and Pacific Islander American Communities

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